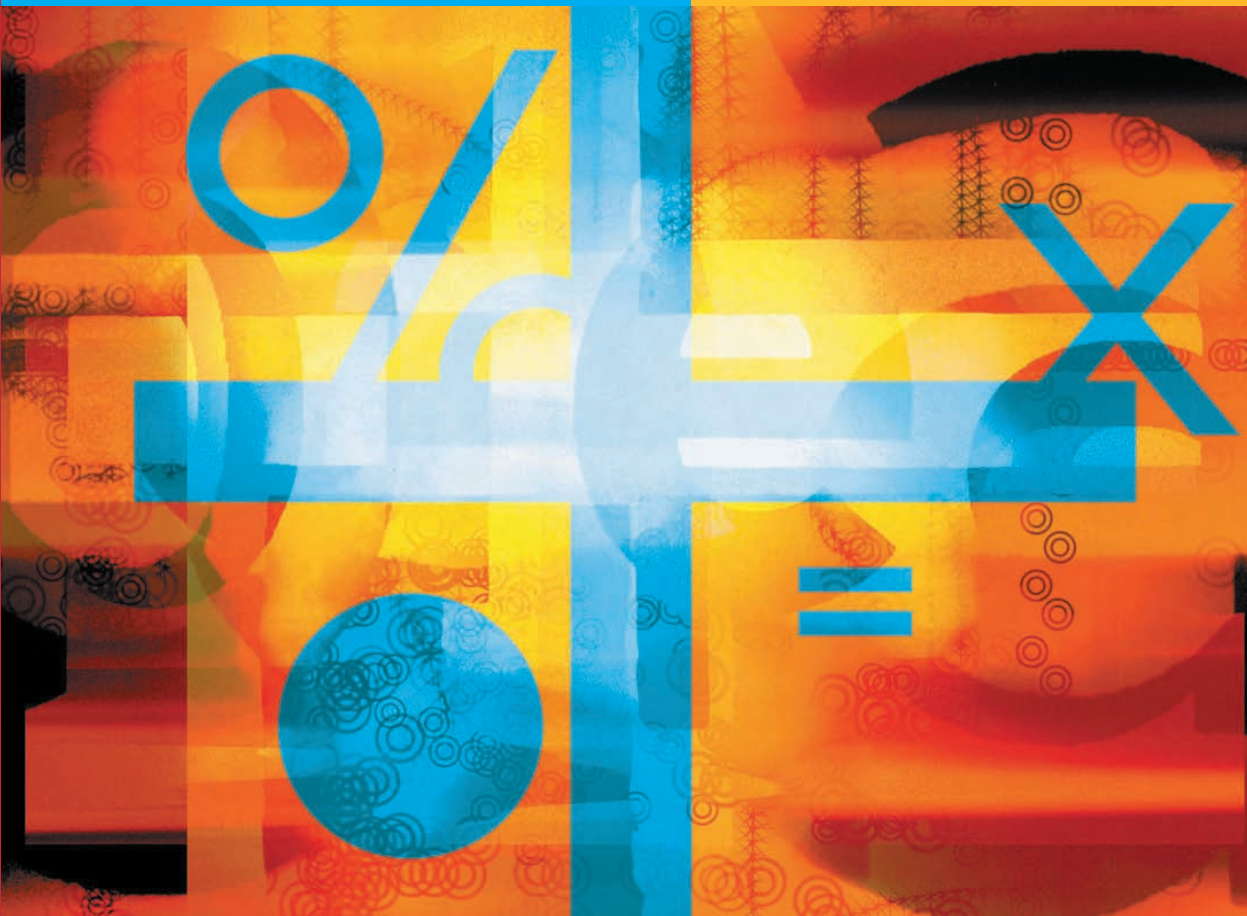




SADDLEBACK
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MATHEMATICS **for New Speakers** **of English**



A Supplemental Text for Beginning ELD Students



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A Supplemental Text for Beginning ELD Students

MATHEMATICS

for New Speakers of English



Three Watson
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Table of Contents

Chapter 1 Names of Numbers

1.1	NAMES OF NUMBERS	3
1.5	MORE NAMES OF NUMBERS	6
1.9	EVEN MORE NAMES OF NUMBERS	9
1.13	NUMBER PERIODS	12
1.18	NAMES OF DECIMAL FRACTIONS	16
1.22	NAMES OF FRACTIONS	19
1.27	VOCABULARY REVIEW	22
1.28	PRACTICE TEST	24

Chapter 2 Measurement

2.1	MEASURING WITH A RULER	29
2.7	LARGE AND SMALL MEASUREMENTS	34
2.11	UNDERSTANDING AREA	38
2.15	UNDERSTANDING VOLUME	41
2.19	ORIENTATION AND DIRECTION	44
2.23	TEMPERATURE	47
2.27	MEASURING TIME	50
2.31	MEASURING WEIGHT	53
2.35	MEASURING CAPACITY	55
2.39	VOCABULARY REVIEW	58
2.41	PRACTICE TEST	60

Chapter 3 Geometric Figures

3.1	GEOMETRIC SYMBOLS	65
3.4	MEASURING ANGLES	67
3.8	IDENTIFYING TRIANGLES	71
3.12	QUADRILATERALS	75
3.16	DRAWING FIGURES WITH A PROTRACTOR AND RULER	79
3.20	DRAWING SOLID FIGURES	82
3.25	CLASSIFYING SOLID FIGURES	84
3.28	VOCABULARY REVIEW	87
3.29	PRACTICE TEST	88

Chapter 4 Addition and Subtraction

4.1	ADDITION AND SUBTRACTION	93
4.5	ADDITION STORY PROBLEMS	96
4.9	ADDING MONEY	99
4.14	SUBTRACTION STORY PROBLEMS	102
4.20	GETTING CHANGE PROBLEMS	105
4.26	MIXED STORY PROBLEMS	108
4.28	VOCABULARY REVIEW	110
4.29	PRACTICE TEST	111

Chapter 5 Rounding and Estimating

5.1	ROUNDING TENS	117
5.6	ROUNDING BIG NUMBERS	119
5.11	ESTIMATING	123
5.16	ROUNDING DECIMAL FRACTIONS	124
5.21	ROUNDING IN MONEY PROBLEMS	127
5.26	VOCABULARY REVIEW	129
5.27	PRACTICE TEST	130

Chapter 6 Multiplication

6.1	Multiplication	135
6.6	Multiplication STORY PROBLEMS	138
6.10	UNITS STORY PROBLEMS	142
6.14	Multiplying DECIMAL FRACTIONS	145
6.18	Multiplication STORY PROBLEMS WITH MONEY	149
6.22	Multiplication IN PERCENT PROBLEMS	152
6.26	Using FORMULAS	155
6.30	MORE STORY PROBLEMS	157
6.32	VOCABULARY REVIEW	158
6.33	PRACTICE TEST	159

1.1 NAMES OF NUMBERS

Numbers have names. The names are easy to learn. We use numbers to count things. You will use numbers every day.

0
zero



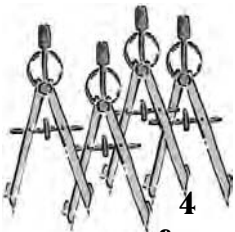
1
one



2
two



3
three



4
four



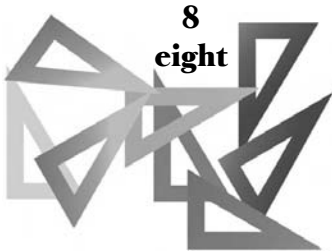
5
five



6
six



7
seven

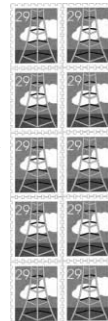


8
eight



9
nine

10
ten



1.2 ORAL PRACTICE

Say these words aloud.

1. seven
2. nine
3. four
4. three
5. two
6. five

7. eight
8. ten
9. ten
10. zero
11. one
12. six

13. two
14. five
15. eight
16. six
17. three
18. nine

19. zero
20. four
21. seven
22. ten
23. four
24. five

Names of Numbers

What are these numbers?



1.3 HOMEWORK

Set A: Spell out the name for the numeral.

- | | | | |
|------|--------|-------|--------|
| 1. 3 | 7. 6 | 13. 3 | 19. 9 |
| 2. 4 | 8. 0 | 14. 2 | 20. 10 |
| 3. 5 | 9. 1 | 15. 1 | 21. 4 |
| 4. 4 | 10. 10 | 16. 5 | 22. 0 |
| 5. 7 | 11. 7 | 17. 6 | 23. 3 |
| 6. 8 | 12. 9 | 18. 8 | 24. 5 |

Set B: Write the numeral.

- | | | | |
|-----------|-----------|-----------|-----------|
| 25. seven | 31. ten | 37. zero | 43. ten |
| 26. one | 32. three | 38. one | 44. six |
| 27. five | 33. six | 39. two | 45. eight |
| 28. two | 34. four | 40. seven | 46. one |
| 29. nine | 35. eight | 41. five | 47. two |
| 30. zero | 36. one | 42. nine | 48. zero |

Set C: Spell out the name for the numeral.

- | | | | |
|-------|--------|--------|-------|
| 49. 3 | 58. 6 | 67. 8 | 76. 3 |
| 50. 1 | 59. 10 | 68. 4 | 77. 1 |
| 51. 4 | 60. 5 | 69. 6 | 78. 0 |
| 52. 7 | 61. 1 | 70. 2 | 79. 6 |
| 53. 2 | 62. 0 | 71. 5 | 80. 2 |
| 54. 9 | 63. 7 | 72. 8 | 81. 9 |
| 55. 5 | 64. 10 | 73. 4 | 82. 3 |
| 56. 8 | 65. 9 | 74. 7 | 83. 0 |
| 57. 0 | 66. 3 | 75. 10 | 84. 9 |

Set D: Write the numeral.

- | | |
|------------|------------|
| 85. ten | 103. three |
| 86. seven | 104. ten |
| 87. four | 105. seven |
| 88. eight | 106. zero |
| 89. five | 107. one |
| 90. two | 108. five |
| 91. six | 109. ten |
| 92. four | 110. six |
| 93. eight | 111. nine |
| 94. zero | 112. zero |
| 95. eight | 113. three |
| 96. five | 114. nine |
| 97. nine | 115. two |
| 98. two | 116. six |
| 99. seven | 117. zero |
| 100. four | 118. one |
| 101. one | 119. three |
| 102. three | 120. nine |



1.4 VOCABULARY

Count
Homework
Number
Name
Oral
Practice
Problem
Say
Set
Write

Names of Numbers

1.5 MORE NAMES OF NUMBERS

Large numbers have names. Small numbers have names. You put the names together.

10 TEN

11 ELEVEN

12 TWELVE

13 THIRTEEN

14 FOURTEEN

15 FIFTEEN

16 SIXTEEN

17 SEVENTEEN

18 EIGHTEEN

19 NINETEEN

20 TWENTY

21 TWENTY-ONE

22 TWENTY-TWO

23 TWENTY-THREE

24 TWENTY-FOUR

25 TWENTY-FIVE

26 TWENTY-SIX

27 TWENTY-SEVEN

28 TWENTY-EIGHT

29 TWENTY-NINE

30 THIRTY

31 THIRTY-ONE

32 THIRTY-TWO

33 THIRTY-THREE

34 THIRTY-FOUR

35 THIRTY-FIVE

36 THIRTY-SIX

37 THIRTY-SEVEN

38 THIRTY-EIGHT

39 THIRTY-NINE

Some numbers have special names (10 to 19). Other numbers put the names together (20 to 99).

40 FORTY

50 FIFTY

60 SIXTY

70 SEVENTY

80 EIGHTY

90 NINETY

Big numbers look like this.

49 is **forty-nine**.

51 is **fifty-one**. **75** is **seventy-five**.

67 is **sixty-seven**. **84** is **eighty-four**.

99 is **ninety-nine**.

1.6 ORAL PRACTICE

Say these words aloud.

- | | | |
|------------------|------------------|------------------|
| 1. twelve | 7. thirty-six | 14. fifty-four |
| 2. sixty-three | 8. seventy-seven | 15. sixteen |
| 3. ninety-six | 9. thirty-two | 16. eighty-nine |
| 4. sixty-one | 10. eighty-three | 17. fifty-one |
| 5. seventy-eight | 11. twenty-eight | 18. ninety-seven |
| 6. twenty-nine | 12. fifty-seven | 19. thirty-eight |
| | 13. forty-eight | 20. eighty-three |

1.7 HOMEWORK

Set A: Spell out the name for the numeral.

- | | | |
|-------|--------|--------|
| 1. 15 | 9. 67 | 17. 51 |
| 2. 37 | 10. 89 | 18. 62 |
| 3. 52 | 11. 99 | 19. 73 |
| 4. 79 | 12. 1 | 20. 0 |
| 5. 91 | 13. 10 | 21. 88 |
| 6. 4 | 14. 28 | 22. 31 |
| 7. 25 | 15. 35 | 23. 83 |
| 8. 48 | 16. 49 | 24. 29 |

Set B: Write the numeral.

- | | | |
|------------------|------------------|------------------|
| 25. eighty-nine | 31. seventy-nine | 37. sixty-five |
| 26. sixty-two | 32. thirty-three | 38. thirty-one |
| 27. eleven | 33. eighty-six | 39. twenty-eight |
| 28. ninety-eight | 34. fifty-two | 40. fifteen |
| 29. seventy-six | 35. thirty-seven | 41. ninety-seven |
| 30. twenty-seven | 36. fifty-eight | 42. seventeen |

Set C: Spell out the name for the answer.

- | | | |
|-----------------|---------------------|---------------------|
| 43. $13 + 62 =$ | 53. $74 - 21 =$ | 63. $8 \times 9 =$ |
| 44. $46 + 29 =$ | 54. $45 - 13 =$ | 64. $6 \times 7 =$ |
| 45. $38 + 52 =$ | 55. $75 - 18 =$ | 65. $4 \times 12 =$ |
| 46. $79 + 12 =$ | 56. $99 - 45 =$ | 66. $3 \times 15 =$ |
| 47. $84 + 9 =$ | 57. $88 - 32 =$ | 67. $21 \div 3 =$ |
| 48. $17 + 24 =$ | 58. $23 - 11 =$ | 68. $48 \div 3 =$ |
| 49. $56 + 32 =$ | 59. $82 - 49 =$ | 69. $50 \div 2 =$ |
| 50. $23 + 47 =$ | 60. $43 - 37 =$ | 70. $93 \div 3 =$ |
| 51. $63 + 22 =$ | 61. $19 \times 3 =$ | 71. $100 \div 5 =$ |
| 52. $51 - 37 =$ | 62. $23 \times 3 =$ | 72. $120 \div 4 =$ |

Names of Numbers

INCAN NUMBERS



the INCAS lived in south america. they had NO alphabet OR numbers. they used strings with knots to count things. a string was called a quipu .

each town had quipucamayocs, the knotkeepers. they kept the records of the town.

the quipus counted people. they counted taxes. they divided people into groups to work.

the INCAS had a big empire. it was very organized even though it had NO writing.

Set D: Write the numeral.

73. 85	99. 96
74. 11	100. 24
75. 9	101. 35
76. 79	102. 89
77. 20	103. 10
78. 36	104. 20
79. 24	105. 83
80. 67	106. 74
81. 3	107. 36
82. 12	108. 15
83. 58	109. 27
84. 43	110. 0
85. 4	111. 91
86. 45	112. 30
87. 6	113. 41
88. 92	114. 82
89. 10	115. 12
90. 44	116. 14
91. 5	117. 73
92. 75	118. 5
93. 5	119. 19
94. 86	120. 74
95. 16	121. 9
96. 77	122. 85
97. 1	123. 36
98. 89	124. 77

1.8 VOCABULARY

Answer
Big
Large
Look
Say
Small
Special
Together

1.9 EVEN MORE NAMES OF NUMBERS

Very large numbers have names. Use the names of small numbers and large numbers.

<u>100</u>	<u>ONE HUNDRED</u>
<u>200</u>	<u>TWO HUNDRED</u>
<u>300</u>	<u>THREE HUNDRED</u>
<u>400</u>	<u>FOUR HUNDRED</u>
<u>500</u>	<u>FIVE HUNDRED</u>
<u>600</u>	<u>SIX HUNDRED</u>
<u>700</u>	<u>SEVEN HUNDRED</u>
<u>800</u>	<u>EIGHT HUNDRED</u>
<u>900</u>	<u>NINE HUNDRED</u>
<u>101</u>	<u>ONE HUNDRED ONE</u>
<u>102</u>	<u>ONE HUNDRED TWO</u>
<u>110</u>	<u>ONE HUNDRED TEN</u>
<u>111</u>	<u>ONE HUNDRED ELEVEN</u>
<u>120</u>	<u>ONE HUNDRED TWENTY</u>
<u>121</u>	<u>ONE HUNDRED TWENTY-ONE</u>
<u>142</u>	<u>ONE HUNDRED FORTY-TWO</u>

All numbers have names. Even the largest numbers have names.

<u>1,000</u>	<u>ONE THOUSAND</u>
<u>1,100</u>	<u>ONE THOUSAND ONE HUNDRED</u>
<u>1,143</u>	<u>ONE THOUSAND ONE HUNDRED FORTY-THREE</u>
<u>2,000</u>	<u>TWO THOUSAND</u>
<u>3,000</u>	<u>THREE THOUSAND</u>
<u>10,000</u>	<u>TEN THOUSAND</u>
<u>20,000</u>	<u>TWENTY THOUSAND</u>
<u>23,000</u>	<u>TWENTY-THREE THOUSAND</u>
<u>37,405</u>	<u>THIRTY-SEVEN THOUSAND FOUR HUNDRED FIVE</u>
<u>100,000</u>	<u>ONE HUNDRED THOUSAND</u>
<u>200,000</u>	<u>TWO HUNDRED THOUSAND</u>

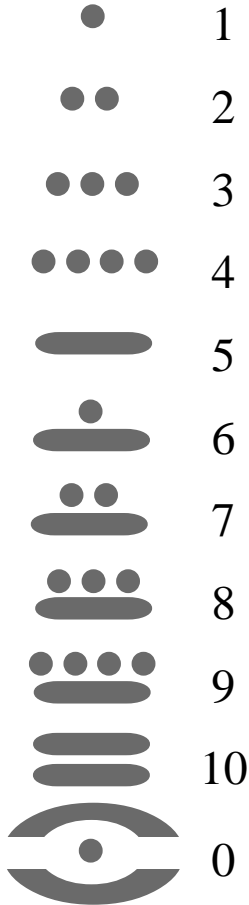
Millions, billions, and trillions are the biggest numbers that we use.

<u>1,000,000</u>	<u>ONE MILLION</u>
<u>2,000,000</u>	<u>TWO MILLION</u>
<u>1,000,000,000</u>	<u>ONE BILLION</u>
<u>1,000,000,000,000</u>	<u>ONE TRILLION</u>

Names of Numbers

MAYAN NUMBERS

THE ANCIENT MAYANS OF CENTRAL AMERICA WERE ONE OF THE FEW CULTURES TO INVENT THE ZERO.



1.10 ORAL PRACTICE

Say these numerals aloud.

- | | |
|-----------|--------------------|
| 1. 673 | 12. 5,566 |
| 2. 427 | 13. 57,763 |
| 3. 2,785 | 14. 453 |
| 4. 8,933 | 15. 4,891 |
| 5. 5,887 | 16. 312,356 |
| 6. 34,174 | 17. 450,000 |
| 7. 34,502 | 18. 676,905 |
| 8. 16,760 | 19. 4,200,000 |
| 9. 6,691 | 20. 3,600,500,210 |
| 10. 786 | 21. 17,323,678,212 |
| 11. 32 | |

Say the answer aloud.

22. $482 + 274 =$
23. $379 + 492 =$
24. $127 + 510 =$
25. $517 + 115 =$
26. $850 + 753 =$
27. $749 + 891 =$
28. $627 + 649 =$
29. $245 + 381 =$
30. $253 - 59 =$
31. $748 - 525 =$
32. $612 - 374 =$
33. $374 - 127 =$
34. $892 - 651 =$
35. $581 - 419 =$
36. $275 - 116 =$

1.11 VOCABULARY

All
For
Largest
These
Very
Word
You

1.12 HOMEWORK
Set A: Spell out the name for the numeral.

- | | | |
|-----------|------------|-------------------|
| 1. 23 | 7. 12,500 | 13. 3,333 |
| 2. 657 | 8. 16,980 | 14. 2,890 |
| 3. 2,345 | 9. 6,891 | 15. 112,379 |
| 4. 7,930 | 10. 599 | 16. 675,985 |
| 5. 5,899 | 11. 21,763 | 17. 3,500,000 |
| 6. 34,544 | 12. 5,876 | 18. 6,300,575,200 |

Set B: Write the numeral.

19. two hundred forty-seven
20. three hundred twenty-three
21. two thousand four hundred
22. six thousand eight hundred sixty-seven
23. twelve thousand four hundred thirty-two
24. three hundred seventy thousand
25. four million five hundred sixty thousand
26. twelve million fifty thousand six hundred

Set C: What is the answer? Spell out the name for the numeral.

- | | | |
|-------------------|-------------------|-------------------|
| 27. $119 + 733 =$ | 33. $228 + 451 =$ | 39. $315 - 102 =$ |
| 28. $441 + 671 =$ | 34. $693 + 254 =$ | 40. $653 - 400 =$ |
| 29. $708 + 194 =$ | 35. $937 + 966 =$ | 41. $376 - 89 =$ |
| 30. $181 + 282 =$ | 36. $639 - 569 =$ | 42. $560 - 137 =$ |
| 31. $550 + 343 =$ | 37. $464 - 308 =$ | 43. $922 - 598 =$ |
| 32. $802 + 820 =$ | 38. $740 - 175 =$ | 44. $874 - 724 =$ |

Set D: Spell out the name for the numeral.

- | | | |
|---------|------------|---------------|
| 45. 481 | 55. 8,571 | 65. 785,711 |
| 46. 527 | 56. 2,497 | 66. 324,978 |
| 47. 178 | 57. 3,682 | 67. 236,820 |
| 48. 212 | 58. 2,864 | 68. 928,645 |
| 49. 664 | 59. 1,053 | 69. 410,536 |
| 50. 709 | 60. 39,859 | 70. 1,470,967 |
| 51. 195 | 61. 52,004 | 71. 3,119,588 |
| 52. 353 | 62. 41,961 | 72. 6,235,305 |
| 53. 900 | 63. 63,725 | 73. 2,590,079 |
| 54. 436 | 64. 74,836 | 74. 4,343,690 |

Names of Numbers

Set E: Write the numeral.

75. three hundred eighty-one
76. six hundred twenty-six
77. two thousand five hundred thirty-four
78. five thousand one hundred one
79. one thousand six hundred eighty-three
80. forty-nine thousand nine hundred fifty-nine
81. seventy thousand two hundred twenty-one
82. eight hundred seventy thousand one hundred seven
83. nine hundred forty-seven thousand fifty-nine
84. three million five hundred three thousand eight hundred

1.13 NUMBER PERIODS

The number system is organized into periods. Each period has three digits. A digit is a number with a place value.

Billions Period			Millions Period			Thousands Period			Ones Period	
Hundred Billions			Hundred Millions			Hundred Thousands			TENS	
Ten Billions			Ten Millions			Ten Thousands			Hundreds	
Billions			Millions			Thousands			ONES	

We use commas in numbers. They help us read numbers.

Examples:

1,247

The first comma tells us "thousands".

12,498,794

The second comma tells us "millions".

1.14 ORAL PRACTICE

What is the place value of the digit "3"?

- | | |
|-----------|-------------------|
| 1. 2,300 | 9. 42,736 |
| 2. 12,803 | 10. 324,248 |
| 3. 30,002 | 11. 632,569 |
| 4. 15,235 | 12. 395,470 |
| 5. 13,200 | 13. 3,802,468 |
| 6. 12,573 | 14. 34,913,574 |
| 7. 3,789 | 15. 3,257,456,908 |
| 8. 29,365 | |

1.15 HOMEWORK

Set A: Add commas to these numbers.

- | | |
|-----------|--------------|
| 1. 7016 | 9. 399449 |
| 2. 3638 | 10. 2829206 |
| 3. 6750 | 11. 4917184 |
| 4. 14271 | 12. 4005062 |
| 5. 902492 | 13. 53303178 |
| 6. 51613 | 14. 86484959 |
| 7. 857267 | 15. 27565730 |
| 8. 108358 | |

Set B: What is the place value of the digit "4"?

- | | |
|---------------|---------------------|
| 16. 60,040 | 26. 456,900 |
| 17. 13,304 | 27. 148,987 |
| 18. 99,400 | 28. 4,560,333 |
| 19. 124,000 | 29. 2,843,987 |
| 20. 400,000 | 30. 34,985,003 |
| 21. 2,340,000 | 31. 4,999,000,000 |
| 22. 1,240 | 32. 345,125,967,876 |
| 23. 4,500 | 33. 411,555,000,000 |
| 24. 5,400 | 34. 735,458,200 |
| 25. 400,001 | |

BABYLONIAN NUMBERS

THE BABYLONIANS WROTE IN SOFT CLAY WITH A POINTED STICK. THE MARKS THEY MADE LOOKED LIKE THIS IN THE CLAY.

1

2

3

4

5

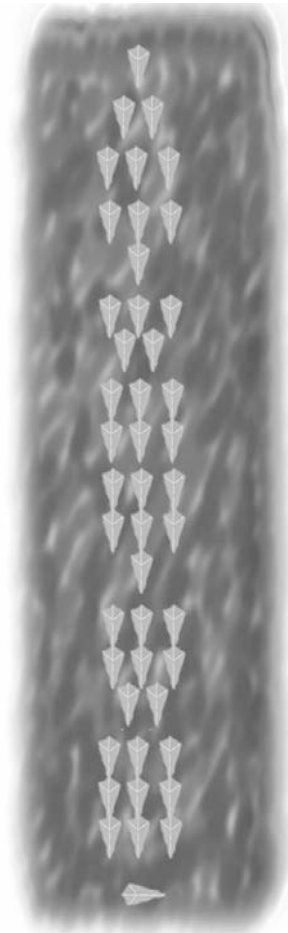
6

7

8

9

10



Names of Numbers

Set C: What is the place value of the digit "5"?

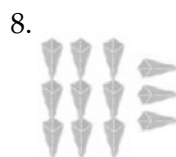
- | | | |
|----------------|------------|---------------------|
| 35. 5 | 43. 4,567 | 51. 5,679,000 |
| 36. 53 | 44. 5,678 | 52. 4,567,098 |
| 37. 512 | 45. 3,657 | 53. 43,257,098 |
| 38. 5,212 | 46. 2,115 | 54. 53,980,000 |
| 39. 53,980 | 47. 12,567 | 55. 512,789,342 |
| 40. 513,876 | 48. 13,657 | 56. 5,123,876,000 |
| 41. 5,234,678 | 49. 15,789 | 57. 53,986,000,000 |
| 42. 53,673,000 | 50. 53,467 | 58. 534,000,000,000 |

Set D: What is the place value of the digit "1"?


- | | | |
|------------|-------------|-------------------|
| 59. 123 | 67. 21,345 | 75. 1,234,567 |
| 60. 213 | 68. 23,145 | 76. 2,314,567 |
| 61. 321 | 69. 23,415 | 77. 2,345,167 |
| 62. 1,234 | 70. 23,451 | 78. 12,345,678 |
| 63. 2,134 | 71. 123,456 | 79. 23,415,678 |
| 64. 3,214 | 72. 213,456 | 80. 213,456,789 |
| 65. 4,321 | 73. 234,561 | 81. 921,345,678 |
| 66. 12,345 | 74. 234,515 | 82. 1,234,567,890 |

1.16 CHALLENGE

Change these symbols from the Mayans and Babylonians into numbers.



Do these problems. Write the answers in the same numerals:
Mayan or Babylonian.

9. 

12. 

10. 

13. 

11. 

14. 

1.17 VOCABULARY

Clay
Comma
Digit
Example
First
Mark
Number System
Numeral
Organized
Period
Place Value
Second
Soft
Stick
Tell

Names of Numbers

1.18 NAMES OF DECIMAL FRACTIONS

We use periods in numbers. A period is called a decimal point. It tells us "decimal fractions." Look at this number.

12.3 (twelve and three tenths)

The word "**and**" is read for the decimal point.

Each place in a number has a name.

The names of decimal fractions are like the names of big numbers.

tens 23.4 **tenths**

twenty-three and four tenths

hundreds 734.83 **hundredths**

seven hundred thirty-four and eighty-three hundredths

thousands 2,304.014 **thousandths**

two thousand three hundred four and fourteen thousandths

The names of decimal fractions are easy to remember. You add a "th" to each place name. This is a decimal fraction place name.

0.1

ONE TENTH

0.01

ONE HUNDREDTH

0.001

ONE THOUSANDTH

0.0001

ONE TEN THOUSANDTH

0.00001

ONE HUNDRED THOUSANDTH

0.000001

ONE MILLIONTH

1.19 ORAL PRACTICE

Say these words aloud with your teacher.

1. 4.3

6. 73.43

11. 25.15

16. 1.001

2. 17.01

7. 299.16

12. 3.125

17. 129.039

3. 15.39

8. 988.02

13. 19.015

18. 1.111

4. 239.95

9. 625.13

14. 16.999

19. 12.563

5. 125.25

10. 199.9

15. 0.238

20. 1,467.053

HOMEWORK

Set A: Write the names for these numerals.

- | | |
|--------------|------------|
| 1. 15.4 | 11. 4.9 |
| 2. 21.7 | 12. 6.19 |
| 3. 125.5 | 13. 5.13 |
| 4. 99.6 | 14. 7.235 |
| 5. 2.2 | 15. 9.6 |
| 6. 0.1 | 16. 5.35 |
| 7. 39.9 | 17. 12.5 |
| 8. 25.3 | 18. 45.65 |
| 9. 1,325.8 | 19. 77.77 |
| 10. 75,500.5 | 20. 19.125 |

Set B: What is the place value of the digit "6"?

- | | |
|---------------|------------|
| 21. 63.09 | 31. 12.465 |
| 22. 19.614 | 32. 26.01 |
| 23. 125.6 | 33. 32.62 |
| 24. 986.34 | 34. 4.756 |
| 25. 500.46 | 35. 53.61 |
| 26. 1,650.013 | 36. 61.99 |
| 27. 23.061 | 37. 7.406 |
| 28. 165.2 | 38. 863.01 |
| 29. 673.34 | 39. 9.642 |
| 30. 2,578.056 | 40. 18.76 |

Set C: Spell out the name for the numeral.

- | | |
|-----------|---------------|
| 41. 13.6 | 51. 971.33 |
| 42. 53.8 | 52. 375.48 |
| 43. 24.2 | 53. 588.90 |
| 44. 44.7 | 54. 782.14 |
| 45. 35.3 | 55. 896.29 |
| 46. 66.52 | 56. 1,037.503 |
| 47. 76.48 | 57. 6,949.648 |
| 48. 21.95 | 58. 9,000.759 |
| 49. 45.06 | 59. 2,798.162 |
| 50. 82.17 | 60. 1,001.271 |

GREEK NUMBERS

THE ANCIENT GREEKS USED THE LETTERS OF THEIR ALPHABET FOR NUMBERS. THE BAR ON TOP OF THE LETTER MEANT THAT IT WAS A NUMBER INSTEAD OF A WORD.

Ᾱ	1	Ῑ	9	Ρ̄	80
Β̄	2	Κ̄	10	Σ̄	90
Γ̄	3	Λ̄	20	Τ̄	100
Δ̄	4	Μ̄	30	Ῡ	200
Ε̄	5	Ν̄	40	Φ̄	300
Ζ̄	6	Ξ̄	50	Χ̄	400
Η̄	7	Ο̄	60	Ψ̄	500
Θ̄	8	Π̄	70	Ω̄	600

Names of Numbers

Set D: What is the place value of the digit "5"?

61. 10.5	66. 61.51	71. 15.081	76. 35.13
62. 410.5	67. 826.25	72. 56.71	77. 7.652
63. 5.36	68. 74.735	73. 262.5	78. 474.5
64. 2.25	69. 9.395	74. 5.83	79. 88.54
65. 34.5	70. 508.4	75. 9.945	80. 509.4

Set E: Spell out the name for the numeral.

81. 0.9	91. 0.47	101. 8.69	111. 70.15
82. 0.7	92. 0.61	102. 9.22	112. 83.47
83. 0.6	93. 0.89	103. 1.31	113. 284.1
84. 0.5	94. 1.9	104. 2.43	114. 518.3
85. 0.1	95. 5.1	105. 4.58	115. 426.5
86. 0.2	96. 6.2	106. 61.1	116. 295.96
87. 0.31	97. 2.4	107. 74.4	117. 406.18
88. 0.42	98. 4.5	108. 32.6	118. 638.39
89. 8.85	99. 3.3	109. 55.5	119. 984.45
90. 0.35	100. 7.17	110. 83.2	120. 101.07

1.20 PLACE NAME CHART

Copy this chart and fill in the place names.

5, 4 8 9, 3 6 8. 7 9 0 1 5										
				hundreds	tens	ones	tenths	hundredths		

1.21 VOCABULARY

Add
And
Decimal fraction
Decimal point
Easy
Place
Read
Remember
Teacher
With

1.22 NAMES OF FRACTIONS

Fractions are parts of numbers. Each fraction has a name. Many names are easy to make. Some fractions have special names.

Each part of a fraction has a name. The parts are called the numerator and the denominator.

$$\frac{2}{3}$$

numerator
denominator

The name of a fraction is two words. First, you say the numerator. It is a number. Then you say the denominator. It is a special name.

<u>fraction</u>	<u>numerator</u>	<u>denominator</u>	<u>name</u>
1/2	one	half	one-half
1/3	one	third	one-third
2/3	two	third	two-thirds
1/4	one	fourth	one-fourth
4/5	four	fifth	four-fifths
5/6	five	sixth	five-sixths
2/7	two	seventh	two-sevenths
7/8	seven	eighth	seven-eighths
5/9	five	ninth	five-ninths
9/10	nine	ten	nine-tenths
7/11	seven	eleventh	seven-elevenths
5/12	five	twelfth	five-twelfths

Names of Numbers

The names of the denominators are easy to make. Most of them have a "th" after the name of the number. Some are special. The special ones are: half, third, fifth, eighth, ninth, and twelfth.

1.23 ORAL PRACTICE

Say these words aloud with your teacher.

- | | |
|-----------|------------|
| 1. $3/8$ | 11. $2/6$ |
| 2. $1/9$ | 12. $6/10$ |
| 3. $6/8$ | 13. $7/12$ |
| 4. $1/2$ | 14. $1/4$ |
| 5. $2/5$ | 15. $2/3$ |
| 6. $3/7$ | 16. $7/8$ |
| 7. $3/4$ | 17. $9/11$ |
| 8. $5/6$ | 18. $1/3$ |
| 9. $9/10$ | 19. $3/5$ |
| 10. $2/7$ | 20. $6/7$ |

1.24 HOMEWORK

Set A: Spell out the name for each of these fractions.

- | | | |
|----------|------------|------------|
| 1. $1/2$ | 9. $5/6$ | 17. $9/11$ |
| 2. $2/5$ | 10. $9/10$ | 18. $2/6$ |
| 3. $3/7$ | 11. $2/7$ | 19. $6/10$ |
| 4. $1/3$ | 12. $3/8$ | 20. $7/12$ |
| 5. $3/5$ | 13. $1/9$ | 21. $1/4$ |
| 6. $6/7$ | 14. $6/8$ | 22. $1/5$ |
| 7. $7/9$ | 15. $2/3$ | 23. $1/6$ |
| 8. $3/4$ | 16. $7/8$ | 24. $5/7$ |

Set B: Spell out the name for each of these fractions.

- | | | |
|------------|------------|------------|
| 25. $2/7$ | 33. $5/9$ | 41. $9/10$ |
| 26. $3/5$ | 34. $1/4$ | 42. $5/7$ |
| 27. $7/10$ | 35. $7/8$ | 43. $2/9$ |
| 28. $1/2$ | 36. $4/5$ | 44. $3/4$ |
| 29. $2/3$ | 37. $1/9$ | 45. $2/5$ |
| 30. $3/8$ | 38. $4/7$ | 46. $1/3$ |
| 31. $1/5$ | 39. $7/9$ | 47. $5/8$ |
| 32. $5/6$ | 40. $1/10$ | 48. $1/6$ |

ROMAN NUMERALS

THE ROMANS USED LETTERS FOR NUMBERS.

I = 1	L = 50
II = 2	LX = 60
III = 3	LXX = 70
IV = 4	LXXX = 80
V = 5	XC = 90
VI = 6	C = 100
VII = 7	D = 500
VIII = 8	M = 1,000
IX = 9	\overline{V} = 5,000
X = 10	\overline{X} = 10,000
XX = 20	\overline{C} = 100,000
XXX = 30	\overline{D} = 500,000
XL = 40	\overline{M} = 1,000,000

Can you change these numbers into our numbers?

- | | |
|-----------------------|------------|
| 1. XXIII | 2. LIX |
| 3. CXXV | 4. CC |
| 5. DCCLXXIV | 6. MCCLIX |
| 7. MCMXCII | 8. MMD |
| 9. \overline{D} DLV | 10. CMXCIX |

49. 3/10

50. 1/7

51. 3/7

52. 6/7

53. 1/8

54. 8/9

55. 1/2

56. 5/6

57. 4/5

58. 7/9

59. 9/10

60. 3/4

61. 1/3

62. 3/10

63. 3/7

64. 6/7

1.25 VOCABULARY

Denominator

Fraction

Numerator

Part

1.26 CHALLENGE

Change these into fractions.

1.



5.



9.



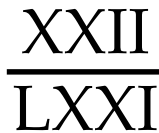
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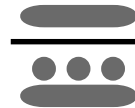
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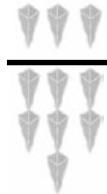
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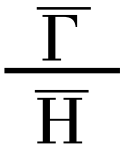
10.



14.



3.



7.



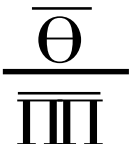
11.



15.



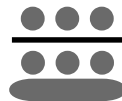
4.



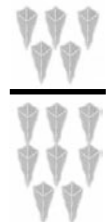
8.



12.



16.



1.27 CHAPTER 1 VOCABULARY REVIEW

Use these words to answer the questions and problems below. Look up unfamiliar words in the dictionary. There might be more than one correct answer.

add	fifty	numerator	special
all	first	one	teacher
also	five	oral	tell
and	for	organized	ten
answer	forty	part	tenth
big	four	period	ten thousand
biggest	fourteen	place	these
billion	fourth	place value	third
called	fraction	practice	thirteen
comma	half	problem	thirty
count	homework	read	thousand
decimal	hundred	remember	thousandth
decimal point	hundredth	same	three
denominator	large	say	together
digit	largest	second	trillion
easy	look	seven	twelfth
eight	million	seventeen	twelve
eighteen	name	seventh	twenty
eighth	nine	seventy	two
eighty	nineteen	set	use
eleven	ninth	six	very
eleventh	ninety	sixteen	with
example	number	sixth	word
fifteen	system	sixty	write
fifth	numeral	small	you
			zero

What is the answer? Spell out the name for the numeral using the words above. There might be more than one correct answer.

- $4 + 3 =$
- $7 + 2 =$
- $8 + 2 =$
- $12 - 4 =$
- $16 - 2 =$
- $7 \times 3 =$
- $2 \times 9 =$
- $6 \times 8 =$
- $5 \times 11 =$
- $100 \div 2 =$
- $84 \div 4 =$
- $48 \div 2 =$
- $112 + 48 =$
- $56 + 47 =$
- $936 - 437 =$

Names of Numbers

- | | |
|----------------------------|---------------------------|
| 16. 1,000 = one _____ | 24. 0.8 = _____ |
| 17. 1,000,000 = _____ | 25. 1.2 = _____ and _____ |
| 18. 43 = _____ - _____ | 26. 0.25 = _____ |
| 19. 79 = _____ - _____ | 27. 14 = _____ |
| 20. 127 = _____ - _____ | 28. 40 = _____ |
| 21. $1/2$ = one - _____ | 29. 414 = _____ |
| 22. $2/3$ = _____ - _____ | 30. 440 = _____ |
| 23. $1/11$ = _____ - _____ | |

31. A _____ helps us read the name of a very big number.
32. The names of _____ numbers go together to make the names of large numbers.
33. In a number, a period is called a _____ .
34. The number 0.87 is called a _____ .
35. The number $2/3$ is called a _____ .
36. We use _____ to count things.
37. The number system is organized into _____. (Hint: See page 12)
38. Fractions are _____ of numbers.
39. The parts of a fraction are called the _____ and the _____ .
40. Spell out the name of $2/3$ _____ - _____ .
41. Spell out the name of 0.5 _____ .
42. Spell out the name of 47 _____ - _____ .
43. Spell out the name of 198 _____ .
44. Spell out the name of 1,275 is _____ .
45. Spell out the name of 2,345,777 _____ .

1.28 CHAPTER 1 PRACTICE TEST

Directions: Circle the correct answer.

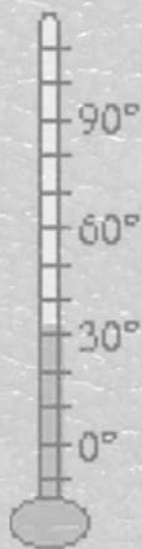
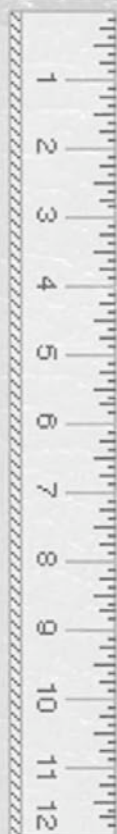
1. The number 9 is spelled:
 - a. eight
 - b. nine
 - c. four
 - d. zero
2. The number 14 is spelled:
 - a. forty
 - b. ten four
 - c. fourteen
 - d. one four
3. The number 90 is spelled:
 - a. ten-nine
 - b. nineteen
 - c. ninety
 - d. ninety-one
4. The number for sixty is:
 - a. 61
 - b. 60
 - c. 16
 - d. 6
5. The number 217 is spelled:
 - a. two seventeen
 - b. two hundred seventy
 - c. twenty one seven
 - d. two hundred seventeen
6. The number for four hundred seven is:
 - a. 407
 - b. 417
 - c. 470
 - d. 4007
7. The number for twenty-one thousand seven hundred sixty-three is:
 - a. 21,763
 - b. 217,63
 - c. 21763
 - d. 2,176.3
8. The number in the hundreds place in 3,748.5901 is:
 - a. 0
 - b. 7
 - c. 4
 - d. 9
9. The number in the ten thousands place in 5,789,001 is:
 - a. 9
 - b. 8
 - c. 7
 - d. 5
10. Which is the largest?
 - a. one million
 - b. one billion
 - c. one thousand
 - d. one trillion
11. Where do the commas go in 84321748?
 - a. 84321,748
 - b. 843,21,748
 - c. 84,321,748
 - d. 8,43,21,748
12. What is the place value of the digit "3" in 7,385,700?
 - a. hundred thousands
 - b. ten thousands
 - c. thousands
 - d. millions

13. The name of the "." in the number 23.17 is:
- decimal fraction
 - decimal point
 - period
 - tenths
14. What is the place value of the digit "5" in 3,467.35
- hundreds
 - hundredths
 - tens
 - tenths
15. What is the number for two and three hundredths?
- 0.23
 - 2.3
 - 2.03
 - 2.003
16. Which number is largest?
- 6.75985
 - 6,759.85
 - 675.985
 - 67,598.5
17. The name of $\frac{2}{3}$ is:
- two-threes
 - half-threes
 - two-thirds
 - three-half
18. The 3 in the number $\frac{1}{3}$ is called a:
- fraction
 - numerator
 - denominator
 - decimal
19. What is the number for three-sevenths?
- $\frac{3}{7}$ ths
 - $\frac{7}{3}$ ths
 - $\frac{7}{3}$
 - $\frac{3}{7}$
20. What is the fraction for IV/IX?
- $\frac{4}{11}$
 - $\frac{4}{9}$
 - $\frac{5}{10}$
 - $\frac{6}{11}$

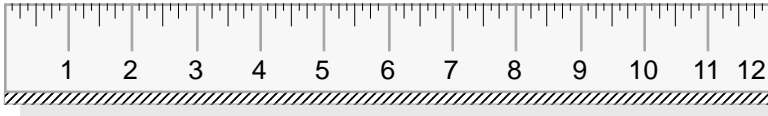
Chapter 2



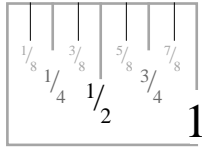
Measurement



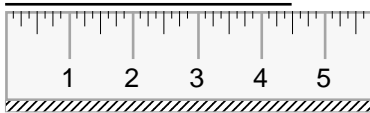
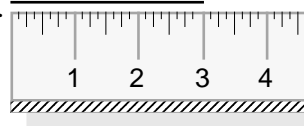
2.1 MEASURING WITH A RULER



This is a one foot ruler. It is twelve inches long. We use it to measure the length of things. Each inch is divided into fractions. Some of the fractions are: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, and $\frac{7}{8}$.

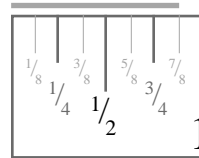


We use rulers to measure length.
This line is 3 inches long. We also write 3".



This one is $4\frac{1}{2}$ inches long.

This line is $\frac{7}{8}$ of an inch long.



2.2 PRACTICE

Use your ruler to measure these lines.

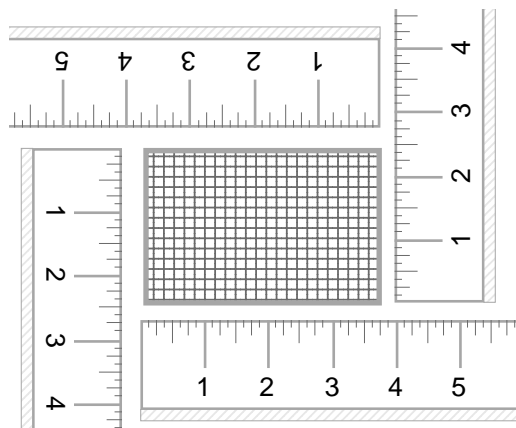
- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Measurement

A rectangle has four sides.

Rectangle

We can measure all four sides.



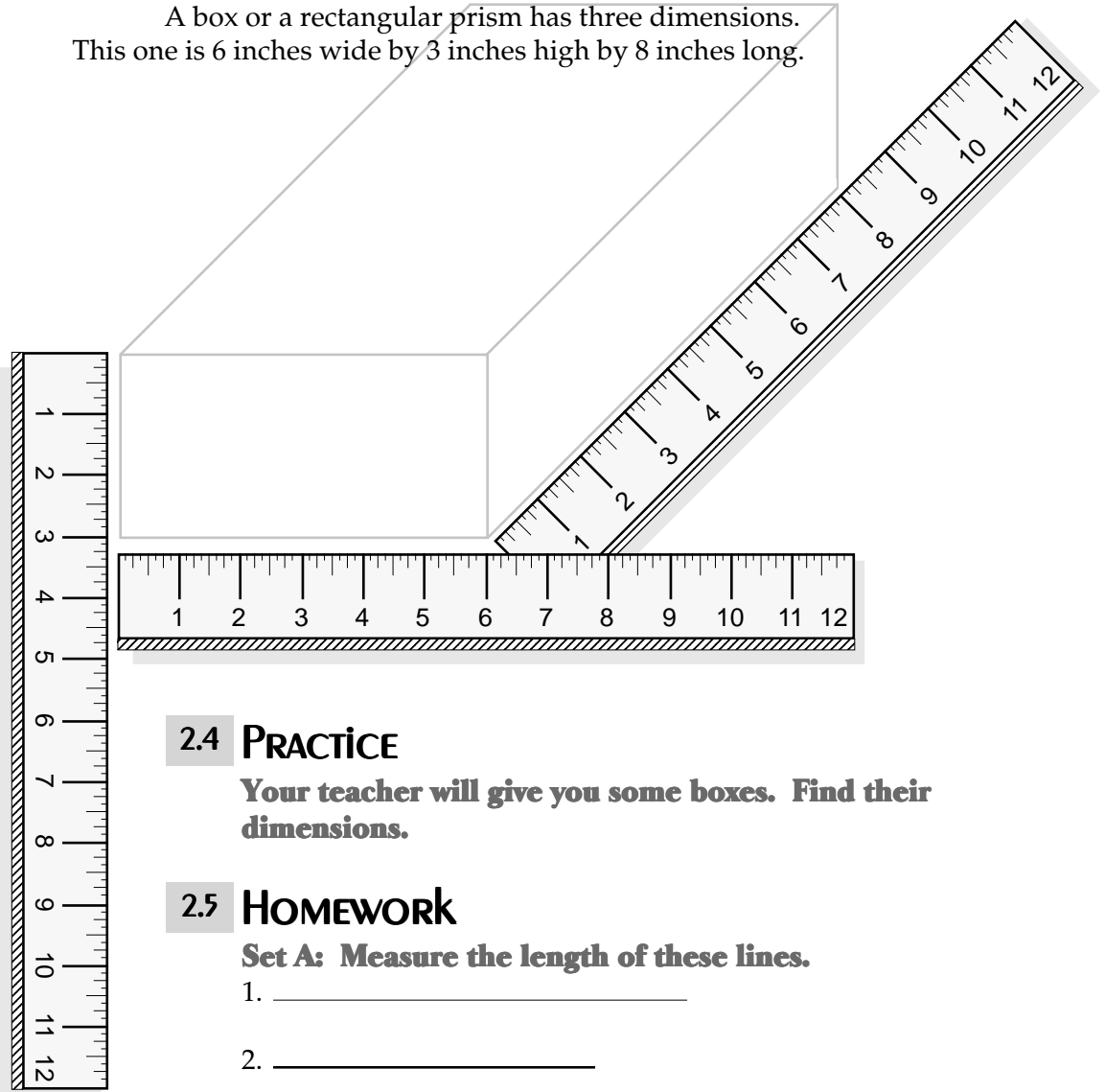
This rectangle measures $2\frac{1}{2}$ by $4\frac{3}{4}$ by $2\frac{1}{2}$ by $4\frac{3}{4}$ inches. Its dimensions are $2\frac{1}{2}$ " wide by $4\frac{3}{4}$ " long.

2.3 PRACTICE

Find the dimensions of these rectangles.

- A rectangle drawn on a grid, measuring 3 units wide and 2 units high.
- A rectangle with diagonal hatching, measuring 4 units wide and 3 units high.
- A solid gray rectangle, measuring 3 units wide and 4 units high.
- A rectangle with vertical lines, measuring 1 unit wide and 6 units high.
- A large solid gray rectangle, measuring 6 units wide and 4 units high.

A box or a rectangular prism has three dimensions.
This one is 6 inches wide by 3 inches high by 8 inches long.



2.4 PRACTICE

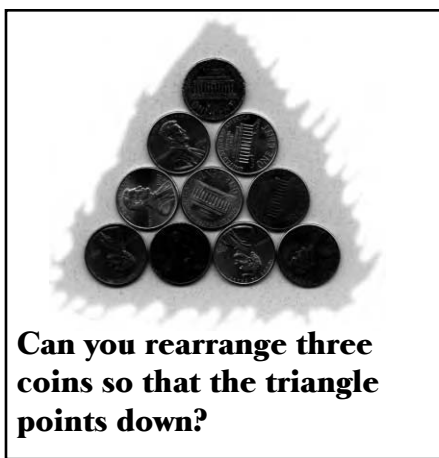
Your teacher will give you some boxes. Find their dimensions.

2.5 HOMEWORK

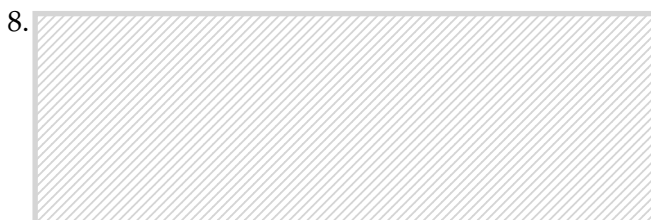
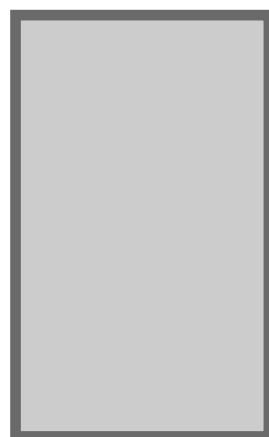
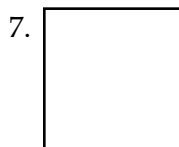
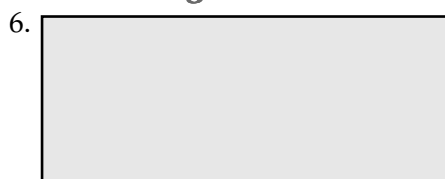
Set A: Measure the length of these lines.

1. _____
2. _____
3. **_____**
4. _____
5. **_____**

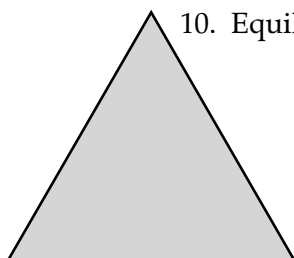
Measurement



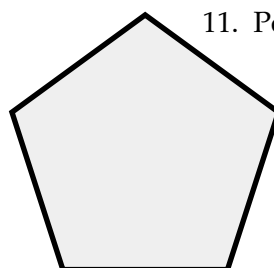
Set B: Find the dimensions of these rectangles.



Set C: Find the dimensions of these figures.



10. Equilateral Triangle

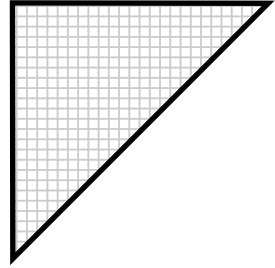


11. Pentagon

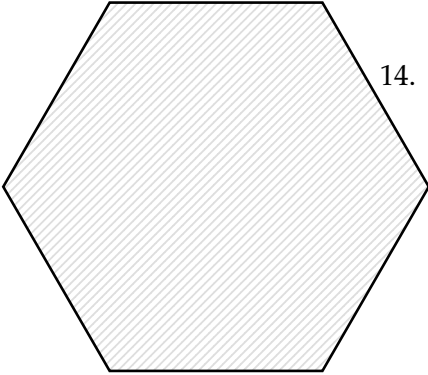
12. Parallelogram



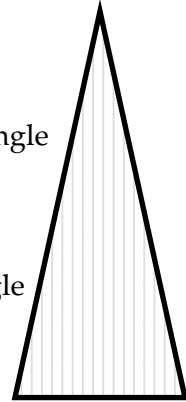
13. Right Triangle



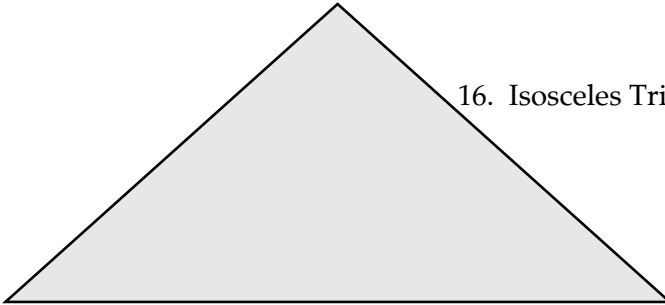
14. Hexagon



15. Isosceles Triangle



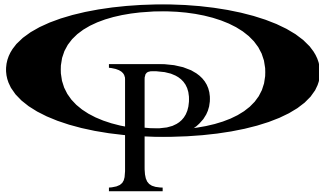
16. Isosceles Triangle



2.6 Vocabulary

Box
Dimension
Figure
Foot
High
Inch
Length
Line
Long
Measure
Prism
Rectangle
Ruler
Side
Wide

ANCIENT SYMBOLS FOR OPERATIONS



THIS WAS USED FOR
ADDITION DURING
THE RENAISSANCE.



THE ANCIENT
GREEKS USED
THIS FOR
SUBTRACTION.



THIS SYMBOL WAS USED BY
GERMANS FOR MULTIPLICATION
DURING THE 1600'S.



DIVISION WAS
INDICATED BY
THIS SYMBOL
DURING THE
1700'S IN FRANCE.

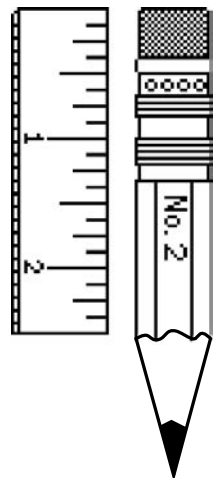
2.7 LARGE AND SMALL MEASUREMENTS

We use large and small units to measure things. These are the units:

12 INCHES (12 in. OR 12") = 1 FOOT (1 ft. OR 1')
3 FEET (3 ft. OR 3') = 1 YARD (1 yd.)
1,760 YARDS (1,760 yd.) = 1 MILE (1 mi.)

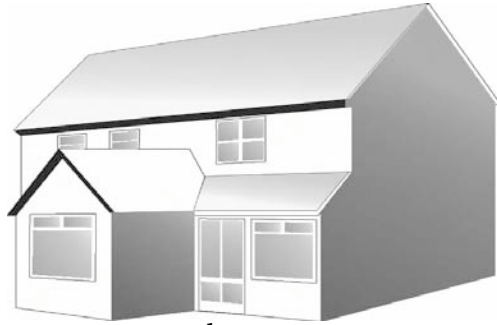
You must use an appropriate unit to measure length or distance.

To measure your pencil you can use inches.

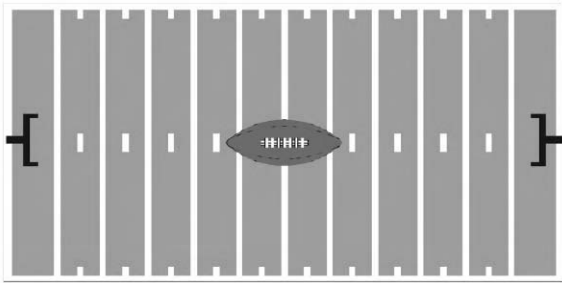


Measurement

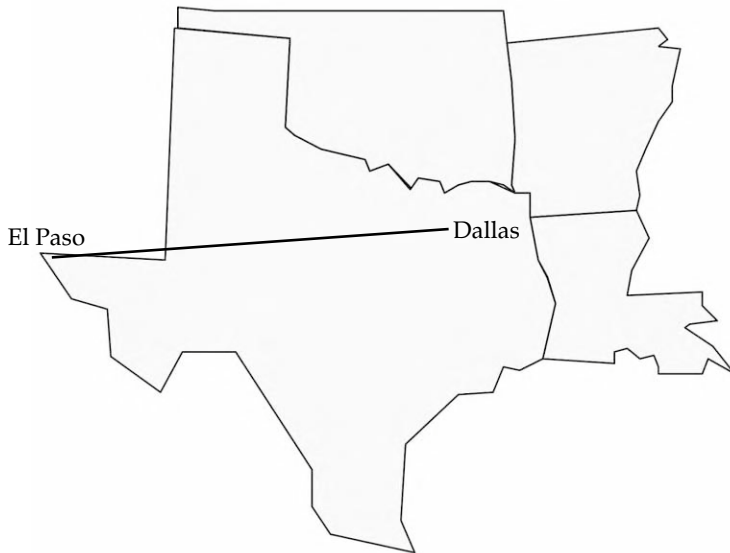
To measure your house you can use feet.



To measure a football field you can use yards.



To measure distance to another city you can use miles.



2.8 PRACTICE

What unit do you use to measure these things?

1. Your height
2. Your car
3. The distance to school
4. A shoe box
5. A cat
6. A bug or insect
7. Your arm
8. Your waist
9. A candy bar
10. A bicycle
11. A book
12. A pencil
13. A staple
14. A window
15. A desk
16. A notebook
17. A hamburger
18. A pizza
19. A stove
20. A school
21. A classroom
22. United States
23. A sandwich
24. Your finger
25. A can of soda
26. An egg
27. A blackboard
28. A door
29. A piece of gum
30. A plate
31. A glass
32. A spoon

Numbers from Other Languages

English	German	Spanish
zero	null	cero
one	eins	uno
two	zwei	dos
three	drei	tres
four	vier	cuatro
five	fünf	cinco
six	sechs	seis
seven	sieben	siete
eight	acht	ocho
nine	neun	nueve
ten	zehn	diez

Italian Latin

zero	
uno	unus
due	duo
tre	tres
quattro	quatuor
cinque	quinque
sei	sex
sette	septem
otto	octo
nove	novem
dieci	decem

2.9 CHALLENGE

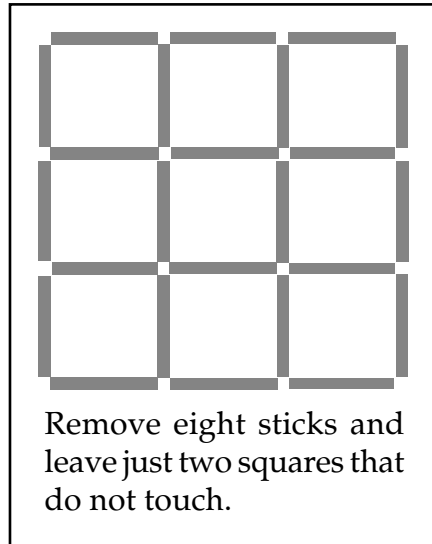
Write the answer in the language of the problem.

Example: due + quattro = sei (from Italian)

- | | |
|---------------------|----------------------|
| 1. tres + quatuor = | 9. due x tre = |
| 2. fünf + eins = | 10. uno x cinco = |
| 3. nove + uno = | 11. duo x quinque = |
| 4. nueve - cinco = | 12. zwei x fünf = |
| 5. septem - duo = | 13. nove ÷ tre = |
| 6. sei - tre = | 14. octo ÷ quatuor = |
| 7. acht - zwei = | 15. diez ÷ dos = |
| 8. diez - cuatro = | 16. sechs ÷ drei = |

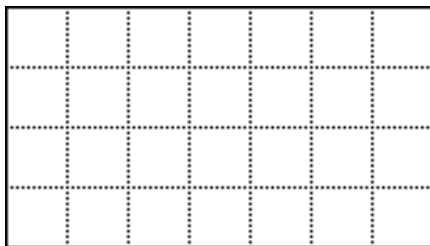
2.10 VOCABULARY

Appropriate
City
Distance
Far
Foot
Feet
Field
Football
House
Inch
Inches
Large
Mile
Pencil
Small
Unit
Yard
Yards



2.11 UNDERSTANDING AREA

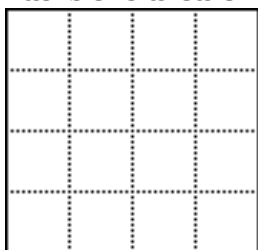
Area is the number of squares inside a figure. This rectangle has 28 squares. The area of this rectangle is 28.



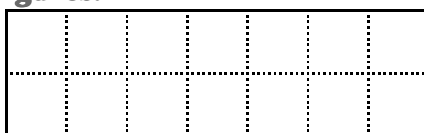
2.12 PRACTICE

What is the area of these figures?

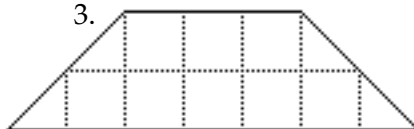
1.



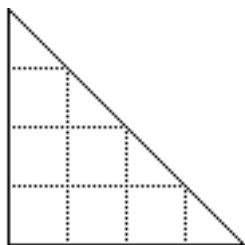
2.



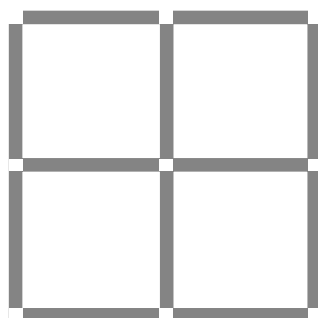
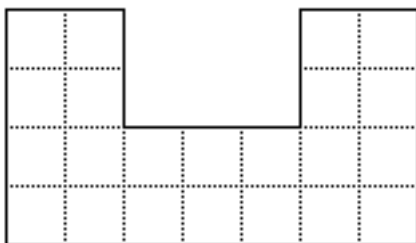
3.



4.

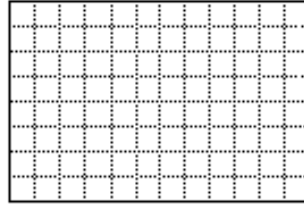
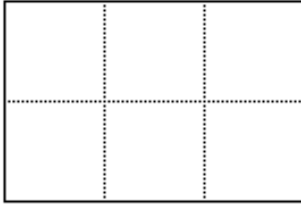


5.



Rearrange two of these objects to make seven squares.

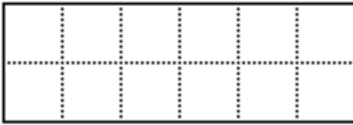
The squares can be big or small. The size of the squares is called the unit.



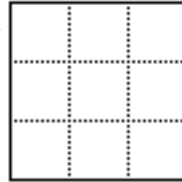
2.13 HOMEWORK

Set A: What is the area of these figures?

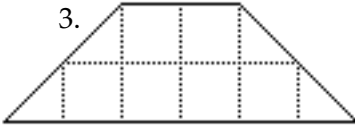
1.



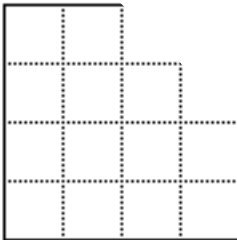
2.



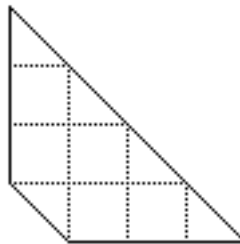
3.



4.



5.



6.



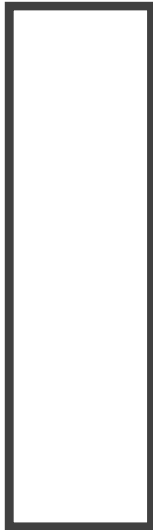
Measurement

Set B: Copy these figures on your paper using one centimeter squares. Draw the squares. What is the area?

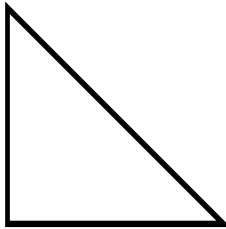
7.



8.



9.



Set C: Use 1/4 inch squares.

10.



11.



EUROPEAN NUMERALS

1400 A.D.

IF YOU LIVED 600 YEARS
AGO YOU MIGHT HAVE
WRITTEN NUMBERS
LIKE THIS.

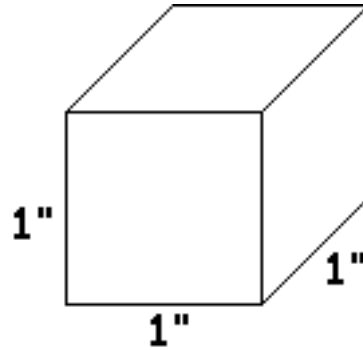
/	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0

2.14 Vocabulary

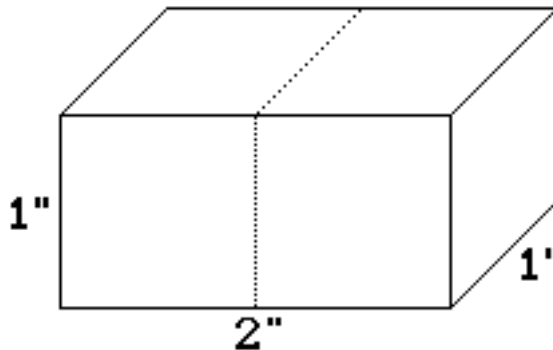
Area
Big
Centimeter
Copy
Draw
Figure
Rectangle
Size
Small
Square
Unit square

2.15 UNDERSTANDING VOLUME

Volume is how many equal cubes are in a figure. This is a one inch cube. Its volume is one cubic inch.



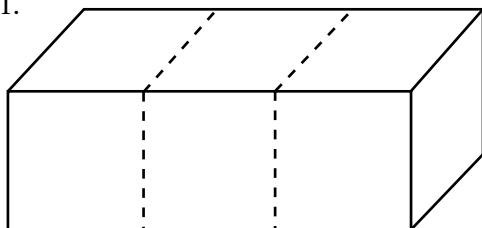
This figure contains two cubes. Its volume is two cubic inches.



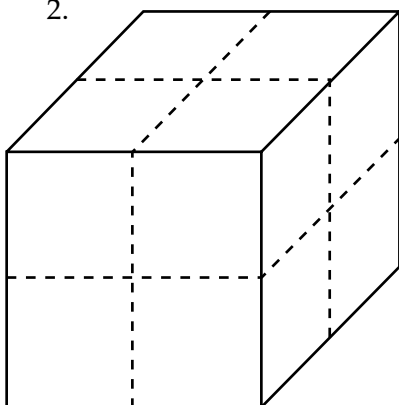
2.16 PRACTICE

How many cubes in these figures? What is their volume.

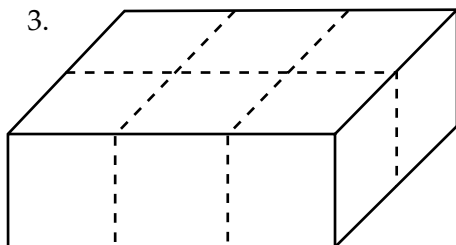
1.



2.



3.



EAST ARABIC NUMERALS

1575 A.D.

—	1
٢	2
٣	3
٤	4
٥	5
٦	6
٧	7
٨	8
٩	9
٠	0

2.17 VOCABULARY

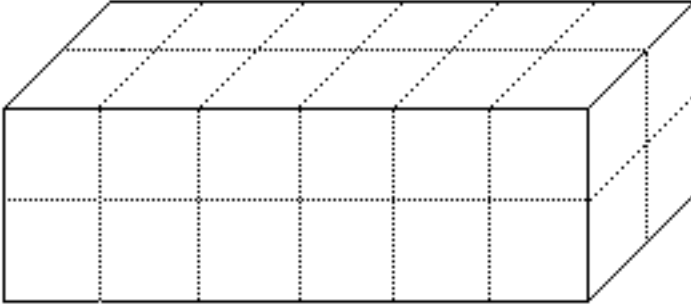
Copy
Count
Cube
Cubic inch
Draw
Equal

Leave
Remove
Square
Sticks
Touch
Volume

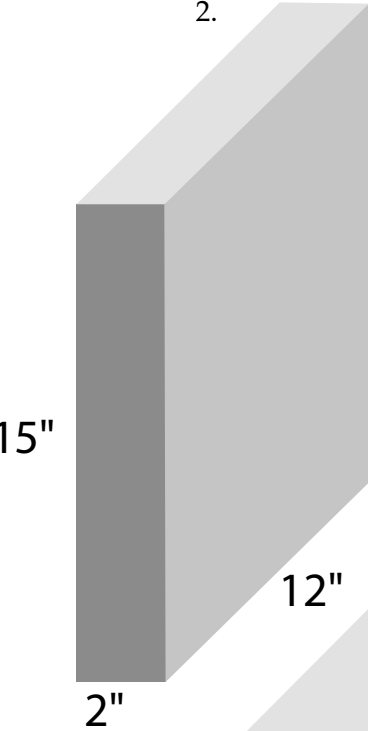
8 HOMEWORK

What is the volume? Copy problems 2, 3, and 4, and draw in the squares. Then count them.

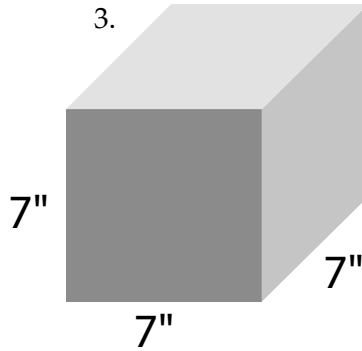
1.



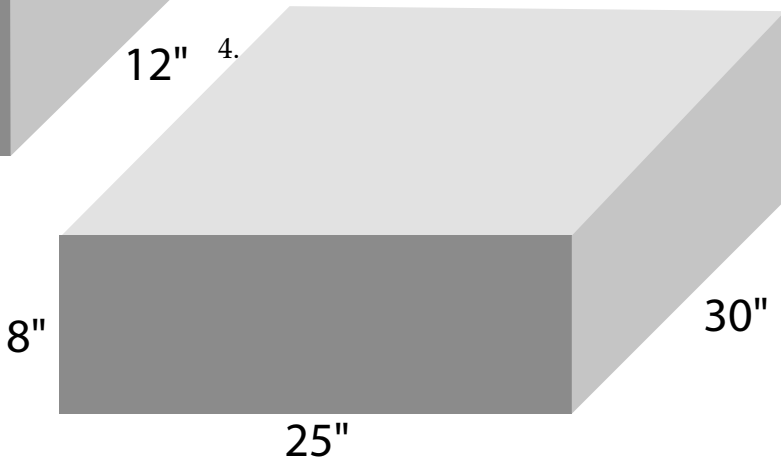
2.



3.



4.

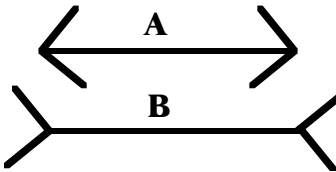


2.19 ORIENTATION AND DIRECTION

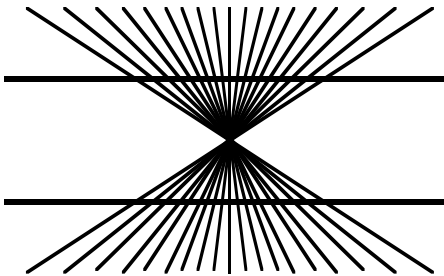
Optical Illusions

Some things are not as they seem. Optical illusions make you see things incorrectly.

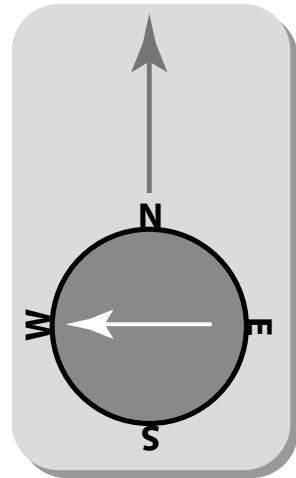
Which line is longer, A or B?



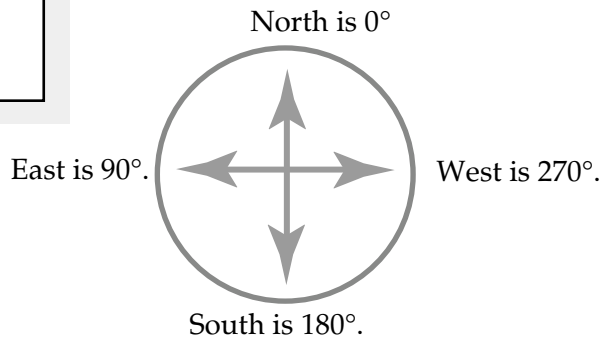
Are the two horizontal lines parallel?



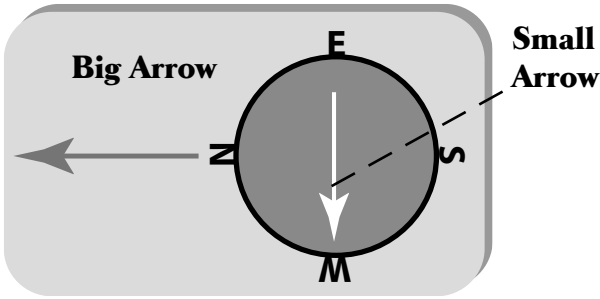
This is a magnetic compass. It measures direction. The directions are north, south, east, and west.



The circle is divided into 360 degrees (360°).



Then to North again which is 360° .



**The important parts
of a compass**

Dial

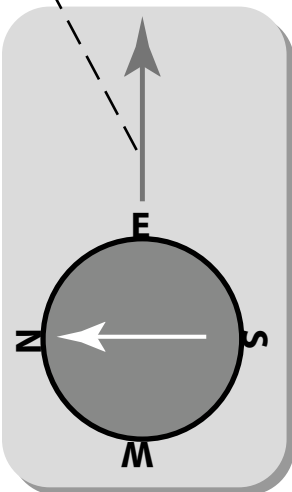
You can find the direction of something.

First, point the big arrow at it.

Second, turn the dial to match the little arrow to north (N).

Third, read the direction on the dial.

Read direction here.



Learning the Months

The months in English are:

**January
February
March
April
May
June
July
August
September
October
November
December**

You can remember the number of days in each month with a simple poem:

*Thirty days hath September,
April, June, and November.
February has twenty-eight alone,
All the rest have thirty-one,
Except in Leap Year, that's the time
when February's days
are twenty-nine.*

2.20 PRACTICE

Use a magnetic compass to measure the direction of these things in your classroom. Your teacher will help.

1. The door
2. The teacher's desk
3. A window
4. The blackboard
5. The file cabinet
6. The bookcase
7. The bulletin board
8. Your best friend
9. The closet
10. The computer
11. The overhead projector
12. The projection screen

2.21 VOCABULARY

Arrow
 Circle
 Compass
 Degree
 Dial
 Divide
 Direction
 East
 Magnetic
 Match
 Measure
 North
 Point
 Read
 South
 West

WEST ARABIC NUMERALS

1,000 اٲ

0 0

/ 1

2 2

3 3

4 4

5 5

6 6

7 7

8 8

9 9

2.22 CHALLENGE

Use the European Numerals from 1400 A.D. (on page 40) and the Ancient Symbols for Operations (on page 34) to solve these problems.

1. $\text{eP}22$

5. $4\text{~} / 3$

2. ~P

6. $3\text{~}6$

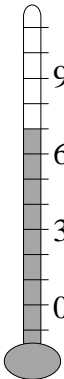
3. $3\text{eT} / 7$

7. $8\text{D}e$

4. $40\text{~}7$

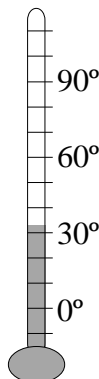
8. $20\text{D}4$

2.23 TEMPERATURE

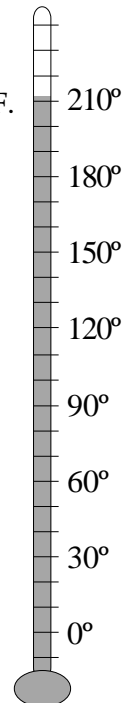


This is a thermometer.
It measures temperature. This temperature
is seventy degrees
Fahrenheit, 70° F.

Water boils at 212° F.
This is very hot.

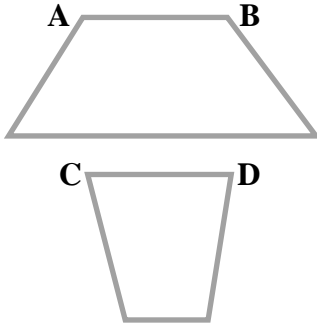


Water freezes at 32° F.
This is cold.

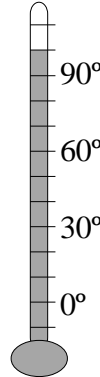
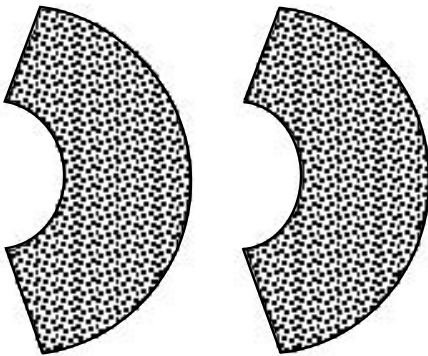


More Optical Illusions

Which is longer, line segment AB or CD?

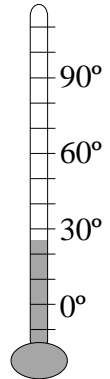


Do these two figures look the same?



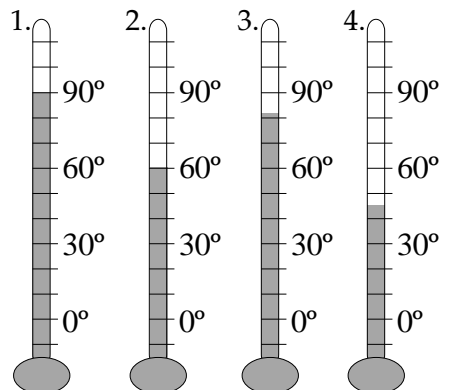
In the summer it is hot. It reaches 90°F to 100°F everyday.

Winter is cold. Many nights it gets down to 30°F or 20°F.

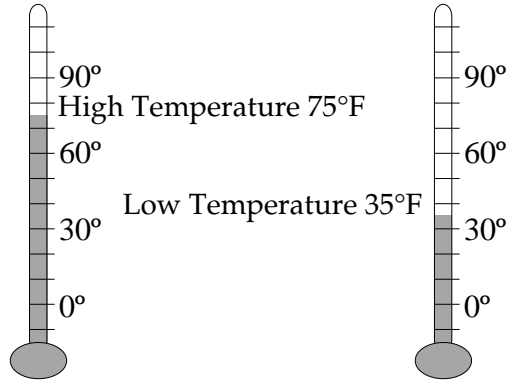


2.24 PRACTICE

Read the temperature on these thermometers. Use the degree sign (°).



Everyday we have a high temperature. We also have a low temperature.

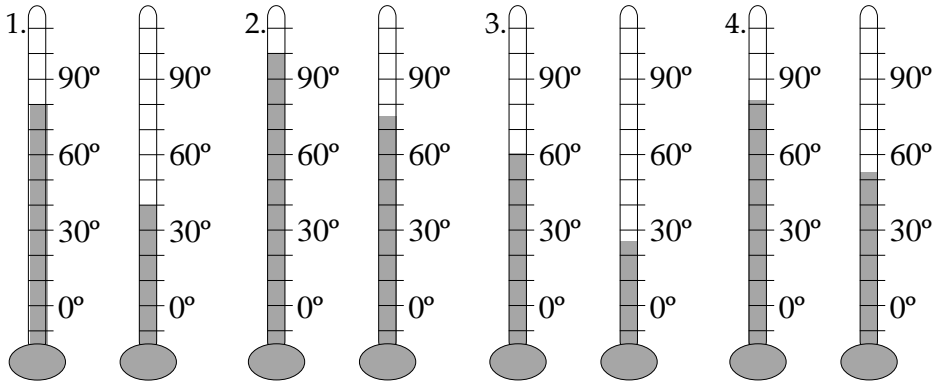


The range of temperatures is the low temperature subtracted from the high temperature.

$$\begin{array}{r} 75^{\circ} \\ -35^{\circ} \\ \hline 40^{\circ} \text{ RANGE} \end{array}$$

5 PRACTICE

Find the range of high temperatures and low temperatures. Use the degree sign (°) in your answers.



6 VOCABULARY

Answer	Fahrenheit	Range	Temperature
Boil	Freeze	Reach	Thermometer
Cold	Get	Read	Use
Degree	High	Sign	Very
Down	Hot	Subtract	Water
Everyday	Low	Summer	Winter

2.27 MEASURING TIME

This is a clock. It measures hours, minutes, and seconds. A clock that we wear on the wrist is called a watch.



Clock

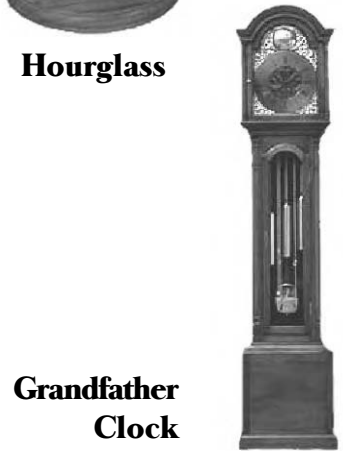
Some clocks and watches use hands to tell time. Some use numbers. Most watches and clocks only go to twelve o'clock. Others are twenty-four hour clocks. These are used by the military and airlines.



Hourglass



**Cuckoo
Clock**



**Grandfather
Clock**

This is a calendar. It measures days, weeks, months, and years.

January						
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

You need to know these facts to measure time:



Wristwatch

60 SECONDS	=	1 MINUTE
60 MINUTES	=	1 HOUR
24 HOURS	=	1 day
7 days	=	1 WEEK
28 TO 31 days	=	1 MONTH
365 OR 366 days	=	1 YEAR
12 MONTHS	=	1 YEAR
52 WEEKS	=	1 YEAR



Digital Stop Watch

2.28 PRACTICE

Set A: How many seconds in these problems?

1. 7 minutes = ____ seconds
2. 12 minutes = ____ seconds
3. 5 minutes 15 seconds = ____ seconds
4. 13 minutes 45 seconds = ____ seconds

Set B: How many minutes in these problems?

5. 5 hours = ____ minutes
6. 19 hours = ____ minutes
7. 7 hours 20 minutes = ____ minutes
8. 14 hours 35 minutes = ____ minutes



Set C: How many weeks in these problems? Hint: Divide by seven.

9. 21 days = ____ weeks
10. 36 days = ____ weeks ____ days

2.29 HOMEWORK

Set A: How many seconds in these problems?

1. 17 minutes
2. 3 minutes
3. 15 minutes
4. 6 minutes 15 seconds
5. 21 minutes 40 seconds
6. 35 minutes 12 seconds
7. 49 minutes 18 seconds

Measurement

Set B: How many minutes in these problems?

- | | |
|--------------|------------------------|
| 8. 5 hours | 12. 1 day |
| 9. 12 hours | 13. 2 days |
| 10. 23 hours | 14. 6 hours 15 minutes |
| 11. 24 hours | 15. 2 days 3 hours |

Set C: How many weeks in these problems?

- | | |
|-------------|--------------|
| 16. 14 days | 19. 1 month |
| 17. 91 days | 20. 3 months |
| 18. 65 days | 21. 3 years |

Set D: How many days in these problems?

- | | | |
|---------------|----------------------------|----------------------------------|
| 22. 48 hours | 29. 6 months | 36. September to December |
| 23. 168 hours | 30. 2 years | 37. 2 years 3 weeks & 6 days |
| 24. 125 hours | 31. January | 38. 3 years 4 weeks & 3 days |
| 25. 3 weeks | 32. February | 39. 5 years 6 weeks and 1 day |
| 26. 7 weeks | 33. September | 40. 10 years 5 weeks and 4 days |
| 27. 12 weeks | 34. March and April | 41. 21 years 20 weeks and 2 days |
| 28. 2 months | 35. June, July, and August | 42. 25 years 10 weeks and 5 days |

2.30 VOCABULARY

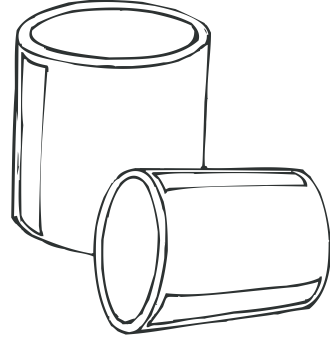
Airline
Calendar
Clock
Day
Divide
Hand
Hour
Military
Minute
Month
Multiply
O'clock
Second
Time
Watch
Wear
Week
Wrist
Year

2.31 MEASURING WEIGHT

The basic units of weight are ounces (oz.), pounds (lb.), and tons.

$$\begin{array}{rcl} 16 \text{ oz.} & = & 1 \text{ lb.} \\ 2,000 \text{ lb.} & = & 1 \text{ TON} \end{array}$$

We use ounces to measure small amounts. We measure food in small packages and cans with ounces.



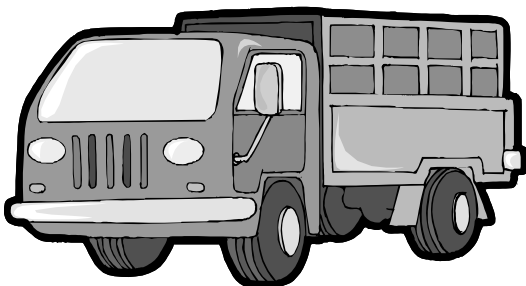
We use pounds to weigh heavier things. We use pounds to weigh people, animals, meat, fruit, and vegetables.

Some things weigh more than one pound. To change from ounces to pounds, you have to divide. The **R** in these problems stands for a remainder in the division problem.

$$\begin{array}{rcl} 20 \text{ oz.} & = & 1 \text{ lb. } 4 \text{ oz.} \\ (20 \div 16) & = & 1 \text{ R } 4 \end{array}$$

$$\begin{array}{r} \underline{1 \text{ Remainder } 4} \\ 16 \overline{)20} \end{array}$$

$$\begin{array}{rcl} 60 \text{ oz.} & = & 3 \text{ lbs. } 12 \text{ oz.} \\ (60 \div 16) & = & 3 \text{ R } 12 \end{array}$$



We use tons to weigh very large amounts of materials. We weigh very heavy objects with tons. We use tons to weigh sand, dirt, steel, rocks, grain, trucks, and ships.

2.32 PRACTICE

Set A: Change to ounces. Hint: Multiply by sixteen.

- | | |
|------------------|--------------------|
| 1. 2 lbs. | 3. 16 lbs. |
| 2. 5 lbs., 6 oz. | 4. 13 lbs., 12 oz. |

Set B: Change to pounds.

- | | |
|-----------------------|-------------|
| 5. 2 tons | 10. 80 oz. |
| 6. 5 tons | 11. 48 oz. |
| 7. 9 tons | 12. 144 oz. |
| 8. 3 tons, 500 lbs. | 13. 108 oz. |
| 9. 7 tons, 1,225 lbs. | 14. 134 oz. |

2.33 HOMEWORK

Set A: Change to ounces.

- | | |
|-------------|---------------------|
| 1. 3 lbs. | 7. 2 lbs., 6 oz. |
| 2. 9 lbs. | 8. 17 lbs., 11 oz. |
| 3. 21 lbs. | 9. 1 lb., 2 oz. |
| 4. 5 lbs. | 10. 3 lbs., 5 oz. |
| 5. 15 lbs. | 11. 10 lbs., 10 oz. |
| 6. 100 lbs. | 12. 21 lbs., 15 oz. |

Set B: Change to pounds.

- | | |
|-------------|------------------------|
| 13. 3 tons | 19. 2 tons, 600 lbs. |
| 14. 7 tons | 20. 5 tons, 1,325 lbs. |
| 15. 11 tons | 21. 7 tons, 250 lbs. |
| 16. 112 oz. | 22. 151 oz. |
| 17. 96 oz. | 23. 38 oz. |
| 18. 64 oz. | 24. 75 oz. |

Set C: Add, subtract, or multiply, and then change your answer to pounds.

- | | |
|--|---|
| 25. 14 oz. + 12 oz. = | 33. 93 lbs., 15 oz. + 14 lbs., 11 oz. = |
| 26. 24 oz. + 8 oz. = | 34. 5 lbs., 12 oz. - 3 lbs., 8 oz. = |
| 27. 35 oz. - 19 oz. = | 35. 19 lbs., 14 oz. - 7 lbs., 14 oz. = |
| 28. 83 oz. - 37 oz. = | 36. 21 lbs., 12 oz. - 9 lbs., 13 oz. = |
| 29. 8 oz. x 6 cans = | 37. 16 lbs., 10 oz. - 9 lbs., 15 oz. = |
| 30. 24 oz. x 8 cans = | 38. 4 lbs., 3 oz. x 3 = |
| 31. 3 lbs., 7 oz. + 9 lb., 9 oz. = | 39. 5 lbs., 8 oz. x 4 = |
| 32. 16 lbs., 13 oz. + 15 lb., 12 oz. = | 40. 3 tons, 250 lbs. x 8 = |

2.34 VOCABULARY

Amount

Animal

Can

Dirt

Food

Fruit

Grain

Heavier

Heavy

Large

Materials

Meat

More than

Package

People

Pound

Ounce

Remainder

Rock

Sand

Ship

Small

Steel

Thing

Ton

Truck

Vegetable

Weigh

Weight

2.35 MEASURING CAPACITY

Pints (pt.), quarts (qt.), and gallons (gal.) are measures of capacity. Capacity measures are for liquids like milk, water, coffee, and tea.



You need to remember these facts:

2 pints	=	1 quart
2 quarts	=	1 half-gallon
4 quarts	=	1 gallon
8 pints	=	1 gallon
4 pints	=	1 half-gallon

Measurement

We use teaspoons (t.), tablespoons (T.), and cups (C.), when we cook. Teaspoons and cups can be divided into fractions. Three teaspoons equal one tablespoon.



2.36 PRACTICE

Set A: How many pints in each problem?

1. 3 quarts
2. 2 gallons
3. 3 half-gallons
4. 5 gallons
5. 1 gallon, 2 quarts
6. 2 gallons, 1 half-gallon
7. 5 gallons, 1 pint
8. 5 gallons, 1 half-gallon, 7 quarts

Set B: How many gallons in each problem?

9. 32 pints
10. 16 quarts
11. 7 half-gallons
12. 35 pints
13. 4 quarts, 8 pints
14. 5 half-gallons, 2 quarts
15. 3 half-gallons, 3 quarts
16. 3 half-gallons, 6 quarts, 14 pints

2.37 HOMEWORK

Set A: How many pints in each problem?

- | | |
|-------------------|---|
| 1. 2 qt. | 5. 3 gallons, 2 quarts |
| 2. 3 gal. | 6. 1 half-gallon, 1 quart |
| 3. 6 half-gallons | 7. 6 gallons, 1 half-gallon, 6 quarts |
| 4. 2 gal., 3 qt. | 8. 10 gallons, 2 half-gallons, 3 quarts |

Set B: How many gallons in each problem?

- | | |
|---------------------|---|
| 9. 48 pt. | 18. 4 qt., 8 pt. |
| 10. 20 qt. | 19. 9 qt., 4 pt. |
| 11. 12 half-gallons | 20. 3 half-gallons, 6 qt. |
| 12. 41 pt. | 21. 2 half-gallons, 8 quarts, 24 pints |
| 13. 13 qt. | 22. 3 half-gallons, 3 quarts, 6 pints |
| 14. 9 half-gallons | 23. 5 half-gallons, 2 quarts, 8 pints |
| 15. 173 pt. | 24. 4 half-gallons, 9 quarts, 3 pints |
| 16. 29 qt. | 25. 7 half-gallons, 2 quarts, 4 pints |
| 17. 25 half-gallons | 26. 12 half-gallons, 6 quarts, 12 pints |

Set C: How many teaspoons in each problem?

- | | |
|-----------|----------------------|
| 27. 5 T. | 30. 6 1/2 teaspoons |
| 28. 3 T. | 31. 19 1/4 teaspoons |
| 29. 11 T. | |

Set D: Add and then change your answer to gallons.

32. 3 quarts + 7 quarts =
33. 2 half-gallons, 3 quarts + 3 half-gallons, 5 quarts =
34. 7 quarts, 9 pints + 8 quarts, 11 pints =

2.38 VOCABULARY

Capacity
Coffee
Cook
Cup
Divide
Equal
Facts
Fractions
Gallon

Half-gallon
Liquid
Milk
Pint
Quart
Tablespoon
Tea
Teaspoon
Water

2.39 CHAPTER 2 VOCABULARY REVIEW

Use these words to answer the questions and problems below. Look up unfamiliar words in the dictionary. There might be more than one correct answer.

amount	divide	mile	square
area	down	minute	summer
arrow	draw	month	tablespoon
boil	east	night	teaspoon
box	eight	north	temperature
calendar	equal	o'clock	thermometer
capacity	everyday	orientation	thousand
centimeter	Fahrenheit	ounce	three
circle	figure	pint	time
clock	foot/feet	pound	ton
cold	freeze	pencil	two
compass	gallon	prism	units
cook	half-gallon	quart	volume
cube	hot	range	watch
cubic	hour	rectangle	week
cup	house	rectangular	weigh
day	inch/inches	ruler	weight
degree	length	second	west
dial	line	side	winter
dimensions	long	size	wrist
direction	magnetic	small	yard
distance	measure	south	year

1. A one foot ruler is twelve _____ long.
2. _____ feet equal one yard.
3. A _____ has four sides.
4. _____ are for measuring distance to cities.
5. Area is how many _____ are inside a figure.
6. _____ is how many equal cubes are in a figure.
7. A _____ measures direction.
8. The directions are north, _____, east, and _____.
9. A _____ measures temperature.
10. In the summer it is _____ everyday.
11. A clock measures _____, minutes, and _____.
12. A _____ is a clock on your wrist.
13. A calendar measures _____, weeks, _____, and years.
14. Sixty _____ equals one minute.
15. 365 or 366 days equals one _____.

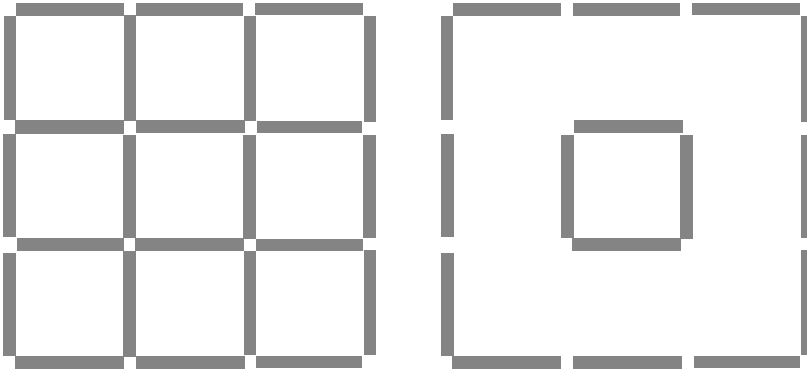
16. Sixteen ounces equals one _____.
17. _____ pounds equals one ton.
18. Pints, _____, and _____ are measures of capacity.
19. _____ pints equals one gallon.
20. We use a _____ to measure length.

2.40 ANSWERS TO THE PUZZLES

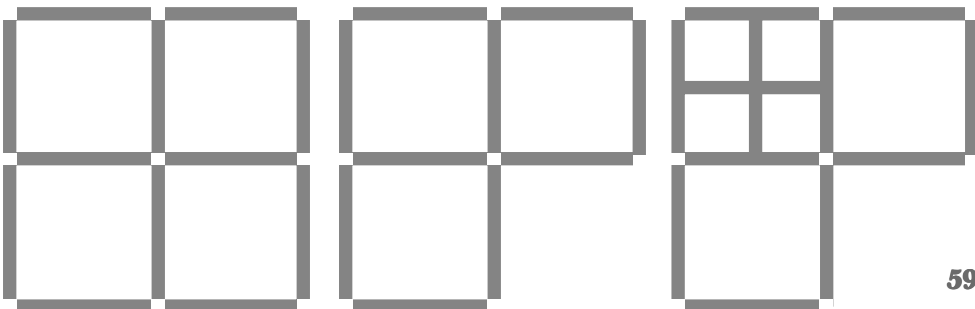
From Section 2.5



From Section 2.10



From Section 2.12



2.41 CHAPTER 2 PRACTICE TEST**Directions: Circle the correct answer.**

1. How many inches are in two feet?
 - a. 12
 - b. 18
 - c. 20
 - d. 24
2. How many feet are in five yards?
 - a. 3
 - b. 15
 - c. 9
 - d. 8
3. Which is the longest?
 - a. a foot
 - b. an inch
 - c. a mile
 - d. a yard
4. Which is East on a magnetic compass?
 - a. 90°
 - b. 180°
 - c. 270°
 - d. 360°
5. Which measures direction?
 - a. a ruler
 - b. a thermometer
 - c. a compass
 - d. a cup
6. What is the range of temperatures between 35° and 65° ?
 - a. 100°
 - b. 30°
 - c. 35°
 - d. 90°
7. How many seconds in three minutes?
 - a. 3
 - b. 60
 - c. 180
 - d. 240
8. What do we use to measure time?
 - a. a watch
 - b. a ruler
 - c. a compass
 - d. a gallon
9. How many days in January?
 - a. 28
 - b. 29
 - c. 30
 - d. 31
10. How many ounces in two pounds?
 - a. 4
 - b. 16
 - c. 24
 - d. 32

11. Which is a measurement of weight?

- a. a ton
- b. a mile
- c. a foot
- d. a degree

12. How many pints in three gallons?

- a. 8
- b. 24
- c. 32
- d. 48

13. Which is a measurement of capacity?

- a. an inch
- b. a quart
- c. a pound
- d. a degree

14. What do we use to measure area?

- a. pints
- b. thermometers
- c. degrees
- d. squares

15. How many ounces are in 2 lbs., 3 oz.?

- a. 5 oz.
- b. 6 oz.
- c. 32 oz.
- d. 35 oz.

16. How many pints are in 2 gallons, 3 quarts?

- a. 5 pints
- b. 6 pints
- c. 16 pints
- d. 22 pints

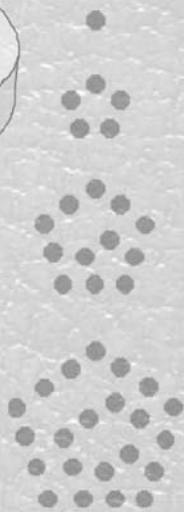
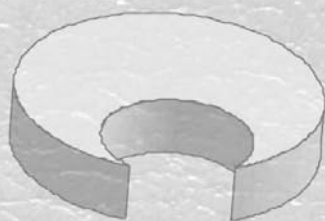
17. How many feet are in 3 yd., 2 ft.?

- a. 11 ft.
- b. 9 ft.
- c. 6 ft.
- d. 5 ft.

Chapter 3



Geometric Figures



3.1 GEOMETRIC Symbols

We use many symbols in mathematics. You know some symbols. Some of them follow:

+	1	2.5	%	≠
-	=	1,473	\$	1/4
x	>	<	¢	÷

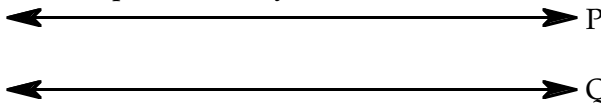
We use symbols in geometry. Geometry is the study of shapes.

This is a line.



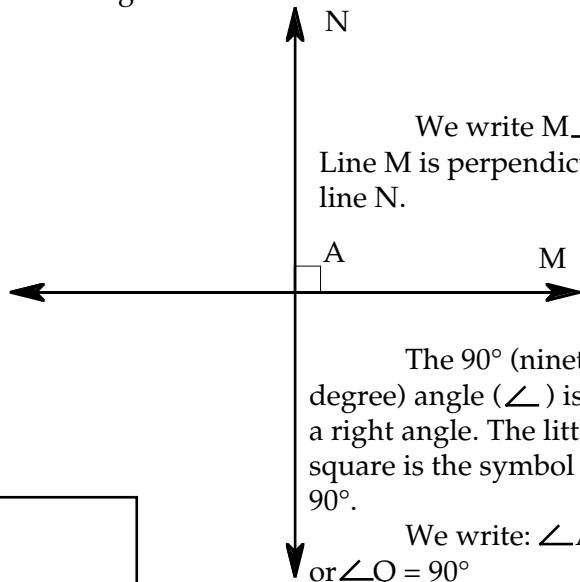
It is called line A.

These lines are parallel. They do not touch.



We write: $P \parallel Q$. Line P is parallel to line Q.

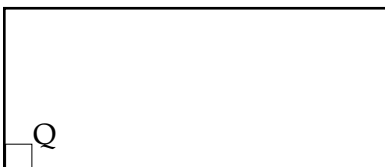
These lines cross. The angle is 90° .



We write $M \perp N$.
Line M is perpendicular to line N.

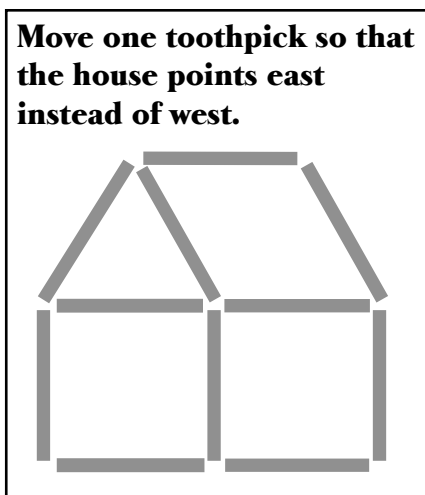
The 90° (ninety degree) angle (\angle) is called a right angle. The little square is the symbol for 90° .

We write: $\angle A = 90^\circ$
or $\angle Q = 90^\circ$

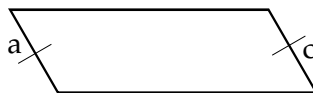


Geometric Figures

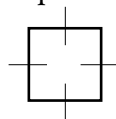
Move one toothpick so that the house points east instead of west.



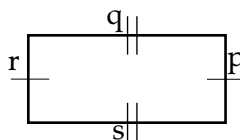
We use symbols to say equal sides. We say: Side a equals side c. We write: $a = c$.



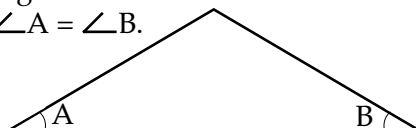
We say all sides are equal (below).



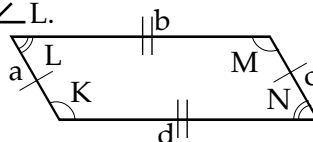
We say: Side p equals side r and side q equals side s. We write: $p = r$ and $q = s$.



We use symbols to say equal angles. We say: Angle A equals angle B. We write: $\angle A = \angle B$.

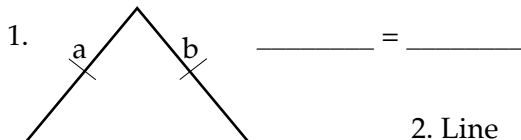


We say: Angle M equals angle K and angle N equals angle L. We write: $\angle M = \angle K$ and $\angle N = \angle L$.

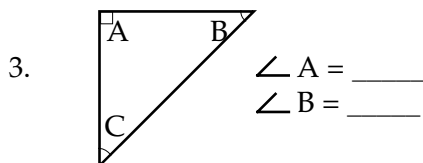
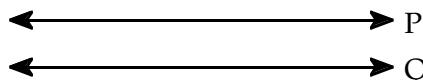


3.2 HOMEWORK

Fill in the blanks. Use words or symbols.

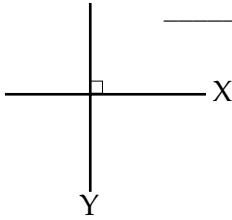


2. Line _ is _____ to line Q.

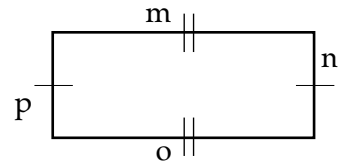


Geometric Figures

4. _____ is _____ to Y.



5. Side _____ equals _____ n.

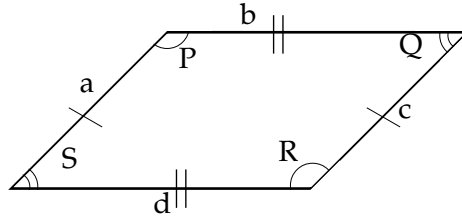


6. $\angle P =$ _____

$\angle Q =$ _____

c = _____

Side _____ equals _____ b.



3.3 VOCABULARY

Angle

Cross

Degrees

Line

Parallel

Perpendicular

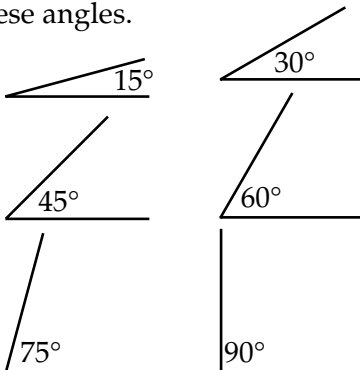
Right

Sides

Symbol

3.4 MEASURING ANGLES

We use a protractor to measure angles. It measures them in degrees ($^{\circ}$). Look at the size of these angles.



HINDU NUMERALS

300 B.C.

— 1

= 2

≡ 3

𑀓 4

𑀔 5

𑀕 6

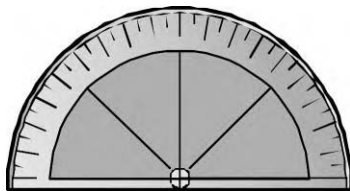
𑀖 7

𑀗 8

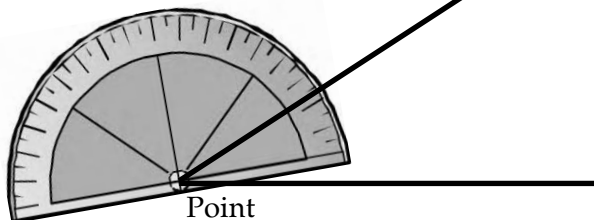
𑀘 9

Geometric Figures

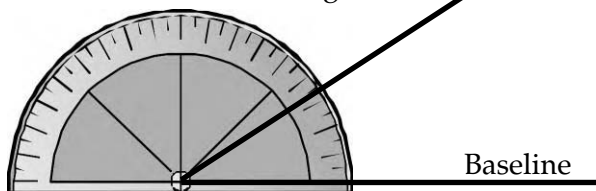
A protractor will help you measure angles. It has two scales. One begins on the right. The other begins on the left.



To measure an angle, first put the hole on the point of the angle.



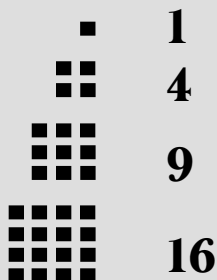
Then line up the baseline with one side of the angle.



Square Numbers

The product when both factors are the same is a square number.

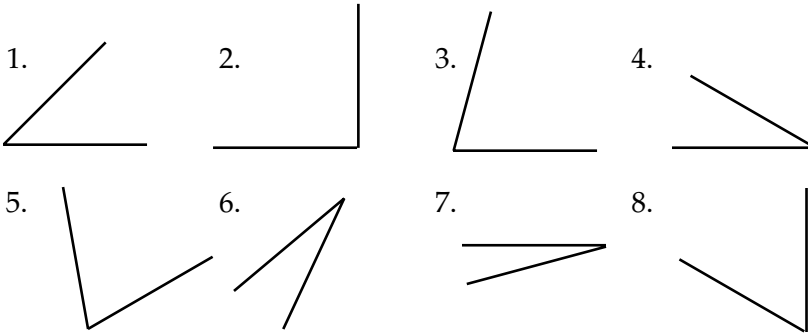
Square numbers are made by making squares with dots. The first four are below. Can you find the next three.



Then measure from the zero on the baseline to the other line of the angle. Read the angle.

3.5 PRACTICE

Set A: Measure these angles with your protractor.

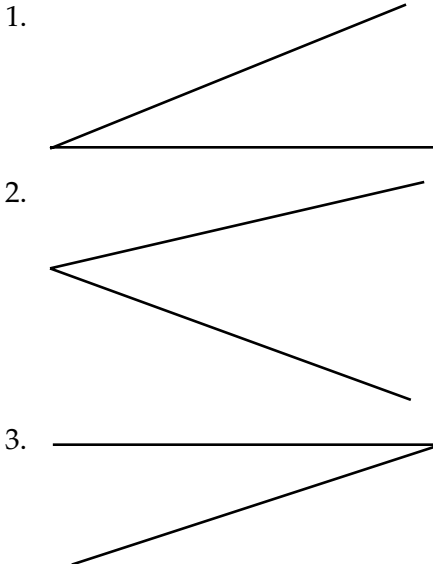


Set B: Draw these angles with your protractor.

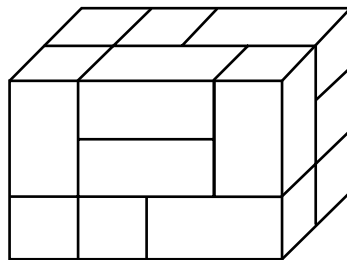
9. 35°
10. 49°
11. 65°
12. 95°
13. 85°

3.6 HOMEWORK

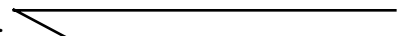
Set A. Measure these angles with your protractor.



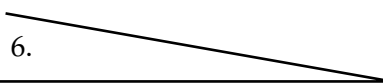
How many rectangular prisms are in this figure? Don't forget to count the ones in the back.

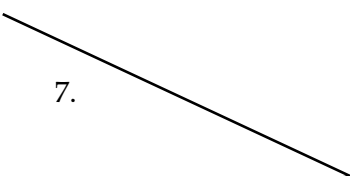


Geometric Figures

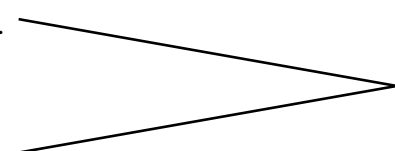
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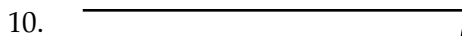
5. 

6. 

7. 

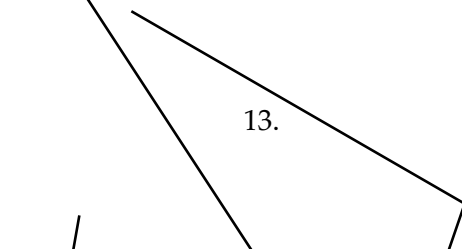
8. 

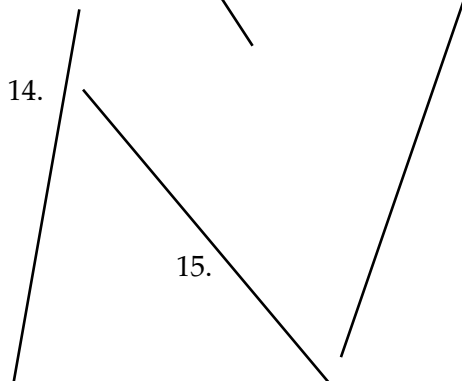
9. 

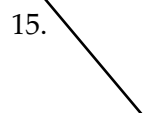
10. 

11. 

12. 

13. 

14. 

15. 

Set B: Draw these angles with your protractor.

16. 40°

17. 70°

18. 10°

19. 100°

20. 120°

21. 150°

22. 175°

23. 110°

24. 200°

25. 270°

3.7 VOCABULARY

Angle
Base line
Degrees
Draw
Hole
Left
Line up
Point
Protractor
Right

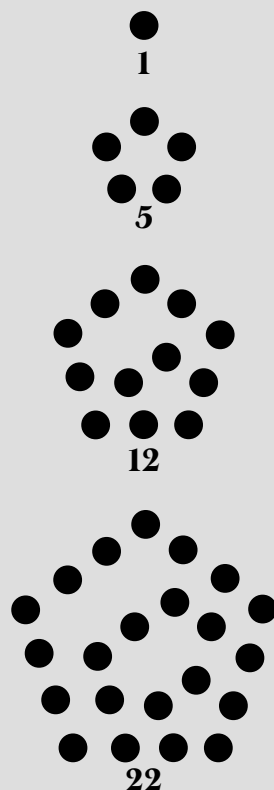
3.8 IDENTIFYING TRIANGLES

We classify triangles into six kinds: right triangles, obtuse triangles, acute triangles, scalene triangles, isosceles triangles, and equilateral triangles. We can remember these better if we use a memory chart like the one below.

R O A S I E	Right Triangle: One right angle (90°)
	Obtuse Triangle: One angle more than 90°
	Acute Triangle: All angle less than 90°
	Scalene Triangle: No equal sides
	Isosceles Triangle: Two equal sides
	Equilateral Triangle: All sides equal

Pentagonal Numbers

Pentagonal Numbers are made by drawing bigger and bigger pentagons with dots. These are the first four.



Can you find the next three?

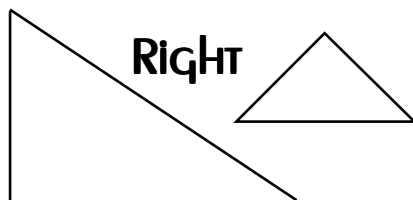
hindu NUMERALS

876 A.D.

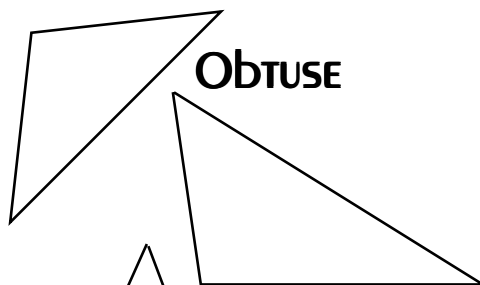
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0

All triangles can be classified into two or three categories. We look at their angles and their sides. Some triangles have special properties. All triangles are very strong. We use them to build things like houses and bridges.

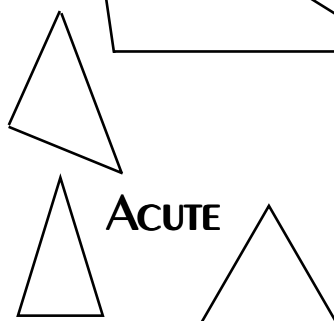
RIGHT



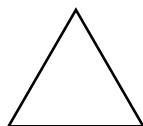
OBTUSE



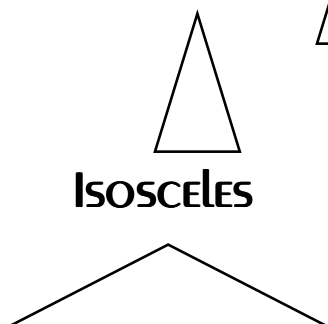
ACUTE



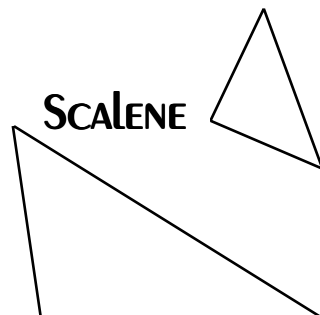
EQUILATERAL



ISOSCELES



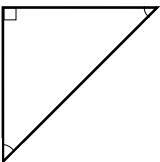
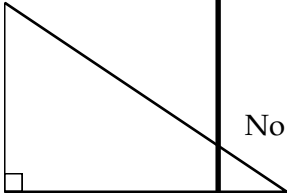
SCALENE



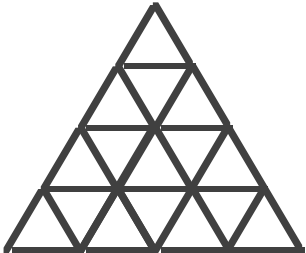
3.9 PRACTICE

Make a chart like the one below. Fill in the information from this lesson. It is called a characteristics matrix.

Geometric Figures

Name	Drawing	Sides	Angles
Right Triangle		2 equal	One 90° angle 2 equal
		No sides equal	Other 2 not equal

How many triangles are in this figure. Be sure to count small ones and large ones.



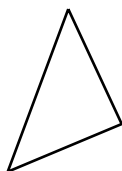
3.10 HOMEWORK

Identify these triangles. Use all the names that can apply. You may use a protractor.

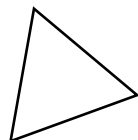
1.



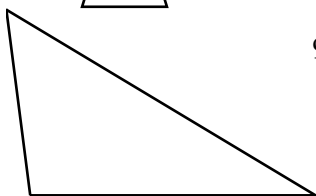
8.



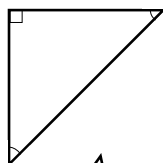
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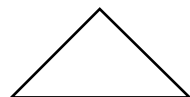
2.



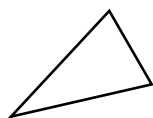
9.



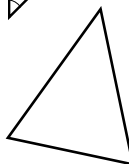
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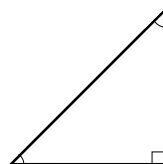
3.



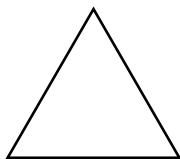
10.



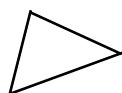
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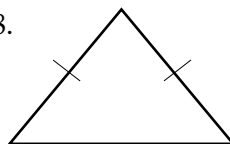
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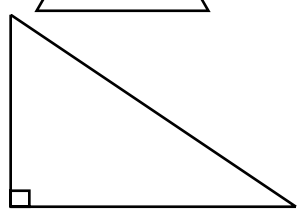
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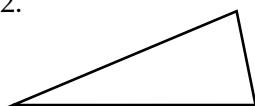
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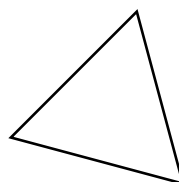
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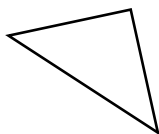
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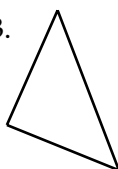
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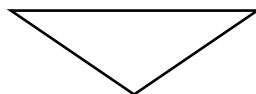
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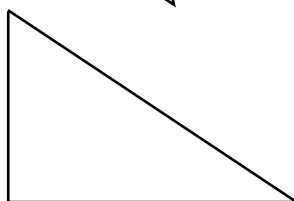
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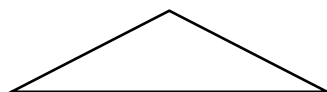
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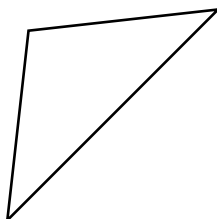
7.



14.



21.



3.11 VOCABULARY

Acute triangle
Bridges
Build
Category
Characteristic
Classify
Equilateral triangle
Isosceles triangle
Matrix
Memory chart
Obtuse triangle
Right triangle
Scalene triangle
Triangle

3.12 QUADRILATERALS

Quadrilaterals are figures with four sides. There are four kinds: Irregular Quadrilaterals, Trapezoids, Isosceles Trapezoids, Parallelograms, Rhombuses, Rectangles, and Squares.

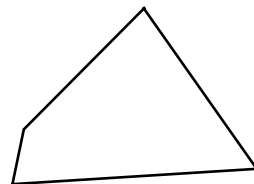
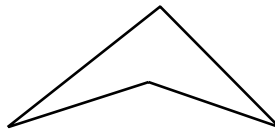
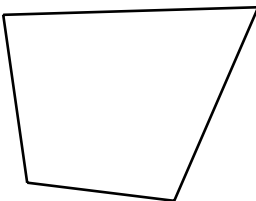
HINDU NUMERALS

1,000 A.D.

१	1
२	2
३	3
४	4
५	5
६	6
७	7
८	8
९	9
०	0

Irregular Quadrilaterals

Irregular quadrilaterals have four sides. No sides are equal. No angles are equal and no sides are parallel. They can be many different shapes.



Trapezoids

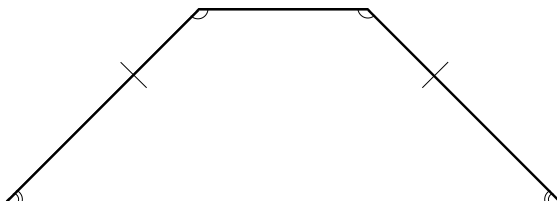


Trapezoids have only two sides parallel. We call these the two bases. Sides and angles do not have to be equal.



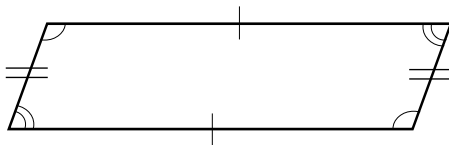
Isosceles Trapezoids

Isosceles trapezoids have two sides equal. They also have some angles equal.



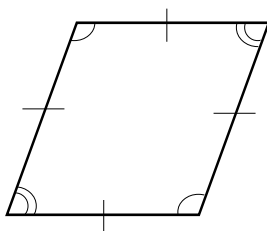
Parallelograms

Parallelograms have opposite sides equal and parallel. They also have opposite angles equal.



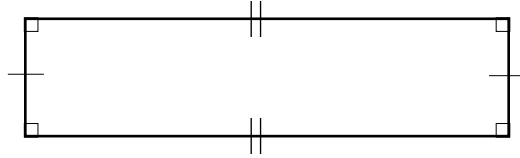
Rhombuses

Rhombuses are parallelograms with all four sides equal.



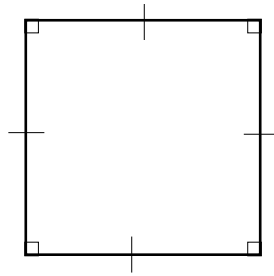
Rectangles

Rectangles have opposite sides equal and parallel. All angles are 90° . Rectangles are parallelograms.



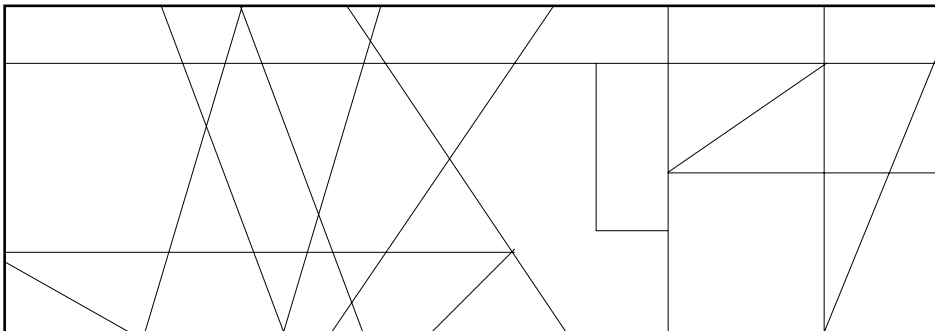
Squares

Squares are rectangles with all four sides equal. They are also rhombuses and parallelograms.



3.13 PRACTICE

Set A: Copy this onto your paper and identify the triangles and quadrilaterals in it.



Geometric Figures

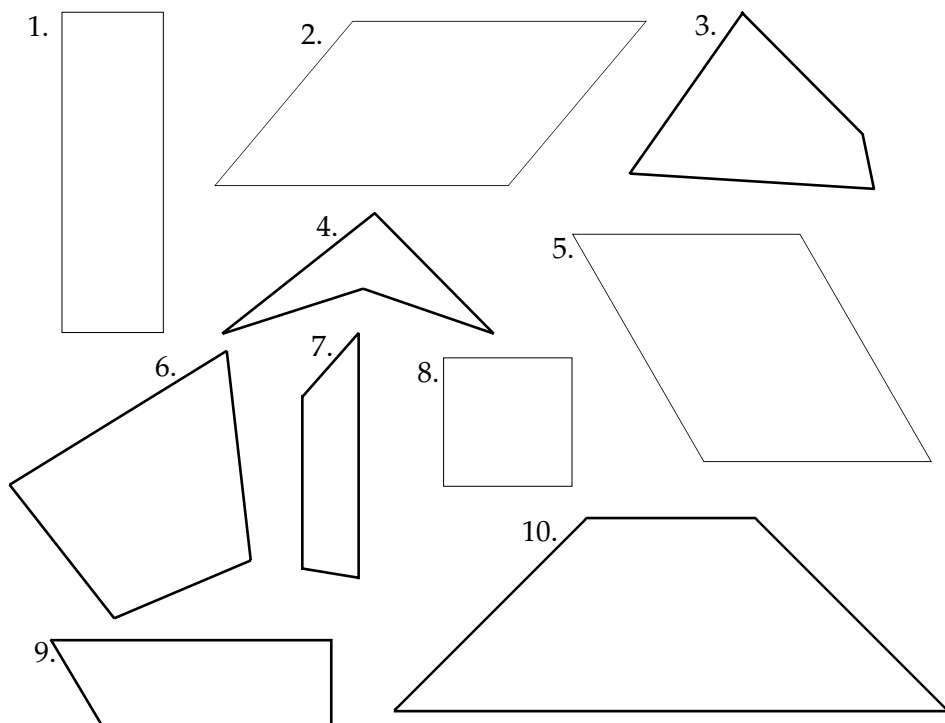
Set B: Make a memory chart like the one below. Fill in the information from this lesson. It is called a characteristics matrix.

Geometric Figures

Name	Drawing	Sides	Angles

3.14 HOMEWORK

Identify these figures.



5 VOCABULARY

Base
 Figure
 Irregular quadrilateral
 Isosceles trapezoid
 Parallelogram
 Quadrilateral
 Rhombus
 Rectangle
 Square
 Trapezoid

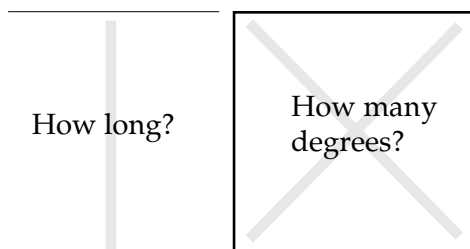
6 DRAWING FIGURES WITH A PROTRACTOR AND RULER

The figures that we have studied are easy to draw. You will need a protractor and a ruler. You need to know the facts below. They tell you how to draw regular polygons.

Regular polygons have all angles equal.

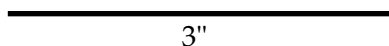
Figure	Number of Angles	Size	Total of All Angles
Triangle	3	60°	180°
Square	4	90°	360°
Pentagon	5	108°	540°
Hexagon	6	120°	720°
Octagon	8	135°	1080°

To draw a regular polygon you need to know how long to make each side and the number of degrees in each angle.

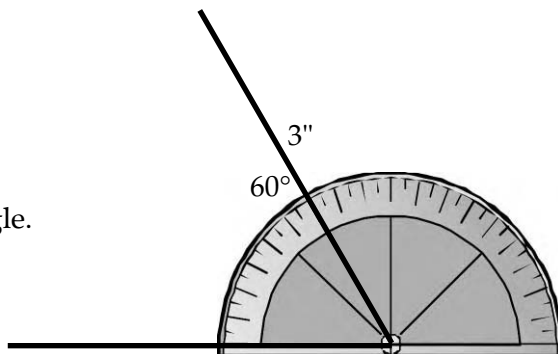


Geometric Figures

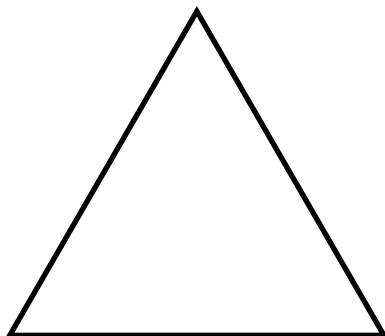
Let's draw a triangle with each side equal to three inches. First draw a line three inches long.



Then draw a 60° angle. The new line is also 3" long.



Then draw the last line. It will also be 3" long if your others are correct.



For other shapes you will have to make more angles and sides.

3.17 PRACTICE

Draw a pentagon with 3" sides. Follow these steps.

First, in the middle of your paper, draw a 3" line.

Second, make an angle of 108° . Draw the second side 3" long.

Third, draw another angle of 108° . Draw the third side 3" long.

Fourth, draw the next angle of 108° . Draw the fourth side 3" long.

Last, draw the fifth line to connect the first line and the fourth line.

3.18 HOMEWORK

Draw one triangle, one square, one pentagon, one hexagon, and one octagon. Make all the sides 2" long.

3.19 VOCABULARY

Angle
Degrees
Draw
Figure
Hexagon
Line
Octagon
Pentagon
Polygon
Protractor
Regular
Ruler
Sides
Square
Triangle

Names of Operations

English

add	subtract
multiply	divide

Latin

addere	deducere
multiplicare	dividere

Italian

aggiungere	sottrarre
multiplicare	dividere

Spanish

sumar	restar
multiplicar	dividir

German

hinzufügen	abziehen
vermehrten	teilen

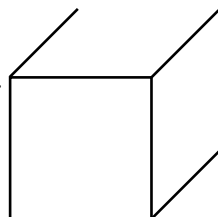
3.20 DRAWING Solid FIGURES

You can learn to draw solid figures on paper. You have to learn a few tricks. These will make your figures look real. The first thing is to draw a cube.

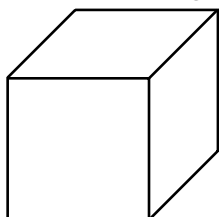
To do this first, draw a square.



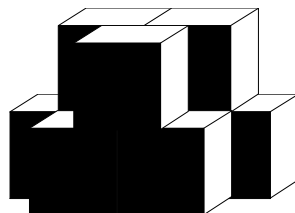
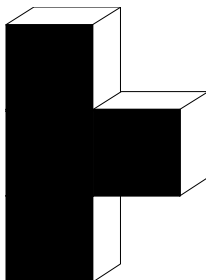
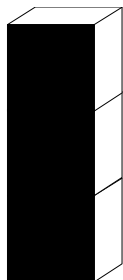
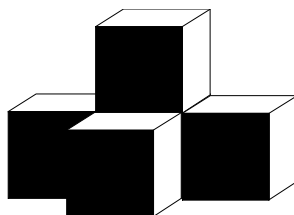
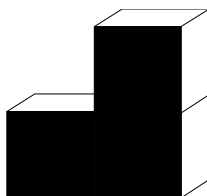
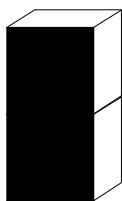
Then draw three diagonal lines from the corners. They should all be parallel.



Last, connect the diagonal lines in the back. This is a cube.

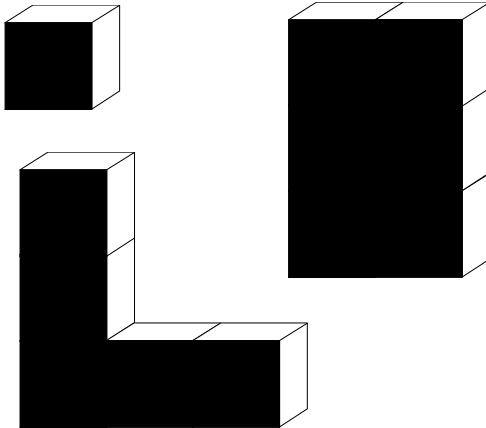


We can make many figures with cubes.



3.21 PRACTICE

Draw these shapes.



Now draw five shapes using five cubes in each one.

3.22 HOMEWORK

Draw as many shapes as you can, but they all must have only seven cubes.

3.23 CHALLENGE

Use the Names of Operations (Section 3.17) and the Numbers from Other Languages (Section 2.8) to do these problems. Write the answer in the same language.

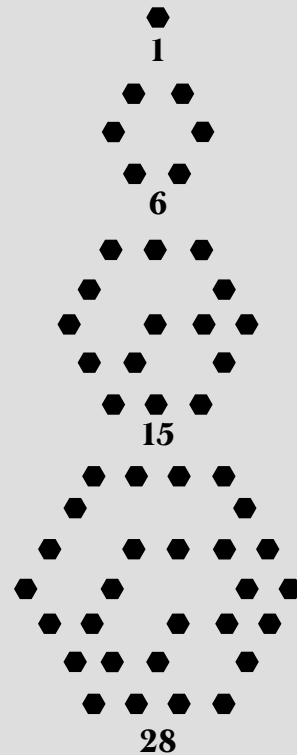
Example: acht teilen vier = zwei (German)

1. ein hinzufügen drei
2. acht abziehen vier
3. zehn teilen zwei
4. sex addere duo
5. novem deducere tres
6. unus multiplicare quattuor
7. octo dividere duo
8. sette aggiungere uno

9. otto sottrarre tre
10. due multiplicare cinque
11. dieci dividere due

Hexagonal Numbers

Hexagonal numbers are made by drawing bigger and bigger hexagons with dots. The first four are below.



Can you find the next three?

3.24 Vocabulary

Corner
 Cube
 Diagonal
 Draw
 Figure
 Real
 Shape
 Solid
 Trick

3.25 Classifying Solid Figures

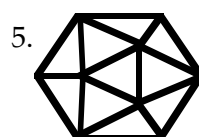
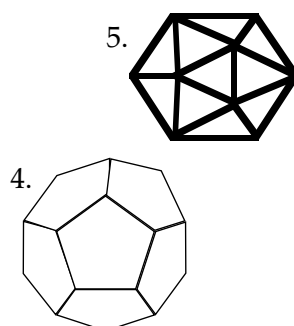
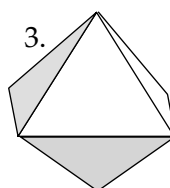
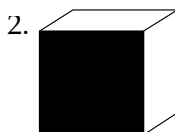
Solid figures can be classified into five kinds:

- Regular Polyhedrons
- Prisms and Cylinders
- Pyramids and Cones
- Spheres and Ovoids
- Composite Figures

All solid figures have surfaces like triangles, squares, or curved surfaces. Most solid figures have vertices. Vertices are the corners that stick out on a figure.

Regular Polyhedrons

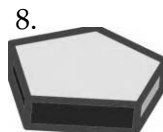
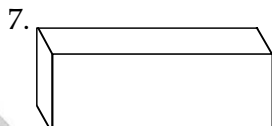
	<u>Name</u>	<u>Vertices</u>	<u>Surfaces</u>
1.	Tetrahedron	4	4 triangles
2.	Cube	8	6 squares
3.	Octahedron	6	8 triangles
4.	Dodecahedron	20	12 pentagons
5.	Icosahedron	18	20 triangles



Geometric Figures

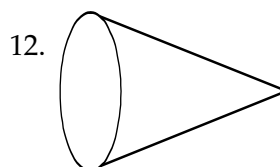
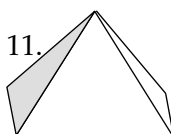
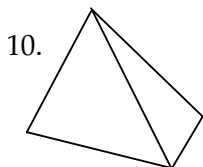
Prisms and Cylinders

	<u>Name</u>	<u>Vertices</u>	<u>Surfaces</u>
6.	Triangular Prisms	6	2 triangles & 3 rectangles
7.	Rectangular Prisms	8	6 rectangles
8.	Pentagonal Prisms	10	2 pentagons & 5 rectangles
9.	Cylinders	0	2 circles & 1 rectangle



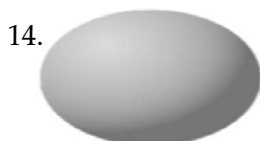
Pyramids and Cones

	<u>Name</u>	<u>Vertices</u>	<u>Surfaces</u>
10.	Triangular Based Pyramids	4	4 triangles
11.	Square Based Pyramids	5	4 triangles & 1 square
12.	Cones	1	1 circle & 1/2 circle



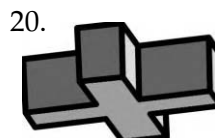
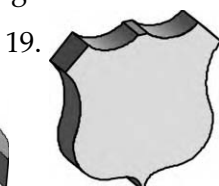
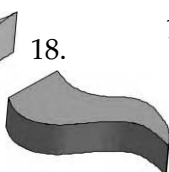
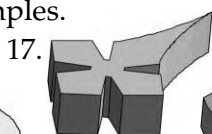
Spheres and Ovoids

	<u>Name</u>	<u>Vertices</u>	<u>Surfaces</u>
13.	Spheres	0	curved
14.	Ellipsoids	0	curved
15.	Ovoids	0	curved



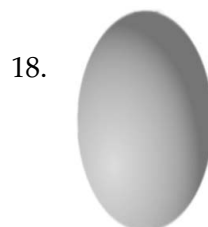
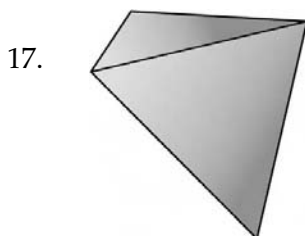
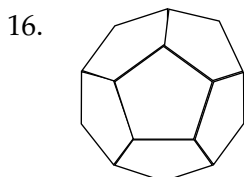
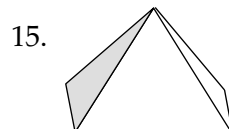
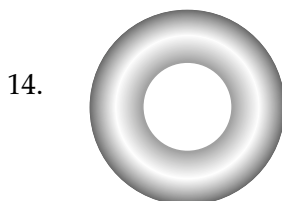
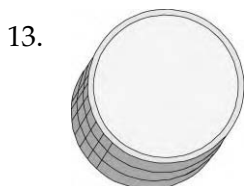
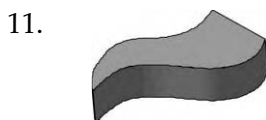
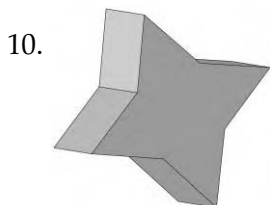
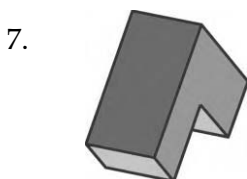
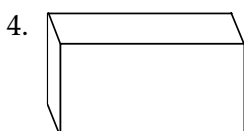
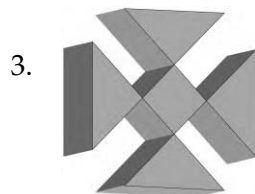
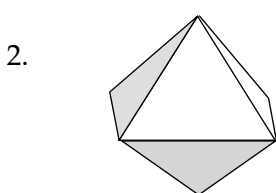
Composite Figures

Made of two other figures or parts of figures. Look at the drawings for some examples.



3.26 HOMEWORK

Identify these figures. If it is a composite figure, can you identify its parts?



3.27 VOCABULARY

Cone
Ellipsoid
Identify
Ovoid
Polyhedron
Prism
Pyramid
Rectangular prism
Sphere
Triangular prism

3.28 CHAPTER 3 VOCABULARY REVIEW

Use these words to answer the questions and problems below. Look up unfamiliar words in the dictionary. There may be more than one correct answer.

acute triangle
angles
base
base line
bridges
build
category
characteristic
classify
cone
cross
cube
cylinder
degrees
draw
ellipsoid
equilateral
figures
geometry
height
hexagon
hole
house

identify
information
irregular quadrilateral
isosceles trapezoid
isosceles triangle
left
length
line
line up
matrix
memory chart
obtuse triangle
octagon
ovoid
parallel
parallelogram
pentagons
perpendicular
point
polygons
polyhedron
prism
property

protractor
pyramid
quadrilateral
rhombuses
rectangular prism
rectangle
regular
right
right triangle
scalene triangle
scale
shapes
sides
strong
solid
sphere
square
surface
symbol
triangular prism
triangle
trapezoid
width

Geometric Figures

1. Geometry is the study of _____.
2. Two lines do not touch. They are _____.
3. An angle of 90° is a _____ angle.
4. Two lines are _____ if their angle is 90° .
5. We use a _____ to measure angles.
6. A protractor has a right and a left _____.
7. We measure angles in _____ ($^\circ$).
8. An _____ has all angles less than 90° .
9. An _____ has three sides and two are equal.
10. An _____ triangle has all sides equal.
11. An equilateral triangle is also an _____.
12. Trapezoids have two _____ parallel.
13. Parallelograms have opposite _____ equal.
14. Squares have all _____ and _____ equal.
15. _____ are parallelograms with all sides equal.
16. Regular _____ have all angles of 108° .
17. We use a protractor and ruler to _____ figures.
18. An _____ has eight angles.
19. To draw a cube first, draw a _____.
20. You can make many _____ with cubes.
21. A rectangular _____ has eight vertices.
22. A _____ and a _____ have curved surfaces.
23. Composite _____ are made of two other _____.

3.29 CHAPTER 3 PRACTICE TEST

Directions: Circle the correct answer.

1. A right angle is:
a. 80°
b. 90°
c. 100°
d. 110°
2. Two lines that do not touch are:
a. perpendicular
b. rectangular
c. parallel
d. characteristic
3. To measure an angle we use a:
a. protractor
b. pentagon
c. shape
d. ruler
4. An angle is made of two:
a. cubes
b. prisms
c. spheres
d. lines

5. How many equal sides are in an isosceles triangle?

- a. 0
- b. 1
- c. 2
- d. 3

6. A triangle with all small angles is:

- a. scalene
- b. acute
- c. right
- d. obtuse

7. How many parallel sides in a trapezoid?

- a. 1
- b. 2
- c. 3
- d. 4

8. A rectangle is also:

- a. a square
- b. a rhombus
- c. a polyhedron
- d. a parallelogram

9. A regular hexagon has angles of:

- a. 120°
- b. 135°
- c. 155°
- d. 168°

10. To draw a cube we start with a:

- a. triangle
- b. pentagon
- c. hexagon
- d. square

11. How many vertices in a rectangular prism?

- a. 4
- b. 6
- c. 8
- d. 10

12. Which figure has triangular surfaces?

- a. a cube
- b. a cylinder
- c. an ellipsoid
- d. an icosahedron

13. Which triangle has a 90° angle?

- a. a right
- b. an acute
- c. an equilateral
- d. a scalene

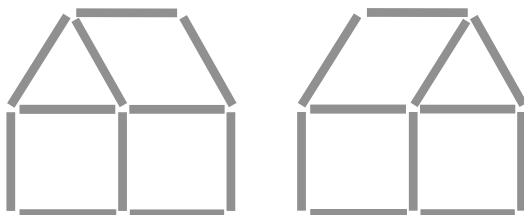
14. Which figure has a circle in it?

- a. a pyramid
- b. a cone
- c. a cube
- d. a prism

3.30 ANSWERS TO PUZZLES

From Section 3.1

Please see book.



From Section 3.4

The first seven Square Numbers are 1, 4, 9, 16, 25, 36, and 49.

From Section 3.6

There are 12 rectangular prisms in the figure.

From Section 3.7

The first seven pentagonal numbers are 1, 5, 12, 22, 35, 51, and 70.

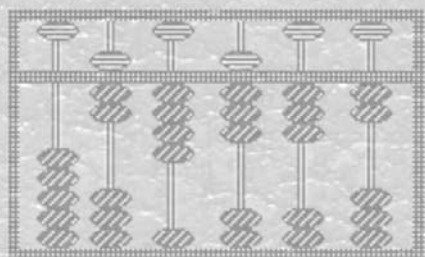
From Section 3.9

The figure has 16 small triangles, 6 with four small triangles in them, 3 with nine small triangles in them, and 1 large triangle. The total is 26 triangles in the figure.

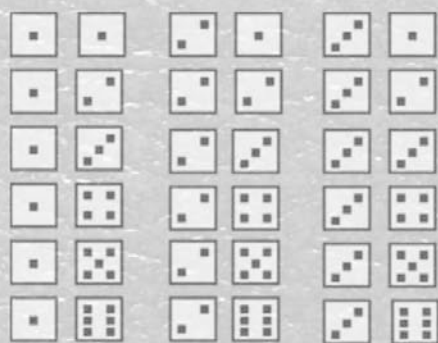
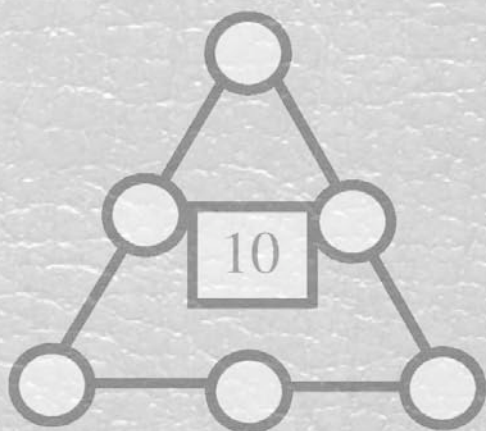
From Section 3.21

The first seven hexagonal numbers are 1, 6, 15, 28, 47, 68, and 93.

Chapter 4



Addition & Subtraction



4.1 Addition AND SUBTRACTION

We write problems in two different ways. One way is horizontally. The other way is vertically.

This problem is horizontal.

$$83 + 47 = 130$$

We say, "Eighty-three plus forty-seven equals one hundred thirty."

This problem is vertical.

$$\begin{array}{r} 83 \\ + 47 \\ \hline 130 \end{array}$$

We say, "Eighty-three plus forty-seven equals one hundred thirty." We say them the same way.

This subtraction problem is horizontal.

$$193 - 76 = 117$$

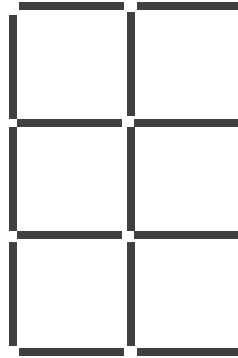
We say, "One hundred ninety-three minus seventy-six equals one hundred seventeen."

This problem is vertical.

$$\begin{array}{r} 193 \\ - 76 \\ \hline 117 \end{array}$$

We say, "One hundred ninety-three minus seventy-six equals one hundred seventeen." We say them the same way.

Challenge



Remove six sticks from this figure, and leave only two squares.

Addition & Subtraction

4.2 PRACTICE

Set A: Read these problems aloud.

1. $17 + 44 = 61$

2. $59 + 83 = 142$

3. $97 - 53 = 44$

4. $123 - 85 = 38$

$$\begin{array}{r} 194 \\ +84 \\ \hline 278 \end{array}$$

$$\begin{array}{r} 217 \\ +63 \\ \hline 280 \end{array}$$

$$\begin{array}{r} 587 \\ +95 \\ \hline 682 \end{array}$$

$$\begin{array}{r} 698 \\ -88 \\ \hline 610 \end{array}$$

$$\begin{array}{r} 744 \\ -29 \\ \hline 715 \end{array}$$

Set B: Spell out these problems with words.

10. $83 + 97 = 180$

12. $59 - 45 = 14$

11. $15 + 19 = 34$

13. $88 - 75 = 13$

$$\begin{array}{r} 275 \\ +97 \\ \hline 372 \end{array}$$

$$\begin{array}{r} 458 \\ +75 \\ \hline 533 \end{array}$$

$$\begin{array}{r} 621 \\ +95 \\ \hline 716 \end{array}$$

$$\begin{array}{r} 487 \\ -79 \\ \hline 408 \end{array}$$

$$\begin{array}{r} 652 \\ -38 \\ \hline 614 \end{array}$$

Set C: Write these problems horizontally with numerals.

19. Forty-three plus seventy-six equals one hundred nineteen

20. Eighty-four plus fifty-three equals one hundred thirty-seven

21. One hundred eighteen minus sixty-nine equals forty-nine

22. Ninety-six minus fourteen equals eighty-two

Set D: Write these problems vertically with numerals.

23. Seventy-eight plus ten equals eighty-eight

24. One hundred sixty-nine plus four hundred seventy-eight equals six hundred forty-seven

25. Five hundred eighty-one minus four hundred ninety-five equals eighty-six

4.3 HOMEWORK

Set A: Spell out these problems with words.

1. $86 + 59 = 145$

4. $195 - 87 = 108$

2. $123 + 78 = 201$

5. $459 - 237 = 222$

3. $457 + 119 = 576$

6. $672 - 599 = 73$

Addition & Subtraction

$$\begin{array}{r} 7. \ 567 \\ +78 \\ \hline 645 \end{array}$$

$$\begin{array}{r} 8. \ 412 \\ +55 \\ \hline 467 \end{array}$$

$$\begin{array}{r} 9. \ 198 \\ +88 \\ \hline 286 \end{array}$$

$$\begin{array}{r} 10. \ 412 \\ -123 \\ \hline 289 \end{array}$$

$$\begin{array}{r} 11. \ 319 \\ -57 \\ \hline 262 \end{array}$$

Set B: Write these problems with numerals. Write them horizontally.

12. Fifty-three plus seventy-nine equals one hundred thirty-two

13. Eighty-five plus one hundred fifty-three equals two hundred thirty-eight

14. One hundred eighty-four minus fifty-nine equals one hundred twenty-five

15. Two hundred ninety-two minus forty-seven equals two hundred forty-five

16. Five hundred eighty-one minus four hundred ninety-six equals eighty-five

Set C: Write these problems vertically with numerals.

17. Seventy-five plus eighteen equals ninety-three.

18. One hundred forty-two plus four hundred sixty-seven equals six hundred nine.

19. Three hundred seven minus two hundred twenty-five equals forty-seven.

20. Six hundred eighty-four minus five hundred ten equals one hundred seventy-four.

21. Two hundred eighteen minus one hundred seventy-eight equals forty.

MODERN CHINESE NUMERALS

一 1

二 2

三 3

四 4

五 5

六 6

七 7

八 8

九 9

十 10

4.4 VOCABULARY

Equals
Horizontal
Minus
Plus
Vertical

4.5 ADDITION STORY PROBLEMS

There are many story problems. You have to read the story, and then do the problem. Most problems follow models. We will study these models.

Model 1:

John has five toys. He buys two more toys. How many toys does he have all together?

The **person** is the one who acts. A problem will also use pronouns (he or she) or proper nouns (a name).

The **numbers** count or measure things. Sometimes they are spelled out (one, two, three, etc.). Sometimes they are numerals (1, 2, 3, etc.).

The **units** tell us what is counted or measured. **Units** can be anything.

The **key words** tell us what operation to do. "All together" means to add. The numbers are in the story. The other words tell us the units and the person who is in the story.

Person **Numbers** **Units** **Key words**

John has five toys. He buys two more toys. How many toys does he have all together?

Addition & Subtraction

We can make many new problems by changing the person, numbers, and units.

Person/Name

John (he) Sam (he) Mary (she)

Numbers

five/two eight/ten seventeen/six

Units

toys apples basketballs

New problem #1: Sam has eight apples. He buys ten more apples. How many apples does he have all together?

New problem #2: Mary has seventeen basketballs. She buys six more basketballs. How many basketballs does she have all together?

4.6 PRACTICE

Use Model 1. Write three new problems. Use other persons, numbers, and units.

4.7 HOMEWORK

Read these problems. List the person, numbers, units, and key words. Then solve the problem.

Example: Sam has eight apples. He buys ten more apples. How many apples does he have all together?

Person:

Sam (he)

Numbers:

eight and ten

Units:

apples

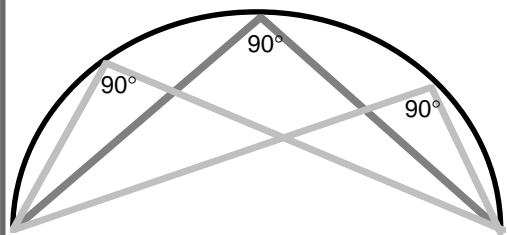
Key words:

all together

$$\begin{array}{r} 8 \\ +10 \\ \hline 18 \end{array} \text{ apples}$$

1. Juan has seventeen horses. He buys twenty-nine more horses. How many horses does he have all together?
2. Maria has fifty-eight books. She buys fourteen more books. How many books does she have all together?
3. Wayne has twenty-one golf balls. He buys thirty-nine more golf balls. How many golf balls does he have all together?
4. Ricky has ninety-seven comic books. He buys one hundred eighteen more comic books. How many comic books does he have all together?
5. Samuel has four hundred eighty-five apples. He buys one hundred twenty-eight more apples. How many apples does he have all together?
6. Gerald has three hundred sixteen candy bars. He buys four hundred eighty-seven more candy bars. How many candy bars does he have all together?
7. Pamela has one thousand four hundred apples. She buys eight hundred seventy-five more apples. How many apples does she have all together?
8. Monica has six thousand one hundred seventy IBM stocks. She buys three thousand five hundred eighty-one more IBM stocks. How many IBM stocks does she have all together?
9. Jessica has forty-four thousand eight hundred twenty-five gold coins. She buys seven thousand fifty-six more gold coins. How many gold coins does she have all together?
10. Javier has two hundred eighty-seven thousand three hundred eighty-one acres of land. He buys seventy-five thousand eight hundred eleven more acres of land. How many acres of land does he have all together?

A Curious Fact



Any angle drawn inside a half circle, like these, is exactly 90°.

4.8 VOCABULARY

All together
Key words
More
Number
Person
Story problem
Unit

4.9 Adding MONEY

We often add money. At the store we add prices. At home we add our bills. At the cafeteria we add up how much the food will cost.

Some key words that will help you do story problems with money are listed on this chart. Look for them in these problems.

Example 1: You buy food at the store. You come home. The register tape is torn. Can you add these prices?

The word add tells you what to do.

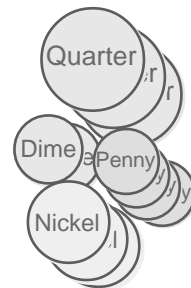
$$\begin{array}{r} 1.89 \\ 3.29 \\ .79 \\ 5.29 \\ +6.99 \\ \hline \$18.25 \end{array}$$

1.89
3.29
.79
5.29
6.99

Example 2: You look in your pocket. You find some coins. How much do you have?

The question, "How much do you have?" tells you what to do.

$$25¢ + 25¢ + 25¢ + 10¢ + 10¢ + 5¢ + 5¢ + 5¢ + 1¢ + 1¢ + 1¢ + 1¢ = \$1.14$$

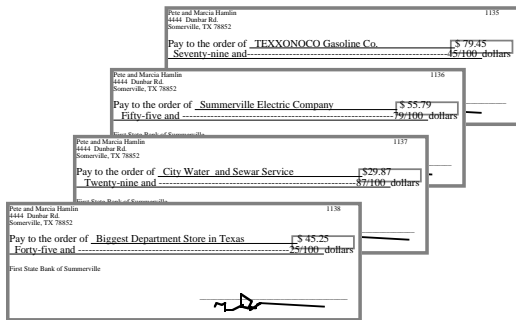
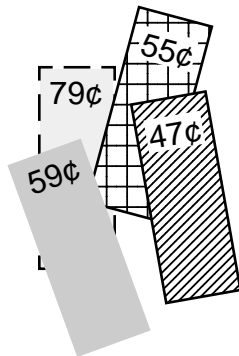


Addition & Subtraction

Example 3: You go to the store. You want to buy some candy. How much will it cost?

The important words are **buy** and **cost**. It tells you to add the prices.

$$\begin{array}{r} \$.79 \\ .47 \\ .55 \\ + .59 \\ \hline \$2.40 \end{array}$$



Example 4: You pay the bills. These are your checks. How much did you spend?

The **key word** is spend. It tells you to add.

$$\begin{array}{r} \$79.45 \\ \$55.79 \\ \$29.87 \\ + \$45.25 \\ \hline \$210.36 \end{array}$$

4.10 PRACTICE

Read these problems and write the person, numbers, units, and key words. Then find the answer.

1. You buy food at the store. You come home. The register tape is torn. It says \$3.79, \$2.99, \$1.09, and \$.79. Can you add these prices?
2. You look in your pocket. You find 2 quarters, 1 dime, and 5 nickles. How much do you have?
3. You go to the store. You want to buy some candy. The prices are 49¢, 79¢, and 89¢. How much will it cost?
4. You pay the bills. You write checks for \$99.15, \$75.00, \$84.11, \$100.45, and \$21.16. How much did you spend?

4.11 AMERICAN MONEY**Coins**

Penny	1¢ or \$.01
Nickle	5¢ or \$.05
Dime	10¢ or \$.10
Quarter	25¢ or \$.25
Half dollar	50¢ or \$.50

Bills

A dollar bill	\$1.00
Five dollars	\$5.00
Ten dollars	\$10.00
Twenty dollars	\$20.00
Fifty dollars	\$50.00
One hundred dollars	\$100.00

Checks

Checks, money orders, cashier's checks, certified checks, and credit card charge slips can be written for any amount. They are all forms of money.

4.12 HOMEWORK

Read these problems and write the person, numbers, units, and key words. Then find the answer.

1. You buy food at the store and come home. The register tape is torn. It says \$5.99, \$2.19, \$6.45, \$.89, and \$.49. Can you add these prices?
2. You look in your pocket. You find 4 quarters, 3 dimes, 2 nickles, and 7 pennies. How much do you have?
3. You look in your pocket. You find 5 quarters, 1 dime, 12 nickles, and 21 pennies. How much do you have?
4. You go to the store. You want to buy some candy. It costs 39¢, 59¢, and 79¢. How much will it cost?
5. You pay the bills and write checks for \$45.99, \$75.25, \$88.12, \$125.00, \$12.99, and \$27.67. How much did you spend?

4.13 VOCABULARY

All together
More
Cost
Add
Spend
Buy
How much do you have?

A Strange Pattern

Choose a number like 5.

Multiply it by 9.

$$5 \times 9 = 45$$

Now multiply 45 by

123456789.

$$45 \times 123456789 = 5555555505$$

Try any other number.

Multiply it by 9.

Then multiply the answer
times 123456789.

Do you get the same results?

4.14 SUBTRACTION STORY PROBLEMS

Many story problems use subtraction. We lose things. We eat things. We spend money. We give things to others. We sell things. All these actions can be made into subtraction problems. The **key word** for many subtraction problems is **left**.

Model 2:

Samuel buys nine pizzas. He eats three. How many does he have left?

Using this model, we can write more problems.

Samuel buys **nine** **pizzas**. **He** eats **three**. How many does **he** have **left**?

Person

Samuel (he) Joseph (he) Isabel (she)

Numbers

nine/three sixteen/nine twenty/six

Units

pizzas candy bars grapes

New problem #1: Joseph buys sixteen candy bars. He eats nine. How many does he have left?

New problem #2: Isabel buys twenty grapes. She eats six. How many does she have left?

4.15 PRACTICE

Use Model 2 to write three new problems. Use other persons, numbers, and units.

4.16 MORE SUBTRACTION STORY PROBLEMS

Some subtraction problems use things to sell. Look at this model.

Model 3:

Maria sells newspapers. She has fifty newspapers to sell. She sells thirty-three. How many does she have left?

Using this model, let's write more problems.

Maria sells newspapers. She has fifty newspapers to sell. She sells thirty-three. How many does she have left?

Person

Maria/she Jennifer/she Matthew/he

Numbers

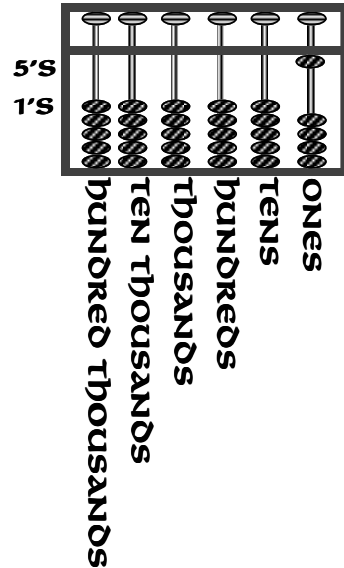
50/33 24/7 100/66

Units

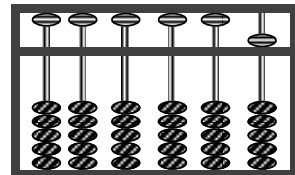
papers candy bars raffle tickets

THE JAPANESE ABACUS

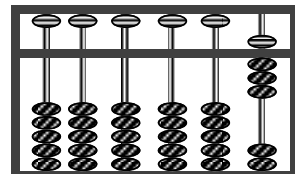
THIS ONE IS THE NUMBER "1".



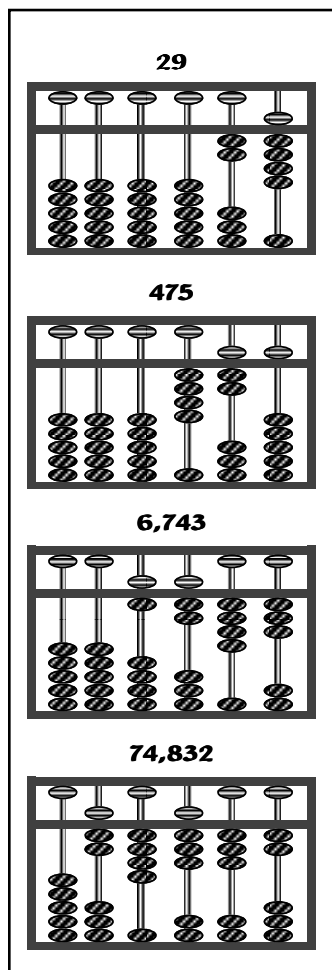
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8



Addition & Subtraction



New problem #1: Jennifer sells candy bars. She has twenty-four to sell. She sells seven. How many does she have left?

New problem #2: Matthew sells raffle tickets. He has one hundred to sell. He sells sixty-six. How many does he have left?

4.17 PRACTICE

Use Model 3 to write three new problems. Use other persons, numbers, and units.

4.18 HOMEWORK

Read these problems. List the person, numbers, units, and key words. Then solve the problem.

1. Harry buys four sandwiches. He eats two. How many does he have left?
2. Patricia buys one hundred nine candies. She eats fifty-six. How many does she have left?
3. William buys twelve pears. He eats nine. How many does he have left?
4. Caroline buys twenty-four hotdogs. She eats three. How many does she have left?
5. Jesse sells dance tickets. He has one hundred fifty to sell. He sells ninety-seven. How many does he have left?
6. Julie sells candy grams. She has seventy-five to sell. She sells thirty-nine. How many does she have left?
7. Omar sells comics. He has fifty-nine to sell. He sells twenty-five. How many does he have left?
8. Susan sells lollipops. She has one hundred forty-four to sell. She sells eighty-seven. How many does she have left?

4.19 VOCABULARY

Buy
At
Give
Left
Lose
Sell
Spend

4.20 GETTING CHANGE PROBLEMS

We spend money at the store. We add the prices to see how much we spend all together. Then we subtract to find how much change we receive. This kind of problem uses addition and subtraction. The key word is change.

Some problems only subtract. Look at this model. The key word is "change." It tells you to subtract.

Model 4:

Mary has \$20.00. She spends \$12.95 at the grocery store. How much **change** does she receive?

Person

Mary/she; Henry/he; Gabriel/he

Numbers

20.00/12.95 50.00/33.50 10.00/7.00

Units

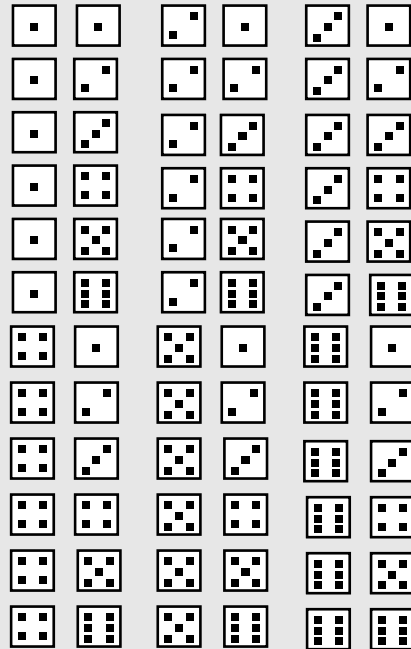
These stay the same in change problems. \$ \$ \$

Kind of store

grocery, auto parts, drugstore

Pairs of Number Cubes

This figure shows all the combinations of two number cubes. Look at the combinations. How many add up to 6? How many add up to 7? How many add up to 12?



Make a list.

- 2 comes up _____ time(s).
- 3 comes up _____ time(s).
- 4 comes up _____ time(s).
- 5 comes up _____ time(s).
- 6 comes up _____ time(s).
- 7 comes up _____ time(s).
- 8 comes up _____ time(s).
- 9 comes up _____ time(s).
- 10 comes up _____ time(s).
- 11 comes up _____ time(s).
- 12 comes up _____ time(s).

Addition & Subtraction

New problem #1: Henry has \$50.00. He spends \$33.50 at the auto parts store. How much change does he receive?

New problem #2: Gabriel has \$10.00. He spends \$7.00 at the drug store. How much change does he receive?

4.21 PRACTICE

Use Model 4 to write two new problems. Use other persons, numbers, and kinds of stores.

4.22 MORE GETTING CHANGE PROBLEMS

Some problems use addition and subtraction. First, you add all the things to buy. Then, you subtract from the money you have. Look at this model. The key word **and** tells you to add. The key word **change** tells you to subtract.

Model 5:

Hiro has \$5.00. He buys a hamburger for \$1.25 and a drink for \$.79. How much change does he receive?

The key word **and** tells you to add.

$$\begin{array}{r} \$1.25 \\ +.79 \\ \hline \$2.04 \end{array}$$

Then the key word **change** tells you to subtract

$$\begin{array}{r} \$5.00 \\ -2.04 \\ \hline \$2.96 \end{array}$$

Person

Hiro he

Alice she

Daphne she

Numbers

\$5.00/\$1.25/\$.79

\$20.00/\$4.95/\$2.95

\$10.00/\$2.95/\$3.15

Units

\$

\$

\$

Things to buy

hamburger/drink

book/magazine

lipstick/mascara

New problem #1: Alice has \$20.00. She buys a book for \$4.95 and a magazine for \$2.95. How much change does she receive?

New problem #2: Daphne has \$10.00. She buys a lipstick for \$2.95 and a mascara for \$3.15. How much change does she receive?

4.23 PRACTICE

Write two new problems. Use other persons, numbers, and things to buy.

4.24 HOMEWORK

Read these problems. List the person, numbers, units, and kind of store or things to buy. Then solve the problem.

1. Juan has \$30.00. He spends \$23.90 at the discount store. How much change does he receive?
2. Phil has \$20.00. He buys a fan belt for \$5.95 and a heater hose for \$7.25. How much change does he receive?
3. Li Mei has \$35.00. She buys a textbook for \$22.95 and a notebook for \$1.95. How much change does she receive?

4.25 VOCABULARY

All together
More
Cost
Add
Spend
Buy
How much do you have?
Left
Change

4.26 MIXED STORY PROBLEMS

Most mathematics books have many story problems. They have many kinds on the same page. Sometimes you will have to add. Sometimes you will have to subtract or multiply. Always look at the key words for help. This list of key words tells you the operation to use.

all together +
more +
cost +
add +
spend +
buy +
how much +
left -
change - or + & -
both +
all +
each x

4.27 HOMEWORK

Read these problems. Underline the key words. Then do the problems.

1. Roberto has fifteen baseballs. He buys five more baseballs. How many baseballs does he have all together?
2. Michael has \$30.00. He spends \$24.95. How much change does he get?
3. Vishnu paid his bills. They were \$55.99, \$84.75, and \$125.76. How much are all the bills?
4. Mr. Park owns three stores. He has fifteen employees at one store, twenty-eight at the second store, and nineteen at the third store. How

many employees does he have all together?

5. Charles had twenty-nine students. He lost three last week. How many does he have left?

6. Tina has five hundred patches. She buys twenty-five more. How many does she have all together?

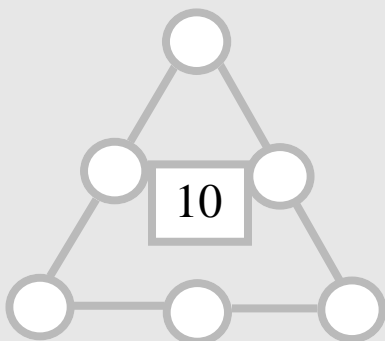
7. Alicia has a ten dollar bill, five quarters, and two pennies. How much money does she have?

8. Alfred has \$20.00. He buys a drink for \$.89, a hotdog for \$1.29, and a bag of chips for \$.79. How much change does he receive?

9. Paula wants to buy a camera for \$179.88 and a flash attachment for \$89.99. How much will both cost?

Magic Triangle

Put the numbers 1, 2, 3, 4, 5, and 6 in the circle. Each side must add up to ten.



10. Alex has \$20.00. He spends \$12.50. How much change does he receive?
11. David has eighteen football stickers. He buys three more. How many stickers does he have?
12. Susan drove 58.7 miles on Monday and 78.3 miles on Tuesday. How many miles did she drive on both days?
13. Dora has \$10.00. She buys three candy bars. They cost 79¢ each. How much change does she receive?
14. Frank has \$10.00. He buys an order of fries for \$.89, a hamburger for \$1.89, and a drink for \$.69. How much change does he get?
15. Carmen wrote checks for \$18.99, \$43.77, and \$78.00. How much are all the checks?
16. Hue has eighty watches to sell. She sells fourteen. How many are left?
17. Jeanie has fifty-five silver thimbles. She buys six more on vacation. How many thimbles does she have?
18. LaToya had seven quarters. She lost two. How much money does she have left?
19. Larry buys three magazines. They cost \$3.95, \$2.95, and \$4.50. How much do all the magazines cost?
20. Belinda wants to buy a candy bar for \$.89, a magazine for \$2.95, a burrito for \$1.29, a drink for \$.75, and an ice cream bar for \$.79. How much will it cost all together?
21. John drives 2.5 miles to work. He drives 4.2 miles to the store and then 3.9 miles back home. How many miles does he drive all together?
22. Leland paid his bills. He paid \$55.75 to the electric company, \$95.00 to the bank, \$250.60 for his car, \$798.00 for the mortgage, and \$45.33 for the water bill. How much did he pay in all?
23. Mario has fifteen apples. He eats six. How many does he have left?
24. Olga had five keys. She lost two. How many does she have left?

Another Strange Pattern

Multiply $2 \times 7 = 14$

Then multiply 14×15873 .

The answer is 222222.

Try $3 \times 7 = 21$

Then $21 \times 15873 =$

What is the answer?

Try other numbers.

Addition & Subtraction

25. Mr. Apodaca teaches science. He has twenty-three students in third period class and twenty-nine students in fifth period. How many students are in both classes?
26. Fatima had \$50.00. She gave \$20.00 to her son. How much does she have left?
27. Karen buys 2.5 pounds of ham and 3.2 pounds of turkey at the delicatessen. How much do both packages weigh?
28. Taylor bought four books. They cost \$12.95, \$21.50, \$8.95, and \$15.00. How much did they all cost?
29. Austin wants to buy a VCR for \$219.99, and a TV for \$289.99. How much will both cost?
30. Ana Maria has a five dollar bill, three quarters, and two dimes. How much money does she have?
31. Dean has one hundred sixteen cars to sell. He sells sixty-one. How many cars are left?

4.28 CHAPTER 4 VOCABULARY REVIEW

Use these words to answer the questions and problems below. Look up unfamiliar words in the dictionary. There might be more than one correct answer.

action	identify	price
add	key words	problems
all together	kinds	sell
bill	left	solve
buy	list	store
change	lose	story
chart	means	spend
checks	model	tell
cost	money	things
eat	minus	toys
give	operation (s)	units
help	person	vertical
horizontal	plus	

1. The key word, **more**, means to _____.
2. Addition and subtraction are _____.
3. Problems can be horizontal or _____.
4. The key word, _____, means to subtract.
5. We read the sign, "-", with the word, _____.

6. Quarters, dimes, and nickles are _____.
7. We write _____ to pay bills.
8. Pizzas and money can be ____ in story problems.
9. We _____ money to buy things.
10. We receive _____ at the store after we pay for something.

Unscramble these vocabulary words:

- | | | |
|---------------|-------------|--------------|
| 11. suimn | 16. inydtfe | 21. tocnia |
| 12. ntrpoeaio | 17. khescc | 22. libl |
| 13. puls | 18. loes | 23. sryto |
| 14. syto | 19. dad | 24. eghnac |
| 15. ivge | 20. sleov | 25. lvtiaerc |

4.29 CHAPTER 4 PRACTICE TEST**Directions: Circle the correct answer.**

- | | | |
|--|---|--|
| 1. What form is the problem, $17 + 23 = 40$, written in?
a. vertical
b. identify
c. all together
d. <u>horizontal</u> | 3. What operation does the key word, "more," tell you to do?
a. multiplication
b. subtraction
c. <u>addition</u>
d. division | 5. You look in your pocket and find two quarters, three dimes, and two pennies. How much do you have?
a. \$.75
b. \$.82
c. <u>\$1.05</u>
d. \$1.07 |
| 2. How do you say the word for the symbol "-"?
a. unit
b. cost
c. plus
d. <u>minus</u> | 4. Hamid has thirteen candy bars. He buys six more. How many does he have?
a. 19 candy bars
b. <u>13 candy bars</u>
c. 7 candy bars
d. 6 candy bars | 6. You buy some candy for 59¢, 69¢, and 25¢. How much will it cost?
a. \$1.53
b. <u>\$1.50</u>
c. \$.69
d. \$.59 |

Addition & Subtraction

7. Manny buys seven apples. He eats four. How many are left?

- a. 3 apples
- b. 4 apples
- c. 7 apples
- d. 11 apples

8. Ms. Brown has thirty students in one class and thirty-five in another. How many does she have in both classes?

- a. 65 students
- b. 55 students
- c. 7 students
- d. 5 students

9. Receiving change in a story problem means to:

- a. add
- b. subtract
- c. multiply
- d. divide

10. Maude has \$30.00. She buys a hair blower for \$14.95 and a bottle of make up for \$7.99. How much change does she get back?

- a. \$6.96
- b. \$7.06
- c. \$7.99
- d. \$9.00

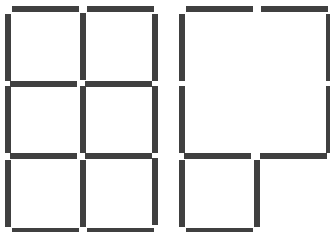
11. Harry buys 3.5 lbs. of oranges and 2.9 lbs. of apples. How much does his bag of fruit weigh?

- a. 0.6 lbs.
- b. 3.5 lbs.
- c. 5.4 lbs.
- d. 6.4 lbs.

12. What key word tells you to subtract?

- a. more
- b. buy
- c. left
- d. cost

4.30 ANSWERS TO PUZZLES



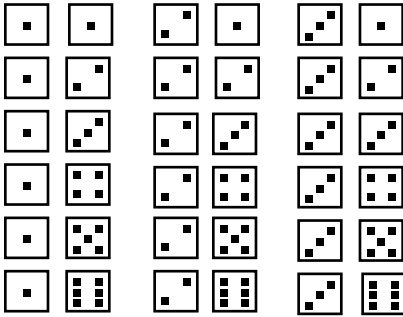
From Section 4.1

Remove six sticks and leave only two squares.

From Section 4.13

1 x 9 x 123456789 = 1111111101
2 x 9 x 123456789 = 2222222202
3 x 9 x 123456789 = 3333333303
4 x 9 x 123456789 = 4444444404
5 x 9 x 123456789 = 5555555505
6 x 9 x 123456789 = 6666666606
7 x 9 x 123456789 = 7777777707
8 x 9 x 123456789 = 8888888808
9 x 9 x 123456789 = 9999999909

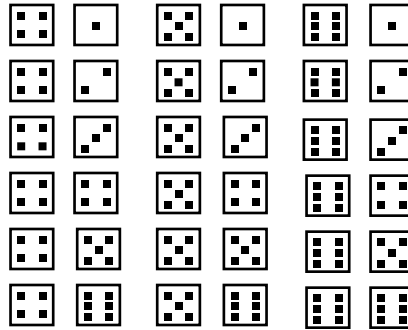
Addition & Subtraction



7 comes up 6 times.
 8 comes up 5 times.
 9 comes up 4 times.
 10 comes up 3 times.
 11 comes up 2 times.
 12 comes up 1 time.

From Section 4.19

2 comes up 1 time.
 3 comes up 2 times.
 4 comes up 3 times.
 5 comes up 4 times.
 6 comes up 5 times.

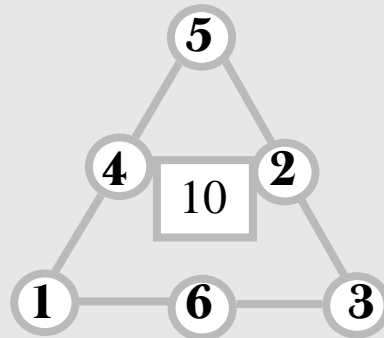


From Section 4.27

$1 \times 7 \times 15873 = 111111$
 $2 \times 7 \times 15873 = 222222$
 $3 \times 7 \times 15873 = 333333$
 $4 \times 7 \times 15873 = 444444$
 $5 \times 7 \times 15873 = 555555$
 $6 \times 7 \times 15873 = 666666$
 $7 \times 7 \times 15873 = 777777$
 $8 \times 7 \times 15873 = 888888$
 $9 \times 7 \times 15873 = 999999$

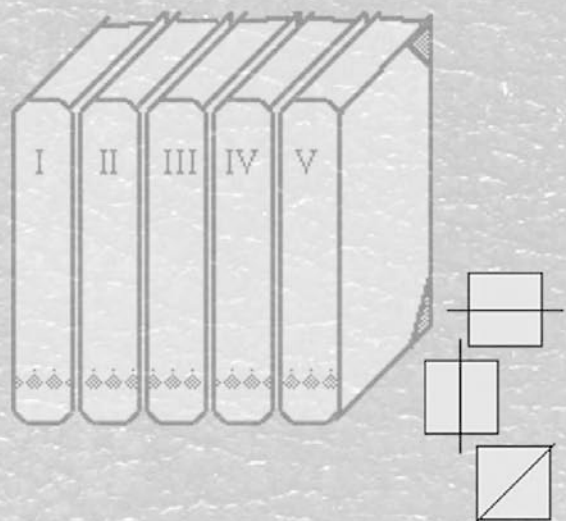
Magic Triangle

Put the numbers 1, 2, 3, 4, 5, and 6 in the circle. Each side must add up to ten.

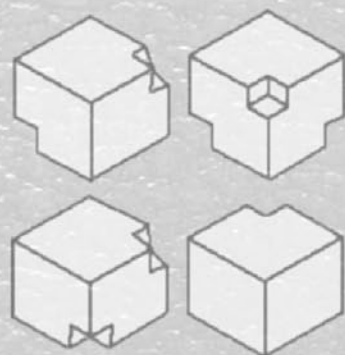


From Section 4.27

Chapter 5



Rounding & Estimating



5.1 Rounding TENS

Rounding is approximating a number. It is changing a hard number into an easy number with a zero at the end. Rounding makes some problems easy to do.

The directions always say, "Round to the nearest ten." The **key words** are **round** and **nearest ten**.

<u>10</u>	<u>BECOMES</u>	<u>10</u>
<u>11</u>	<u>BECOMES</u>	<u>10</u>
<u>12</u>	<u>BECOMES</u>	<u>10</u>
<u>13</u>	<u>BECOMES</u>	<u>10</u>
<u>14</u>	<u>BECOMES</u>	<u>10</u>
<u>15</u>	<u>BECOMES</u>	<u>20</u>
<u>16</u>	<u>BECOMES</u>	<u>20</u>
<u>17</u>	<u>BECOMES</u>	<u>20</u>
<u>18</u>	<u>BECOMES</u>	<u>20</u>
<u>19</u>	<u>BECOMES</u>	<u>20</u>
<u>20</u>	<u>BECOMES</u>	<u>20</u>



The rule for rounding tens:

First, look at the digits in the tens and ones places.

tens
ones
 56,789
 ↑↑

Then make the tens digit bigger if the ones digit is big.

56,790

tens
ones
 32,473
 ↑↑

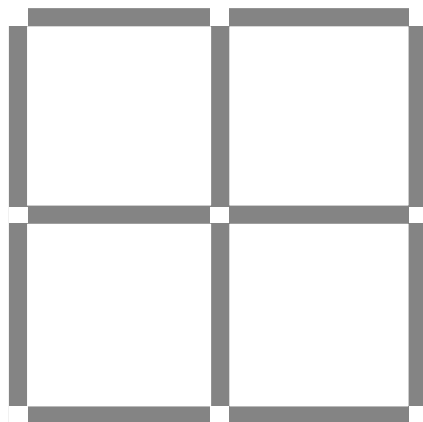
Do not change the tens digit if the ones digit is small.

32,470

Also, the ones digit always becomes zero!

Rounding and Estimating

Move four lines and make only three squares. All the squares will be the same size. Use all the lines, but none of the sides will touch.



5.2 EXAMPLES

Round to the nearest ten.

9	becomes	10
4	becomes	0
37	becomes	40
22	becomes	20
98	becomes	100
54	becomes	50
225	becomes	230
254	becomes	250
279	becomes	280
393	becomes	390
589	becomes	590
580	becomes	580
995	becomes	1,000
994	becomes	990
4,785	becomes	4,790
5,972	becomes	5,970

5.3 PRACTICE

Set A: Identify as big or small ones digit.

- | | | | |
|------|------|--------|--------|
| 1. 5 | 5. 2 | 9. 6 | 13. 37 |
| 2. 3 | 6. 9 | 10. 8 | 14. 82 |
| 3. 7 | 7. 0 | 11. 23 | 15. 70 |
| 4. 1 | 8. 4 | 12. 98 | 16. 44 |

Set B: Round to the nearest ten.

- | | | | |
|--------|--------|---------|-----------|
| 17. 21 | 22. 60 | 27. 155 | 32. 982 |
| 18. 43 | 23. 39 | 28. 510 | 33. 321 |
| 19. 55 | 24. 54 | 29. 233 | 34. 707 |
| 20. 26 | 25. 47 | 30. 664 | 35. 878 |
| 21. 32 | 26. 78 | 31. 446 | 36. 2,199 |

5.4 HOMEWORK

Round to the nearest ten.

- | | |
|--------|-----------|
| 1. 14 | 11. 241 |
| 2. 63 | 12. 826 |
| 3. 9 | 13. 482 |
| 4. 26 | 14. 168 |
| 5. 41 | 15. 604 |
| 6. 53 | 16. 1,313 |
| 7. 72 | 17. 7,757 |
| 8. 37 | 18. 3,990 |
| 9. 85 | 19. 9,535 |
| 10. 98 | 20. 5,079 |

5.5 VOCABULARY

Approximating
Bigger
Changing
Digit
Easy
End
Hard
Round
Nearest
Nearest ten

5.6 ROUNDING BIG NUMBERS

How many students are in your class? We sometimes say, "About twenty." How many students are in your school? We sometimes say, "About one thousand." The word **about** means that we rounded the number.

The directions always say, "Round to the nearest ____." The key word in the blank tells you how many zeroes will be in the answer.

ADDING ROMAN NUMERALS

ROMAN NUMERALS WERE VERY HARD TO WORK WITH. ANY PROBLEMS COULD BE VERY LONG AND COMPLICATED. LOOK AT THE ADDITION PROBLEM.

XIX
XVIII
XXXVII

+ LXXXVIII

LXXXXXXXXXIXVVVVIII

THIS BECOMES...

LXXXXXXXXXIXVVVVII

THIS BECOMES...

LXXXXXXXXXIXIII

THIS BECOMES...

LLIXIII

THIS BECOMES...

CLIXIII

THIS BECOMES...

CLXII

THIS IS THE ANSWER.
COMPARE THIS TO THE
WAY WE ADD...

3
19
18
37
+ 88
162

Rounding and Estimating

Round to the nearest **ten** means one zero in the answer.

Answers like: 10 or 20 or 140

Round to the nearest **hundred** means two zeros in the answer.

Answers like: 100 or 700 or 3200

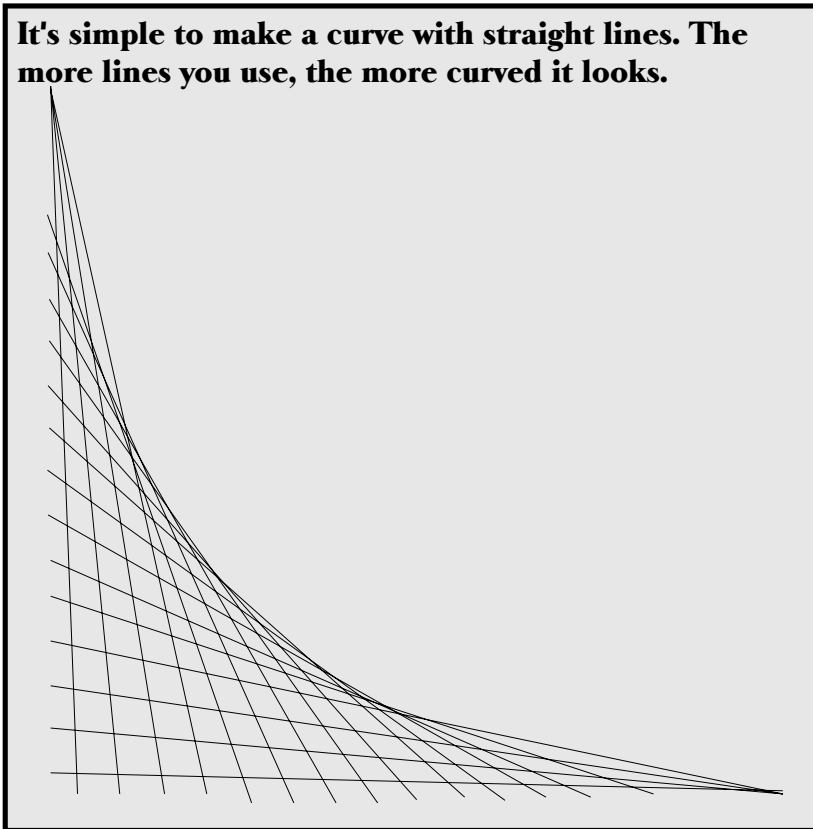
Round to the nearest **thousand** means three zeros in the answer.

Answers like: 2,000 or 5,000 or 11,000

Round to the nearest **ten thousand** means four zeros in the answer.

Answers like: 50,000 or 90,000 or 170,000

It's simple to make a curve with straight lines. The more lines you use, the more curved it looks.



5.7 EXAMPLES

Round to the nearest ten.

23 becomes 20

282 becomes 280

49 becomes 50

5,239 becomes 5,240

Round to the nearest hundred.

214 becomes 200

2,112 becomes 2,110

386 becomes 400

5,672 becomes 5,700

Round to the nearest thousand.

24,723 becomes 25,000

189,534 becomes 190,000

Round to the nearest ten thousand.

147,147 becomes 150,000

281,520 becomes 280,000

5.8 PRACTICE

Set A: Round to the nearest ten.

1. 15

2. 60

3. 27

4. 84

5. 39

Set B: Round to the nearest hundred.

6. 122

8. 839

10. 774

12. 357

14. 109

7. 508

9. 243

11. 458

13. 660

15. 916

Set C: Round to the nearest thousand.

16. 5,151

21. 49,147

17. 6,422

22. 1,475

18. 83,898

23. 7,636

19. 9,581

24. 3,873

20. 22,006

Set D: Round to the nearest ten thousand.

25. 37,404

26. 97,810

27. 261,685

28. 85,054

29. 10,866

30. 217,477

31. 44,522

32. 39,231

33. 539,968

How big will it get?

$\frac{1}{2}$

+ $\frac{1}{4}$ ($2 \times 2 = 4$)

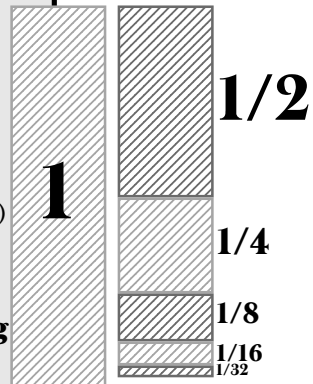
+ $\frac{1}{8}$ ($4 \times 2 = 8$)

+ $\frac{1}{16}$ ($8 \times 2 = 16$)

+ $\frac{1}{32}$ ($16 \times 2 = 32$)

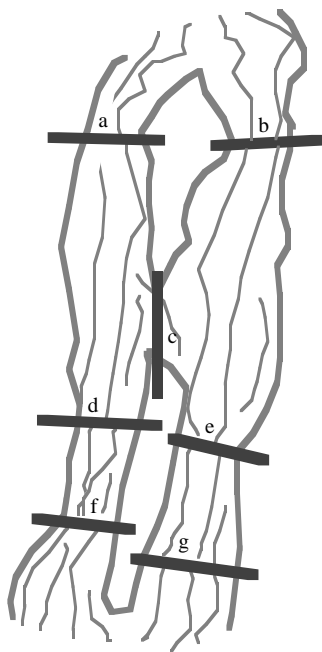
+ $\frac{1}{64}$...

If we continue adding more fractions like these, will the sum ever be larger than one? Maybe this graphic representation might help you decide.



Königsberg Bridge Problem

This map represents a city on two islands in a river. Can you cross all the bridges just one time? The bridges are labeled a through g.



5.9 HOMEWORK

Set A: Round to the nearest ten.

- | | |
|-------|---------|
| 1. 94 | 6. 70 |
| 2. 30 | 7. 85 |
| 3. 16 | 8. 383 |
| 4. 46 | 9. 495 |
| 5. 62 | 10. 674 |

Set B: Round to the nearest hundred.

- | | |
|---------|-----------|
| 11. 760 | 16. 909 |
| 12. 298 | 17. 556 |
| 13. 825 | 18. 704 |
| 14. 133 | 19. 111 |
| 15. 147 | 20. 8,780 |

Set C: Round to the nearest thousand.

- | | |
|-----------|------------|
| 21. 4,899 | 26. 2,650 |
| 22. 9,518 | 27. 2,038 |
| 23. 6,761 | 28. 23,092 |
| 24. 2,013 | 29. 55,458 |
| 25. 3,241 | |

Set D: Round to the nearest ten thousand.

- | | |
|------------|-------------|
| 30. 83,770 | 35. 35,849 |
| 31. 12,193 | 36. 149,531 |
| 32. 46,289 | 37. 933,162 |
| 33. 87,162 | 38. 467,570 |
| 34. 96,004 | |

5.10 VOCABULARY

- Round
- Round nearest ten
- Round nearest hundred
- Round nearest thousand
- Round nearest ten thousand

5.11 ESTIMATING

We use rounding to make some problems easier. Estimating is approximating the answer to a problem. We can estimate addition problems (+). We can estimate subtraction problems (-) and multiplication problems (x). We can even estimate division problems (÷). The key word is always **estimate**.

EXAMPLES

Estimate the answers.

299 + 807 is about 300 + 800, which is 1,100.

637 - 479 is about 600 - 500, which is 100.

27 x 79 is about 30 x 80, which is 2,400.

597 ÷ 22 is about 600 ÷ 20, which is 30.

Estimating an answer is easy to do. First, round to the biggest place in the smaller number. Then do the operation. Many times you can do this in your head. It is very easy way to do a problem.

5.12 EXAMPLES

Estimate 2,243 + 793

The problem becomes: 2,200 + 800 = 3,000

Estimate 227 - 43

The problem becomes: 230 - 40 = 190

Estimate 22,475 x 2,356

The problem becomes: 23,000 x 2,000 = 46,000,000

Estimate 275,823 ÷ 123

The problem becomes: 275,800 ÷ 100 = 2,758

Round to the biggest place of the smaller number.

5.13 PRACTICE

Estimate the answer:

- | | | | |
|------------------|------------------|-------------------|-------------------|
| 1. 155 + 326 = | 5. 414 - 448 = | 9. 224 x 63 = | 13. 6,763 ÷ 193 = |
| 2. 314 + 53 = | 6. 9,306 - 623 = | 10. 1395 x 417 = | 14. 5,619 ÷ 695 = |
| 3. 206 + 937 = | 7. 5,928 - 593 = | 11. 7,295 x 771 = | 15. 7,812 ÷ 178 = |
| 4. 4,107 + 214 = | 8. 684 - 328 = | 12. 848 x 813 = | |

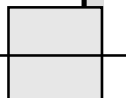
Rounding and Estimating

Symmetry

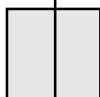
A figure is symmetric if it can be divided in half. Each half is a reflection of the other. This square is symmetric.



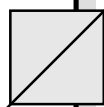
It can be divided horizontally.



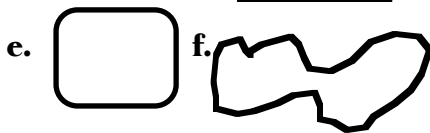
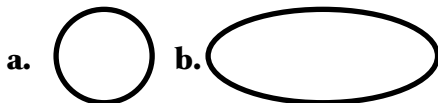
It can be divided vertically.



It can be divided diagonally.



Which of these figures are symmetrical?



5.14 HOMEWORK

Estimate the answer:

1. $532 + 615 =$
2. $405 + 31 =$
3. $693 + 720 =$
4. $2,140 + 410 =$
5. $1,444 - 834 =$
6. $6,623 - 993 =$
7. $2,859 - 592 =$
8. $432 - 268 =$
9. $562 \times 31 =$
10. $954 \times 171 =$
11. $9,577 \times 172 =$
12. $885 \times 687 =$
13. $3,008 \div 264 =$
14. $1,969 \div 547 =$
15. $6,351 \div 361 =$
16. $24,977 \div 495 =$

5.15 VOCABULARY

Estimate
Round
Nearest ten
Nearest hundred
Nearest thousand
Nearest ten thousand

5.16 ROUNDING DECIMAL FRACTIONS

We round decimal fractions often. Sometimes we do this when we divide or multiply. We always do this when we make calculations with money. We round decimal fractions in percent problems, also.

The directions always say, "Round to the nearest _____. Then, they tell you the place name. This key word tells you how many places after the decimal point will have numbers. If the answer will have no digits after the decimal point the key words are whole numbers.

5.17 EXAMPLES

Round to the nearest tenth. (Each answer has only one decimal place.)

12.88 becomes 12.9

17.01 becomes 17.0

24.953 becomes 25.0

Round to the nearest hundredth. (Each answer has two decimal places.)

5.123 becomes 5.12

12.467 becomes 12.47

31.091 becomes 31.09

Round to the nearest thousandth. (Each answer has three decimal places.)

4.6432 becomes 4.643

0.9659 becomes 0.966

93.00461 becomes 93.005

Round to the nearest whole number. (Each answer is a whole number.)

16.43 becomes 16

29.5 becomes 30

67.49 becomes 67

0.21 becomes 0

0.556 becomes 1

5.18 PRACTICE

Set A: Round to the nearest tenth.

1. 16.87 3. 27.36

2. 93.156 4. 21.05

Set B: Round to the nearest hundredth.

5. 6.423 7. 3.5442

6. 4.611 8. 0.325

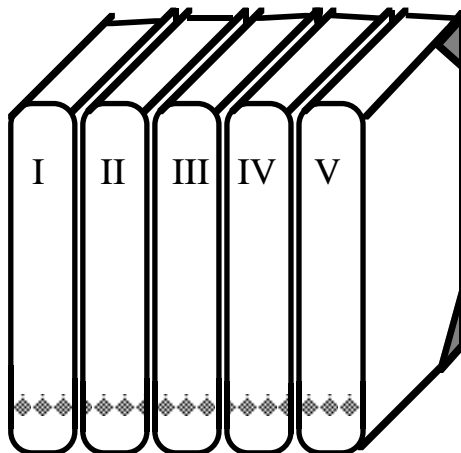
Set C: Round to the nearest thousandth.

9. 1.4314 11. 3.6422

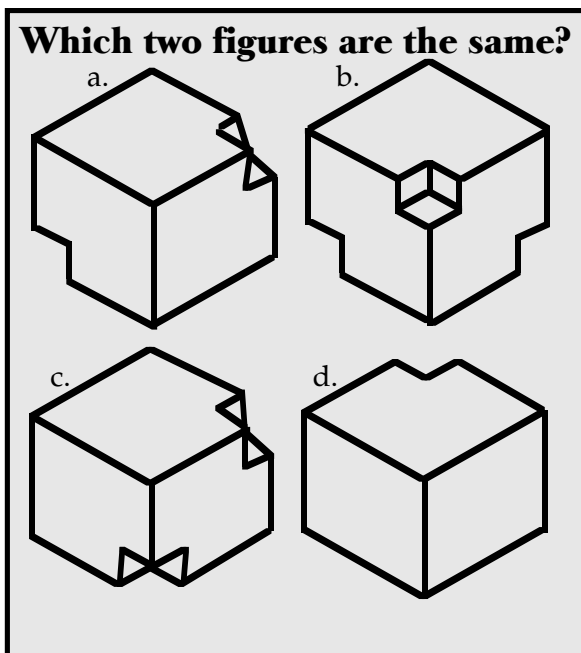
10. 4.8253 12. 1.5436

The Bookworm

A bookworm began eating his way through a set of five books on the shelf. He began at the front cover of volume one and ate through to the back cover of volume five. If each volume was one inch thick, how many inches did he eat through?



Rounding and Estimating



Set D: Round to the nearest whole number.

- 13. 4.4
- 14. 3.31
- 15. 16.27
- 16. 25.6

5.19 HOMEWORK

Set A: Round to the nearest tenth.

- | | | | |
|-----------|----------|----------|-----------|
| 1. 27.78 | 3. 16.49 | 5. 3.42 | 7. 42.821 |
| 2. 56.562 | 4. 21.06 | 6. 93.33 | 8. 69.98 |

Set B: Round to the nearest hundredth.

- | | | | |
|----------|-----------|------------|-----------|
| 9. 6.144 | 10. 3.215 | 11. 12.015 | 12. 9.995 |
|----------|-----------|------------|-----------|

Set C: Round to the nearest thousandth.

- | | | | |
|------------|-------------|------------|-------------|
| 13. 0.5624 | 14. 16.0255 | 15. 5.9236 | 16. 23.9996 |
|------------|-------------|------------|-------------|

Set D: Round to the nearest whole number.

- | | | | |
|---------|-----------|----------|-----------|
| 17. 0.6 | 18. 24.12 | 19. 6.99 | 20. 12.45 |
|---------|-----------|----------|-----------|

5.20 VOCABULARY

Nearest tenth
Nearest hundredth
Nearest thousandth
Nearest whole number

5.21 ROUNDING IN MONEY PROBLEMS

Our money comes in dollars and cents. Cents are decimal fractions. Cents are hundredths of a dollar.

One dollar is written "\$1.00." Twenty-five cents can be written either "25¢" or "\$.25."

Since \$.01 is the smallest amount of money we have, we have to round off to the nearest cent in many calculations.

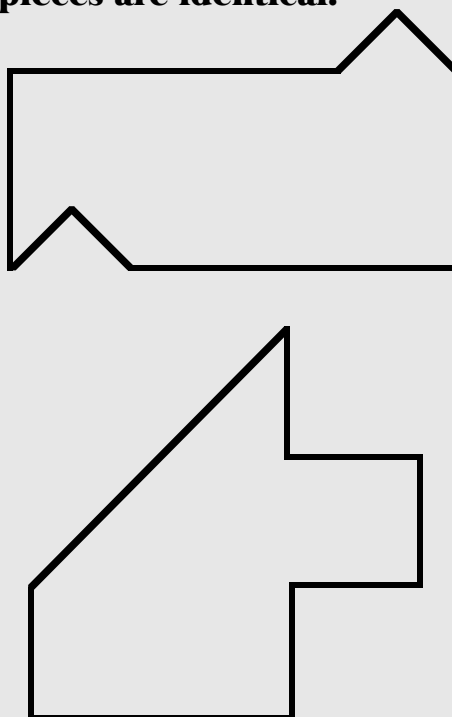
5.22 EXAMPLES

$$\begin{array}{r}
 \$1.25 \\
 \times .25 \\
 \hline
 605 \\
 2500 \\
 \hline
 \$3.105 \text{ becomes } \$3.11
 \end{array}$$

$$\begin{array}{r}
 \$.678 \text{ becomes } \$.68 \\
 7 \overline{) \$4.75} \\
 \underline{42} \\
 55 \\
 \underline{49} \\
 60 \\
 \underline{56} \\
 4...
 \end{array}$$

"Round off to the nearest cent," means, "Round off to the nearest hundredth." We use the same rule. We put a dollar sign (\$) in front of the number.

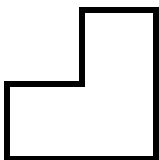
Can you divide these figures into two pieces so that both pieces are identical?



Symmetry Again!

Which of these figures are symmetrical?

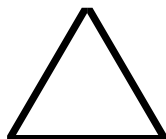
a.



b.



c.



d.



e.



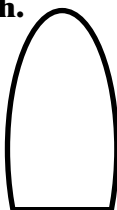
f.



g.



h.



5.23 PRACTICE

Round off to the nearest cent.

1. \$6.1151
2. \$52.978
3. \$82.154
4. \$.7469
5. \$.3472
6. \$36.568
7. \$10.521
8. \$65.235
9. \$.3893
10. \$96.286
11. \$23.014
12. \$78.077
13. \$47.863
14. \$.422
15. \$.69345
16. \$.0098

5.24 HOMEWORK

Set A: Round off to the nearest cent.

1. \$2.101
2. \$5.576
3. \$10.829
4. \$.2421
5. \$4.317
6. \$.4383
7. \$7.784
8. \$.6552

Set B: Multiply and then round off to the nearest cent.

9. $2.35 \times 6.22 =$
10. $12.33 \times 6.2 =$

11. $15.90 \times 0.52 =$

12. $2.25 \times 0.1 =$

13. $14.23 \times 0.16 =$

14. $19.99 \times 3.5 =$

Set C: Divide and then round off to the nearest cent.

15. $\$15.02 \div 6 =$

18. $\$2.50 \div 4 =$

16. $\$3.25 \div 8 =$

19. $\$100.00 \div 13 =$

17. $\$5.50 \div 8 =$

20. $\$200.00 \div 3 =$

5.25 VOCABULARY

Dollar

Dollar sign

Cent

Money

Nearest cent

5.26 CHAPTER 5 VOCABULARY REVIEW

Use these words to answer the questions and problems below.
Look up unfamiliar words in the dictionary. There might be more than one correct answer.

about	fractions	front	round off
aproximating	decimal	has	rounding
addition	places	head	rule
always	decimal	hundred	same
answer	point	hundredth	say
amount	directions	like	since
becomes	divide	money	small
big	division	multiplication	smallest
biggest	dollar sign	multiply	subtraction
both	dollars	nearest	ten
calculation	easier	often	ten thousand
cent	easy	ones place	tenth
change	either	percent	thousand
close	estimate	problem	thousandth
comes	estimating	raise	whole number
decimal	estimation	round	very

- Round to the _____ ten.
- the number 5.43 has two _____ places.
- $8 + 4$ is an _____ problem.
- For $12 \cdot 3 = 36$, 36 is the _____.
- In the number 8.53, the symbol "." is a _____.
- The symbol "\$" is the _____.
- _____ is approximating the value of a number.
- The number 84 _____ 80 when you round.
- The number \$3.988 needs to be rounded to the nearest _____.
- The problem $800 + 700$ is an _____ of the problem $823 + 698$.

5.27 CHAPTER 5 PRACTICE TEST

Directions: Circle the correct answer.

Round to the nearest ten:

1. 84

- a. 70
- b. 80
- c. 85
- d. 85

2. 23

- a. 10
- b. 20
- c. 25
- d. 30

3. 115

- a. 105
- b. 110
- c. 115
- d. 120

Round to the nearest hundred:

4. 224

- a. 100
- b. 120
- c. 130
- d. 200

5. 569

- a. 500
- b. 560
- c. 570
- d. 600

6. 1,459

- a. 1,000
- b. 1,400
- c. 1,460
- d. 1,500

Round to the nearest tenth:

7. 17.45

- a. 17
- b. 17.4
- c. 17.5
- d. 18

8. 2.31

- a. 2
- b. 2.3
- c. 2.4
- d. 3

9. 0.821

- a. 0.7
- b. 0.8
- c. 0.82
- d. 1.0

Round to the nearest cent:

10. \$8.215

- a. \$8.00
- b. \$8.21
- c. \$8.22
- d. \$8.30

11. \$.123

- a. \$.11
- b. \$.12
- c. \$.13
- d. \$.20

12. \$12.4379

- a. \$12.40
- b. \$12.43
- c. \$12.44
- d. \$12.438

Estimate the answer:

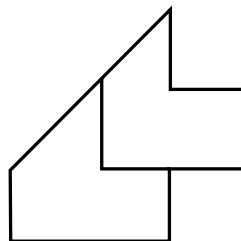
13. $88 + 19$

- a. 100
- b. 107
- c. 110
- d. 117

14. $262 - 37$

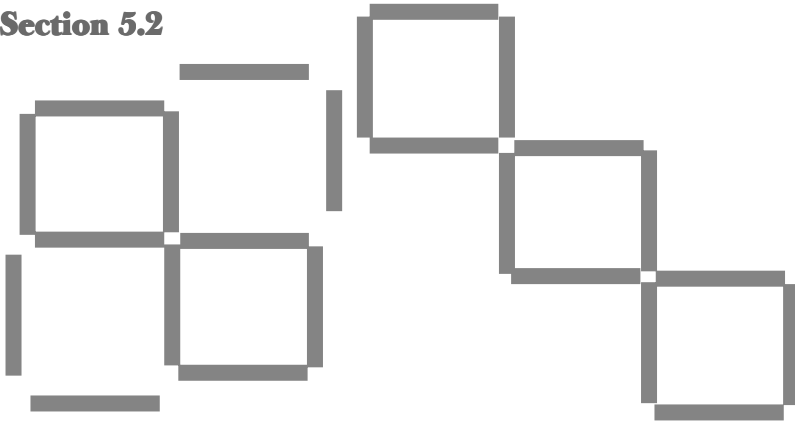
- a. 220
- b. 225
- c. 230
- d. 260

From Section 5.22



5.28 ANSWERS TO PUZZLES

From Section 5.2



From Section 5.8

The addition of the fractions $1/2 + 1/4 + 1/8 + 1/16 \dots$ will never be bigger than the number one. The reason is that you always go just half the distance that remains.

From Section 5.9

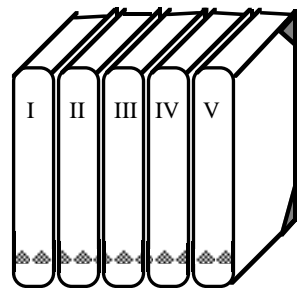
It is impossible to cross all the bridges just one time. The reason for this is the odd number of bridges that lead to the northern island.

From Section 5.14

The figures a, b, c, and e are symmetrical.

From Section 5.17

The book worm would eat through three inches only.



From Section 5.19

Figures B and C could be the same. To see this, rotate figure B one quarter turn in a counter-clockwise direction.

From Section 5.22

The figure on the opposite page can be divided into two equal parts. The other cannot.

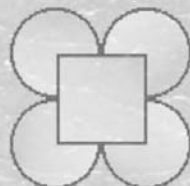
From Section 5.23

Figures a, c, e, and h are symmetrical.

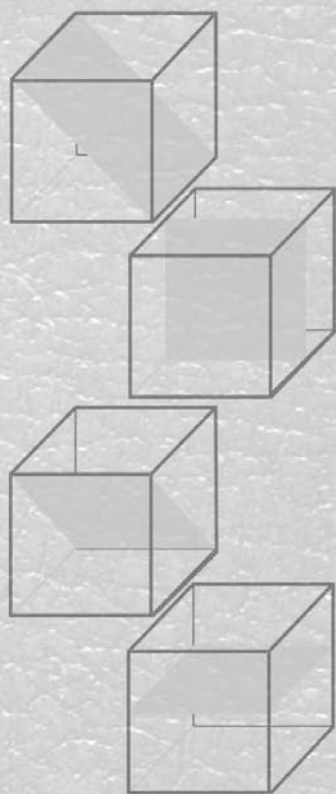
Volume 1 begins here.

Volume 5 ends here.

Chapter 6



Multiplication



10000
10001
10010
10011
10100
10101
10110
10111
11000
11001
11010
11011
11100
11101
11110
11111
100000
100001
100010
100011
100100
100101
100110
100111
101000
101001
101010
101011
101100
101101
101110

6.1 Multiplication

We write multiplication problems in two different ways. One way is horizontally. The other way is vertically.

This problem is horizontal.

$$593 \times 127 = 75,311$$

We say, "Five hundred ninety-three times one hundred twenty-seven equals seventy-five thousand three hundred eleven." The word times always means to multiply.

This problem is vertical.

$$\begin{array}{r} 593 \\ \times 127 \\ \hline 75,311 \end{array}$$

We say, "Five hundred ninety-three times one hundred twenty-seven equals seventy-five thousand three hundred eleven." We say it the same way as the first problem.

6.2 PRACTICE

Read these problems aloud, then spell them out with words.

1. $48 \times 63 = 3,024$

2. $189 \times 116 = 21,924$

3. $648 \times 96 = 62,208$

4. $142 \times 93 = 13,206$

5.
$$\begin{array}{r} 47 \\ \times 17 \\ \hline 799 \end{array}$$

6.
$$\begin{array}{r} 69 \\ \times 83 \\ \hline 5,727 \end{array}$$

7.
$$\begin{array}{r} 832 \\ \times 212 \\ \hline 176,384 \end{array}$$

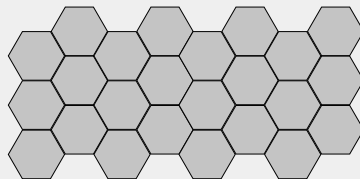
8.
$$\begin{array}{r} 1,480 \\ \times 692 \\ \hline 1,024,160 \end{array}$$

Tessellations

Tessellations are patterns made up of small shapes that are all the same. Some tessellations use simple shapes.



Hexagon



Tessellation with hexagons

Multiplication

Multiplication uses many symbols. All of these mean to multiply six and four together.

$$6 \times 4$$

$$6 \cdot 4$$

$$6 * 4$$

$$6(4)$$

$$(6)4$$

$$(6)(4)$$

Multiplication is commutative. This means that the numbers being multiplied can be moved. All these problems are the same.

$$73 \cdot 42 = 3,066$$

$$42 \cdot 73 = 3,066$$

$$\begin{array}{r} 42 \\ \times 73 \\ \hline 3,066 \end{array}$$

$$\begin{array}{r} 73 \\ \times 42 \\ \hline 3,066 \end{array}$$

6.3 HOMEWORK

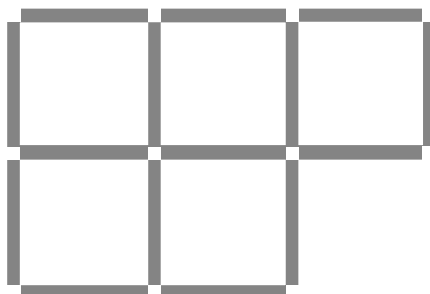
Set A: Spell out these problems with words.

1. $178(314) = 55,892$
2. $(269)490 = 131,810$
3. $350 * 682 = 238,700$
4. $(412)(573) = 236,076$

<p>5. $\begin{array}{r} 83 \\ \times 64 \\ \hline 5,312 \end{array}$</p>	<p>7. $\begin{array}{r} 193 \\ \times 24 \\ \hline 4,632 \end{array}$</p>
---	--

<p>6. $\begin{array}{r} 79 \\ \times 19 \\ \hline 1,501 \end{array}$</p>	<p>8. $\begin{array}{r} 682 \\ \times 419 \\ \hline 285,758 \end{array}$</p>
---	---

Remove three sticks so that only three squares are left. All three squares will be the same size.



Set B: Solve these problems.

9. $12 \times 25 =$

10. $(53)(4) =$

11. $62(4) =$

12. $17 \times 6 =$

13. $11 \times 9 =$

14. $31 \cdot 14 =$

15. $5 \cdot 8 =$

16. $10 * 14 =$

17. $16 \times 27 =$

18. $(26)13 =$

19. $13 \times 26 =$

20. $6(17) =$

21. $21 \cdot 37 =$

22. $11 * 19 =$

23. $75(11) =$

24. $14 \times 10 =$

25. $(25)(12) =$

26. $49 * 11 =$

27. $42 * 16 =$

28. $23 \cdot 6 =$

29. $(9)(11) =$

30. $18 \times 5 =$

31. $15 \times 7 =$

32. $32 \cdot 20 =$

33. $(7)(15) =$

34. $27(16) =$

35. $19 \times 11 =$

36. $22 \cdot 11 =$

37. $45 * 10 =$

38. $65(14) =$

39. $(51)(9) =$

40. $(59)6 =$

6.4 EXTENSION

Look at the problems above. List all the pairs of problems that are the same. These show the commutative property.

Example: $45 * 17$ and $17(45)$ are the same problem.

6.5 VOCABULARY

Commutative
Horizontal
List
Moved
Multiplication
Pair
Property
Symbol
Times
Vertical

Symmetrical Letters

Which letters of the alphabet are symmetrical.

A
B
C
D
E
F
G
H
I
J
K
L
M

N
O
P
Q
R
S
T
U
V
W
X
Y
Z

6.6 Multiplication STORY PROBLEMS

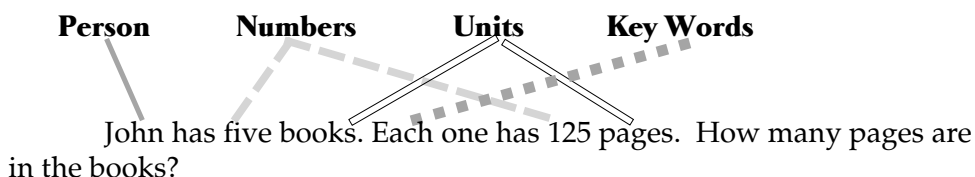
Many story problems use multiplication. You have to read the story and then do the problem. Most problems follow models. We will look at several models.

Model 1

John has five books. Each one has 125 pages. How many pages are in the books?

The key word tells us what to do. **Each** tells us to multiply. The other words tell us the person, numbers, and units.

In this model we see two units: books and pages. Pages are in books. The units must go together.



We can make many new problems by changing the person, numbers, and units of this model.

Person

John

William

Susan

Numbers

5/125

7/48

19/265

Units

Books/pages

Bottles of soda/ounces

Bags of peanuts/peanuts

New problem #1:

William has seven bottles of soda. Each one has forty-eight ounces of soda. How many ounces are in the bottles?

New problem #2:

Susan has nineteen bags of peanuts. Each one has 265 peanuts. How many peanuts are in the bags?

6.7 PRACTICE

Write three new problems with this model. Use other persons, numbers, and units.

6.8 HOMEWORK

Read these problems. List the person, numbers, and units. Then solve the problem.

Example: Maria has 24 boxes of candy. Each one has 88 pieces of candy in it. How many pieces of candy are in the boxes?

Person: Maria

Numbers: 24 and 88

Units: boxes of candy and pieces of candy

Key words: Each

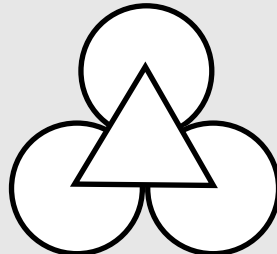
$$\begin{array}{r} 24 \\ \times 88 \\ \hline 2,112 \end{array} \text{ pieces of candy}$$

1. Ella has three bags of marbles. Each one has 89 marbles. How many marbles are in the bags?
2. Ben has nine boxes of pencils. Each one has 24 pencils. How many pencils are in the boxes?
3. Alberto has six cans of cola. Each one has twelve ounces. How many ounces are in the cans?
4. Maria has seven packages of bubble gum. Each one has six pieces of gum. How many pieces of gum are in the package?
5. Ricky has six rolls of quarters. Each one has 50 quarters. How many quarters are in the rolls?

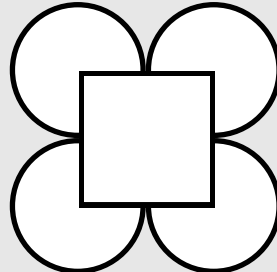
Multifoils

Multifoils are regular polygons with arcs of circles around each vertex. They are called trefoils, quatrefoils, pentafoils, hexafoils, octafoils, etc.

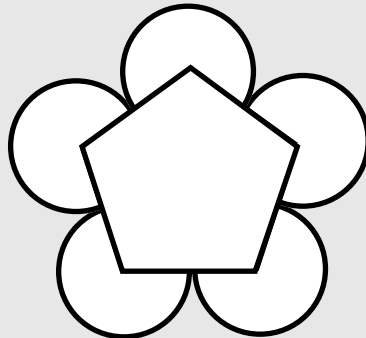
Trefoil



Quatrefoil



Pentafoil



Try making a hexafoil and octafoil for yourself.

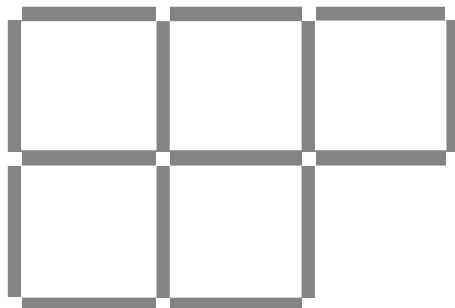
Multiplication

6. Juanita has nine boxes of paper clips. Each one has fifty paper clips. How many paper clips are in the boxes?
7. Donald has three packages of notebook paper. Each one has 250 sheets of paper. How many sheets are in the packages?
8. Harry has forty-nine packages of ballpoint pens. Each one has three pens. How many pens are in the packages?
9. April has twelve bags of rubber bands. Each one has 100 rubber bands. How many rubber bands are in the bags?
10. Juan has nineteen jigsaw puzzles. Each one has 150 pieces. How many pieces are in the puzzles?
11. Patricia has three sets of dominoes. Each one has forty-eight dominoes. How many dominoes are in the sets?
12. Jim has six bags of hamburgers. Each one has four hamburgers. How many hamburgers are in the bags?

6.9 VOCABULARY

Bag
Book
Bottle
Box
Change
Each
Model
Number
Page
Peanut
Person
Several
Story
Times
Units

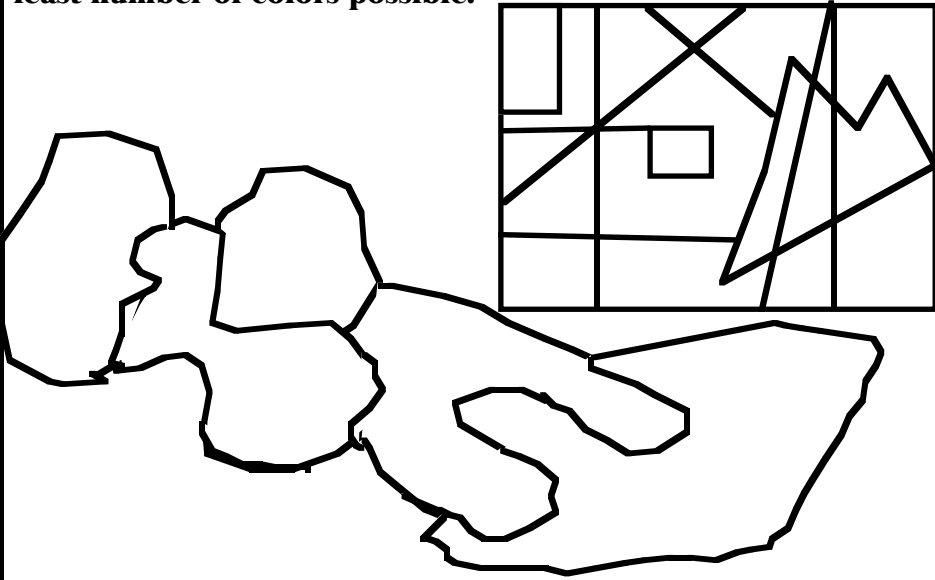
Remove two sticks so that three squares are left. They will not all be the same size.



How Many Colors?

How many different colors do you need to color a map? Sections that have the same color should not touch.

Copy these figures on your paper and try to color them. Use the least number of colors possible.



6.10 UNITS STORY PROBLEMS

Many story problems ask you to change units. You have to remember the units we studied in Chapter 2 to do the problems. Some of these units are listed below.

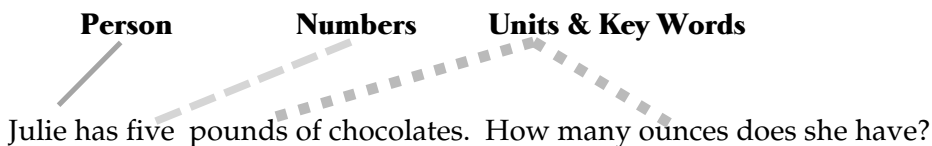
UNITS CHART

1 foot (ft.)	=	12 inches (in.)
1 yard (yd.)	=	3 feet (ft.)
1 mile (mi.)	=	1,760 yards (yd.)
1 minute (min.)	=	60 seconds (sec.)
1 hour (hr.)	=	60 minutes (min.)
1 day	=	24 hours (hr.)
1 week (wk.)	=	7 days
1 pound (lb.)	=	16 ounces (oz.)
1 ton	=	2,000 pounds (lb.)
1 quart (qt.)	=	2 pints (pt.)
1 gallon (gal.)	=	4 quarts (qt.)
1 tablespoon (T.)	=	3 teaspoons (t.)

Model 2

Julie has five pounds of chocolates. How many ounces does she have?

The key words are pounds and ounces. The Units Chart says that 1 lb. = 16 oz. This is changing big units to small units. Pounds are bigger than ounces. The number to multiply with is 16. This is on the chart.



We can make many new problems by changing the person, numbers, and units.

Person

Julie she

Pete he

Frank he

Numbers

5

3

6

Units & Key Words

Pounds of chocolate/oz.

gallons of milk/qt.

feet tall/inches

New Problem #1:

Pete has three gallons of milk. How many quarts does he have?

New Problem #2:

Frank is six feet tall. How many inches tall is he?

6.11 PRACTICE

Write two new problems.

Use other persons, numbers, and units.

6.12 HOMEWORK

Read these problems.

List the person, numbers, units, and information from the Units Chart. Then solve the problem.

Example: Monica has eleven minutes left to do her test. How many seconds does she have?

Person: Monica

Numbers: 11

Units: minutes and seconds

From the chart: 1 minute = 60 seconds

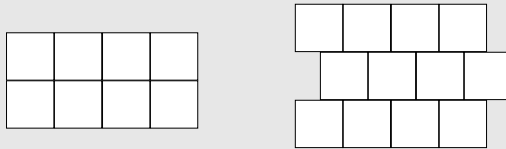
11

$\times 60$

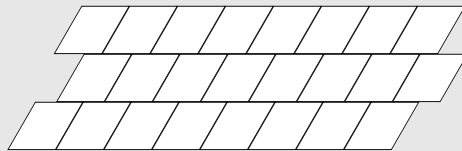
660 seconds to do her test

1. William has 100 yards to run. How many feet does he have to run?
2. Dwayne has three hours to drive. How many minutes does he have?
3. Hilda has two miles to ride home. How many yards does she have?
4. Charles has eight pounds of steak. How many ounces does he have?
5. Mohammed has twelve quarts of oil for his car. How many pints does he have?
6. Alice has thirty feet of muslin material. How many inches does she have?
7. Jason has four days until his birthday. How many hours does he have?

More Tessellations



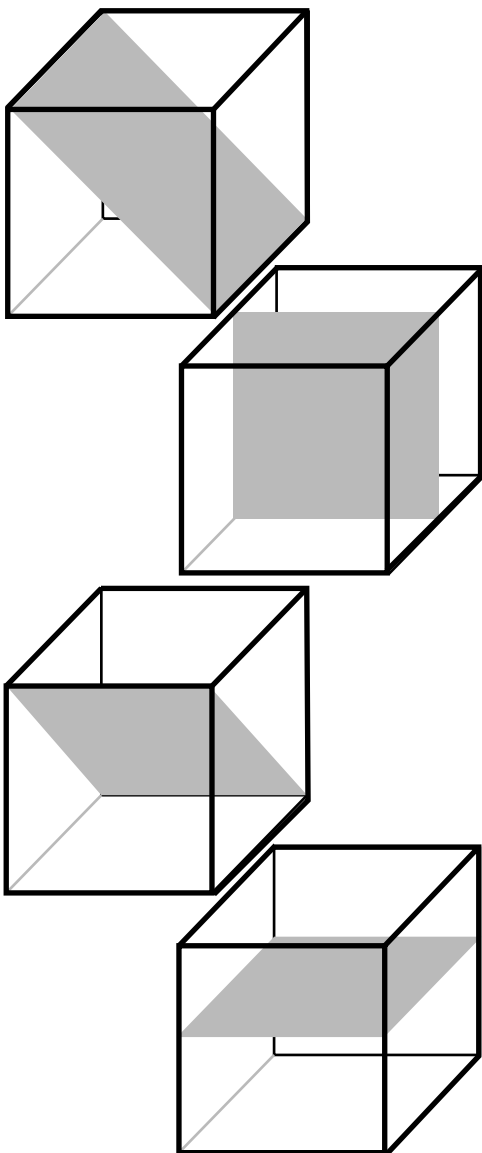
Tessellations with squares



Tessellation with rhombuses

Dividing a Cube

Here are four ways to divide a cube into halves. Can you think of any others?



8. Eli has ten tons of sand. How many pounds does he have?

9. Sean has twelve days until the test. How many hours does he have?

10. Teresa has five table-spoons of sugar. How many teaspoons does she have?

11. Mark has seven pounds of flour. How many ounces does he have?

12. Jennifer has four gallons of milk. How many quarts does she have?

6.13 VOCABULARY

Big units to small units

Bigger

Change

Left

Listed

Milk

Remember

Tall

6.14 Multiplying DECIMAL FRACTIONS

If you can multiply, you can multiply decimal fractions. It looks the same and it works the same. It only has one more rule. The rule tells you where to put the decimal point in the answer.

$\begin{array}{r} 1.7 \\ \times 45 \\ \hline 76.5 \end{array}$	$\begin{array}{r} 1.7 \\ \times 4.5 \\ \hline 7.65 \end{array}$	$\begin{array}{r} 1.7 \\ \times .45 \\ \hline .765 \end{array}$	$\begin{array}{r} .17 \\ \times .45 \\ \hline .0765 \end{array}$
--	---	---	--

These examples are all the same except for the decimal points. Count how many digits are after the decimal point in both numbers.

one	two	three	four
$\begin{array}{r} 1.7 \\ \times 45 \\ \hline 76.5 \end{array}$	$\begin{array}{r} 1.7 \\ \times 4.5 \\ \hline 7.65 \end{array}$	$\begin{array}{r} 1.7 \\ \times .45 \\ \hline .765 \end{array}$	$\begin{array}{r} .17 \\ \times .45 \\ \hline .0765 \end{array}$

Now count how many digits are after the decimal point in the answers.

one	two	three	four
-----	-----	-------	------

The rule for multiplying decimals fractions tells us to have the same number of digits after the decimal point in the **problem** and the **answer**.

6.15 PRACTICE

Solve these problems.

- | | | |
|--|--|--|
| 1. $\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$ | 4. $\begin{array}{r} 7.1 \\ \times .3 \\ \hline \end{array}$ | 7. $\begin{array}{r} 2.6 \\ \times .5 \\ \hline \end{array}$ |
| 2. $\begin{array}{r} .5 \\ \times .6 \\ \hline \end{array}$ | 5. $\begin{array}{r} .8 \\ \times 2 \\ \hline \end{array}$ | 8. $\begin{array}{r} .58 \\ \times .4 \\ \hline \end{array}$ |
| 3. $\begin{array}{r} 7.1 \\ \times .9 \\ \hline \end{array}$ | 6. $\begin{array}{r} .17 \\ \times .2 \\ \hline \end{array}$ | 9. $\begin{array}{r} 3.9 \\ \times 3 \\ \hline \end{array}$ |

10. Daniel has 15.6 boxes of ceramic tiles. Each one has 12 pieces of tile. How many tiles are in the boxes?

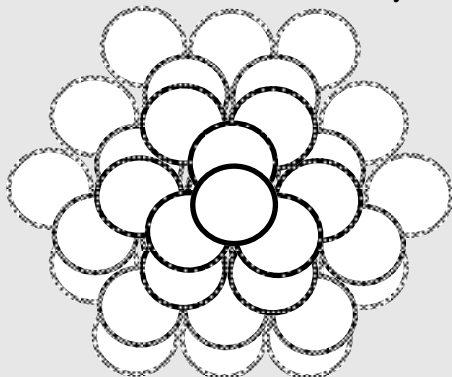
11. Raymond has 4.3 bags of sugar. Each one has 2.5 pounds of sugar. How many pounds of sugar are in the bags?

Multiplication

6.16 HOMEWORK

Set A: Solve these problems.

How many coins in this pile? There are no holes under the five layers.



$$\begin{array}{r} 1. \quad 1.3 \\ \times 2.2 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 10.4 \\ \times 4.19 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 79.83 \\ \times .61 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 27 \\ \times 49 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 563 \\ \times 8.3 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 994.6 \\ \times 1.07 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 4.1 \\ \times .10 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad .282 \\ \times 75 \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad 107.27 \\ \times .923 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 8.41 \\ \times 3.8 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad 655.1 \\ \times 5.1 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 361.05 \\ \times 6.8 \\ \hline \end{array}$$

Set B: Read these problems. List the person, numbers, units, and information from the Units Chart. Then solve the problem.

Example: Monica has 11.5 minutes left to do her test. How many seconds does she have?

Person: Monica

Numbers: 11.5

Units: minutes and seconds

From the chart: 1 minute = 60 seconds

$$\begin{array}{r} 11.5 \\ \times 60 \\ \hline 690.0 \end{array}$$

seconds to do her test

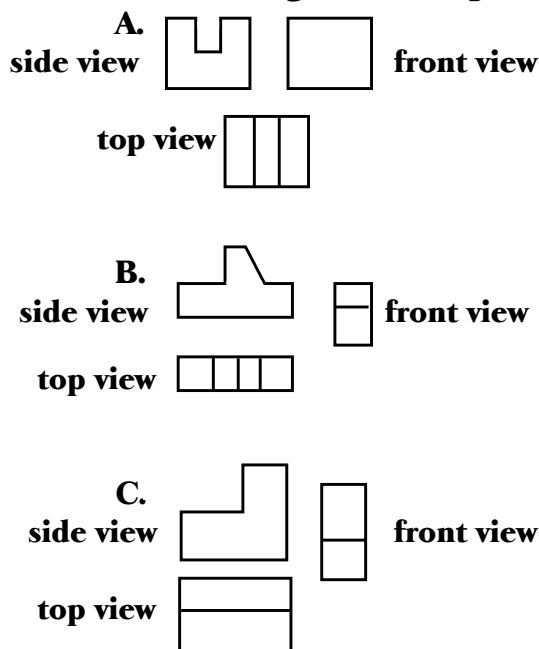
13. Francesco has 12.5 packages of trading cards. Each one has six cards. How many cards are in the packages?
14. Tanisha has 4.8 boxes of staples. Each one has 1,000 staples. How many staples are in the boxes?
15. Putri has 2.3 bags of cookies. Each one has eighty cookies. How many cookies are in the bags?
16. Tran has 3.2 pounds of candy. How many ounces does he have?
17. Ned has 6.9 pounds of flour. How many ounces does he have?
18. Frank ran 3.2 miles. How many yards did he run?
19. Carlos bought 8.7 gallons of gas. How many quarts did he buy?
20. Max has 8.5 cases of soda. Each one has twenty-four cans of soda. How many cans are in the cases?
21. Fabrice has 6.2 cans of coffee. Each one has thirteen ounces. How many ounces are in the cans?
22. Ophelia bought 3.5086 tons of gravel. How many pounds did she buy?

6.17 Vocabulary

Decimal fraction
 Decimal point
 Digits
 Except
 Rule

The important
 vocabulary for
 the vocabulary
 notebook are:
 Decimal fraction

Which of these figures is impossible?



Binary Numbers

Binary numbers use the digits 0 and 1 only. Computers and calculators use these numbers to do their calculations.

0	=	0	25	=	11001
1	=	1	26	=	11010
2	=	10	27	=	11011
3	=	11	28	=	11100
4	=	100	29	=	11101
5	=	101	30	=	11110
6	=	110	31	=	11111
7	=	111	32	=	100000
8	=	1000	33	=	100001
9	=	1001	34	=	100010
10	=	1010	35	=	100011
11	=	1011	36	=	100100
12	=	1100	37	=	100101
13	=	1101	38	=	100110
14	=	1110	39	=	100111
15	=	1111	40	=	101000
16	=	10000	41	=	101001
17	=	10001	42	=	101010
18	=	10010	43	=	101011
19	=	10011	44	=	101100
20	=	10100	45	=	101101
21	=	10101	46	=	101110
22	=	10110	47	=	101111
23	=	10111	48	=	110000
24	=	11000			

6.18 Multiplication STORY PROBLEMS WITH MONEY

We multiply money many times. We multiply money when we buy several things at the same price. We multiply money when we buy things by the pound. Look at these models.

Model 3:

Joe bought six gallons of ice cream at \$1.97. How much did he spend?

Model 4:

William bought 3.2 lbs. of ham. It cost \$3.69 per pound. How much did it cost?

Model 5:

Isabel wants to buy 19 pencils. They cost \$.12 each. How much does she need?

The key words are **at**, **per**, and **each**. These words always tell you to multiply. Sometimes you have to round the answer like in Model 4.

Model 3:

Joe bought six gallons of ice cream at \$1.97. How much did he spend?

Person: Joe

Numbers: 6 and \$1.97

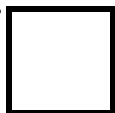
Units: gallons of ice cream and dollars

Key Words: at

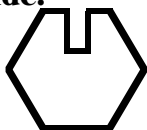
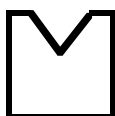
$$\begin{array}{r} \$1.97 \\ \times 6 \\ \hline \$11.82 \end{array}$$

Making Tessellations

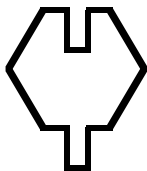
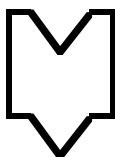
You can make your own custom tessellations by starting with a square or hexagon and following these steps.



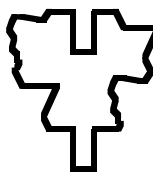
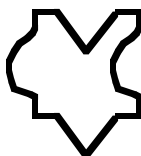
Cut out a section from one side.



Add the same shape to the other side so that it sticks out.



Do the same to the other sides of your figures.



Model 4:

William bought 3.2 lbs. of ham. It cost \$3.69 per pound. How much did it cost?

Person: William

Numbers: 3.2 and \$3.69

Units: pounds of ham and dollars

Key Words: per

$$\begin{array}{r} \$3.69 \\ \times 3.2 \\ \hline \$11.808 \end{array} \quad \text{which becomes } \$11.81$$

Model 5:

Isabel wants to buy 19 pencils. They cost \$.12 each. How much does she need?

Person: Isabel

Numbers: 19 and \$.12

Units: pencils and dollars

Key Words: each

$$\begin{array}{r} \text{\$.12} \\ \times 19 \\ \hline \text{\$2.28} \end{array}$$

6.19 PRACTICE

Write one new problem for each model. Use new persons, numbers, and units.

6.20 HOMEWORK

Read these problems. List the person, numbers, units, and information from the Units Chart. Then solve the problem.

Example: Manny bought three ice cream bars at \$.39. How much did he spend?

Person: Manny

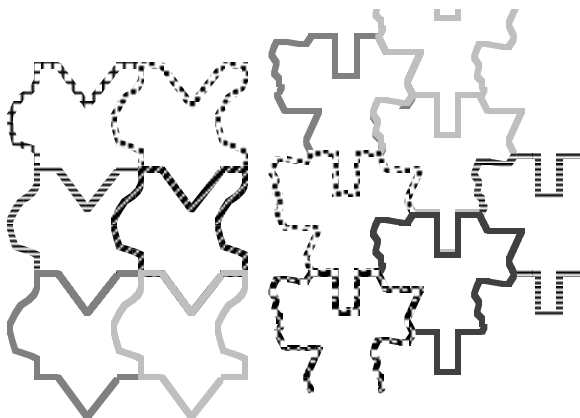
Numbers: 3 and \$.39

Units: ice cream bars and dollars

$$\begin{array}{r} \text{\$.39} \\ \times 3 \\ \hline \text{\$1.17} \end{array}$$

1. Pete bought four packages of lunchmeat at \$.79. How much did he spend?
2. Nellie wants to buy six cans of soup. They cost \$.58 each. How much does she need?

Make your tessellation.



Multiplication

3. Manuel bought nine candy bars at \$.59. How much did he spend?
4. Francis bought three dozen eggs at \$.99. How much did he spend?
5. Carolina bought 5.7 lbs. of apples. They cost \$.89 per pound. How much did they cost?
6. Robert bought 39.8 feet of lumber. It cost \$2.59 per foot. How much did it cost?
7. Alexia bought three balloons. They cost \$1.99 per balloon. How much did they cost?
8. Tom wants to buy four boxes of nails. They cost \$2.99 each. How much money does he need?
9. Luis wants to buy 16 quarts of oil. They cost \$.79 each. How much money does he need?
10. Claude bought a bottle of soda at \$1.68. How much did he spend?
11. Svetlana bought 1.75 lbs. of coffee. It cost \$8.99 per pound. How much did she spend?
12. Doug wants to buy five pizzas. They cost \$8.99 each. How much money does he need?

6.21 VOCABULARY

At	Money
Buy	Pencils
By the pound	Per pound
Cost	Price
Each	Several
Ham	Spend
Ice cream	

6.22 MULTIPLICATION IN PERCENT PROBLEMS

Most percent problems use multiplication to find the answers. It is like multiplying decimal fractions. The only thing new to remember is to change the percent into a decimal fraction by moving the decimal point to the left two places.

This table will help you change percents into decimals.

1%	becomes	.01
5%	becomes	.05
10%	becomes	.10
29%	becomes	.29
100%	becomes	1.00
125%	becomes	1.25

Model 6

Find 17% of 42.

17% becomes .17. Then multiply.

$$\begin{array}{r} 42 \\ \times .17 \\ \hline 7.14 \end{array}$$

Two decimal places in the answer

Find 6 percent of 59.

6% becomes .06. Then multiply.

$$\begin{array}{r} 59 \\ \times .06 \\ \hline 3.54 \end{array}$$

The key words are **percent of** or the symbol and word **% of**. These always tell you to change the percent into a decimal fraction and then multiply the numbers.

6.23 PRACTICE

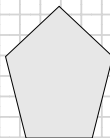
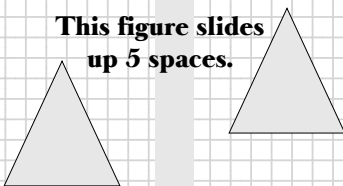
Solve these percent problems.

1. 75% of 80
2. 18% of 90
3. 59 percent of 25
4. 65 percent of 200
5. 21% of 21
6. 85 percent of 900
7. 85% of \$25.00
8. 8% of \$12.50
9. 5 percent of \$2,000
10. 75% of \$125,000

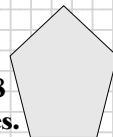
Slides

A slide of a geometric figure is a movement up, down, right, or left. You do not rotate the figure.

This figure slides up 5 spaces.



This one slides down 8 and to the right 4 spaces.



Multiplication

This is how you should have done the problems on page 153.

- | | |
|-------------------------|-----------------------------------|
| 1. 75% of 80 | $.75 \times 80 = 60$ |
| 2. 18% of 90 | $.18 \times 90 = 16.2$ |
| 3. 59 percent of 25 | $.59 \times 25 = 14.75$ |
| 4. 65 percent of 200 | $.65 \times 200 = 130$ |
| 5. 21% of 21 | $.21 \times 21 = 4.41$ |
| 6. 85 percent of 900 | $.85 \times 900 = 765$ |
| 7. 85% of \$25.00 | $.85 \times \$25.00 = \21.25 |
| 8. 8% of \$12.50 | $.08 \times \$12.50 = \1.00 |
| 9. 5 percent of \$2,000 | $.05 \times \$2,000 = \100 |
| 10. 75% of \$125,000 | $.75 \times \$125,000 = \$93,750$ |

6.24 HOMEWORK

Solve these percent problems.

- | | |
|--------------------------|-------------------------------------|
| 1. 55 percent of 99 | 13. 11% of 4,156 |
| 2. 11% of 310 | 14. 42 percent of 76 |
| 3. 62% of 849 | 15. 61 percent of \$195 |
| 4. 2 percent of 9,810 | 16. 53% of 2,110 |
| 5. 74% of 1,671 | 17. 74% of 323 |
| 6. 33% of 106 | 18. 85 percent of 747 |
| 7. 87% of \$718.00 | 19. 96% of \$8,545.00 |
| 8. 46 percent of 829 | 20. 109% of \$1,036.95 |
| 9. 9 percent of 144 | 21. How much is 29% of \$53,987.23? |
| 10. 100 percent of \$252 | 22. How much is 15.5% of 90,000? |
| 11. 28 percent of 53 | 23. How much is 79.9% of 2,395? |
| 12. 39% of 623 | |

6.25 VOCABULARY

Change
Decimal fractions
Moving the decimal point
Percent
Percent of
Two places
% of

6.26 USING FORMULAS

We use many formulas in mathematics and science. Formulas are combinations of letters, numbers, and symbols. The letters are called variables. When two variables are written together we multiply.

Example: $A = lw$

This means to multiply l and w . If l is 10 and w is 5 we can evaluate the formula.

$$\begin{aligned} A &= l \times w && \text{for } l = 10 \text{ and } w = 5 \\ A &= 10 \times 5 \\ A &= 50 \end{aligned}$$

If a formula has a number next to a variable we also multiply.

Example: $A = .5bh$ for $b = 12$ and $h = 18$

This mean to multiply $.5$, b , and h together. If b is 12 and h is 18 then we evaluate the formula this way.

$$\begin{aligned} A &= .5 \times 12 \times 18 \\ A &= 6 \times 18 \\ A &= 108 \end{aligned}$$

Putting numbers into a formula is called substituting values for the variables. Finding the answer is called evaluating the formula.

Some formulas have other operations in them along with multiplication. Sometimes these operations are in parentheses, "()." If a number or variable is next to a parentheses you multiply.

Example: $A = .5(b + c)h$ for $b = 15$, $c = 21$, and $h = 7$

This means that you first add what is inside the parentheses and then you multiply. Let's substitute 15, 21, and 7 for the variables and evaluate the formula.

$$\begin{aligned} A &= .5(15 + 21)7 \\ A &= .5(36)7 \\ A &= 18 \times 7 \\ A &= 126 \end{aligned}$$

Multiplication

6.27 PRACTICE

Substitute the values for the variables and evaluate these formulas.

- | | |
|-------------------------|-----------------------------|
| 1. $A = lw$ | $l = 21; w = 17$ |
| 2. $A = bh$ | $b = 122; h = 240$ |
| 3. $A = .5bh$ | $b = 25; h = 50$ |
| 4. $V = lwh$ | $l = 6; w = 8; h = 20$ |
| 5. $M = DV$ | $D = 0.25; V = 1.96$ |
| 6. $M = .03lf$ | $l = 7; f = 1.236$ |
| 7. $A = .5(b_1 + b_2)h$ | $b_1 = 6; b_2 = 12; h = 27$ |

6.28 HOMEWORK

Substitute the values for the variables and evaluate these formulas.

- | | |
|--------------------------|------------------------------|
| 1. $A = lw$ | $l = 1,200; w = 825$ |
| 2. $A = lw$ | $l = 4,500; w = 698$ |
| 3. $A = bh$ | $b = 127; h = 88$ |
| 4. $A = .5bh$ | $b = 65; h = 87$ |
| 5. $A = .5bh$ | $b = 124; h = 970$ |
| 6. $V = lwh$ | $l = 14; w = 15; h = 25$ |
| 7. $V = lwh$ | $l = 94; w = 17; h = 23$ |
| 8. $M = DV$ | $D = 5.25; V = 0.855$ |
| 9. $M = .03lf$ | $l = 72; f = 8.38$ |
| 10. $M = .03lf$ | $l = 0.98; f = 0.45$ |
| 11. $A = .5(b_1 + b_2)h$ | $b_1 = 10; b_2 = 82; h = 5$ |
| 12. $A = .5(b_1 + b_2)h$ | $b_1 = 93; b_2 = 67; h = 82$ |
| 13. $V = .33lwh$ | $l = 50; w = 60; h = 40$ |
| 14. $C = \pi d$ | $\pi = 3.14159; d = 20$ |
| 15. $V = .5bhl$ | $b = 7; h = 9; l = 25$ |
| 16. $F = 1.8C + 32$ | $C = 36$ |
| 17. $D = .5att$ | $a = 50; t = 10$ |
| 18. $y = 2x + 7$ | $x = 15$ |
| 19. $x = .5y - 7$ | $y = 16$ |

6.29 VOCABULARY

Combination
Evaluate
Formula
Inside
Letter
Next to

Operation
Parentheses
Science
Substitute
Symbol
Variable

6.30 MORE STORY PROBLEMS

These problems come from the lessons in this chapter. Look for the key words as you do the problems. The Units Chart will help you solve some of the problems.

6.31 HOMEWORK

Read these problems. List the person, numbers, units, key words, and information from the Units Chart. Then solve the problem.

1. Mary has three magazines. Each one has seventy-five pages. How many pages are in the magazines?
2. Sam wants to buy six hamburgers. They cost \$1.29 each. How much money does he need?
3. How much is ten percent of \$127.00?
4. Katrina bought twelve loaves of bread at \$.89. How much did she spend?
5. Lomana bought seven gallons of gasoline. How many quarts did he buy?
6. How much is fifty percent of \$96.40?
7. Willie wants to buy eleven candy bars. They cost \$.89 each. How much does he need?
8. Jorge bought three bicycles at \$129.99. How much did he spend?
9. How much is 25% of 480?
10. Pili has twelve bottles of soda. Each one has thirty-two ounces of soda. How many ounces are in the bottles?
11. Martha wants to buy fourteen sandwiches. They cost \$1.79 each. How much does she need?
12. Julio worked six weeks at his new job. How many days did he work?
13. Ali bought 4.7 lbs. of bacon. It cost \$1.97 per pound. How much did it cost?
14. Sourav bought 2.8 yards of concrete. It cost \$18.50 per yard. How much did it cost?
15. Harold bought 12.9 gallons of gasoline. It cost \$1.29 per gallon. How much did it cost?
16. Fernie bought 6.4 lbs. of cheese. It cost \$2.89 per pound. How much did it cost?
17. Sara bought five pairs of skates at \$49.99. How much did she spend?
18. Jim bought eighteen hotdogs at \$1.19. How much did he spend?
19. Hannah bought 3.4 lbs. of steak. How many ounces did she buy?

Multiplication

20. Brad has nine boxes of candy. Each one has fifty-three pieces of candy. How many pieces of candy are in the boxes?
21. Gracie wants to buy two Christmas trees. They cost \$15.00 each. How much does she need?
22. How much is 12% of 54?
23. Becky has fifteen rolls of tape. Each one has 125 feet of tape. How many feet of tape are on the rolls?
24. Andre has 15.5 ft. of string. How many inches does he have?

6.32 CHAPTER 6 VOCABULARY REVIEW

Use these words to answer the questions and problems below. Look up unfamiliar words in the dictionary. There might be more than one correct answer.

add	information into	property
answer	key words	putting
at	left	read
bag	letter	remember
become	list	round
big	many	rule
bigger	milk	same
book	model	science
bottle	move	several
box	moved	small
buy	money	solve
by	multiplication	spend
by the pound	multiply	story
change	next to	study
combination	number	substitute
commutative	operation	symbol
cost	other	tall
count	out loud	times
decimal fraction	page	together
decimal point	pair	two places
different	parentheses	units
digit	peanut	values
each	pencil	variables
equals	per pound	vertical
evaluate formula	percent of	vertically
except	per	where
ham	person	write
horizontal	place	written
horizontally	price	% of
ice cream	problem	

1. A problem can be written _____ or vertically.
2. The word _____ always means to multiply.
3. Multiplication is _____. This means that the numbers being multiplied can be moved.
4. Most story problems follow a _____.
5. The _____ tell us what to do in a story problem.
6. Many story problems ask you to change _____.
7. You need the same number of _____ after the _____ in the problem and the answer of a multiplication problem.
8. We multiply _____ when we buy _____ things at the same price.
9. The key words at, _____, and _____ tell us to multiply in money problems.
10. Most percent problems use _____ to find the answer.
11. The letters in a formula are called _____.
12. When two variables are next to each other we _____.

6.33 CHAPTER SIX PRACTICE TEST

Directions: Circle the correct answer.

1. $59 \times 83 = 4,897$, is written:
 - a. multiplication
 - b. vertically
 - c. horizontally
 - d. substitute
2. Multiplication is:
 - a. several
 - b. commutative
 - c. parentheses
 - d. combination
3. Which of these is a key word?
 - a. each
 - b. digit
 - c. formula
 - d. equals
4. Books and pages, bottles of soda and ounces, and bags of peanuts and peanuts are examples of:
 - a. units
 - b. equals
 - c. values
 - d. answers
5. Sam has four bags of marbles. Each one has 52 marbles. How many marbles are in the bags?
 - a. 28 marbles
 - b. 56 marbles
 - c. 200 marbles
 - d. 208 marbles

Multiplication

6. Juan has two pounds of candy. How many ounces does he have?
 - a. 6 ounces
 - b. 8 ounces
 - c. 32 ounces
 - d. 48 ounces

7. $4.7 \times .28 =$
 - a. 1.316
 - b. 13.16
 - c. 131.6
 - d. 1316

8. $4.71 \times 82.4 =$
 - a. 3881.04
 - b. 388.104
 - c. 38.8104
 - d. 3.88104

9. Joe bought eight gallons of milk at \$2.66. How much did he spend?
 - a. \$2.74
 - b. \$10.66
 - c. \$21.28
 - d. \$21.58

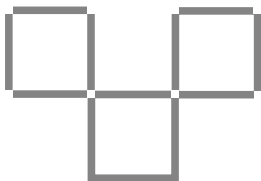
10. Evaluate $A = lw$ for $l = 7$ and $w = 5$.
 - a. 2
 - b. 12
 - c. 30
 - d. 35

11. How much is 20 percent of 82?
 - a. 102
 - b. 82.2
 - c. 16.4
 - d. 16

12. How much is 13.8% of 147?
 - a. 20.286
 - b. 147.138
 - c. 160.8
 - d. 202.86

6.34 ANSWERS TO PUZZLES

From Section 6.3



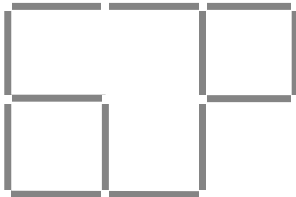
From Section 6.4

These letters are more or less symmetrical depending on the way they are written.

A	B	C	D	E	H	I	M
O	T	U	V	W	X	Y	

From Section 6.9

Mathematicians claim that any map can be colored with only three different colors, even though map makers normally use five colors.



From Section 6.16

Bottom layer	19
Fourth layer	12
Third layer	7
Second layer	3
Top layer	<u>1</u>
TOTAL	42

From Section 6.17

Figure C is impossible.

MATHEMATICS

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