Soluție

a) $4x^2+6x+1\geq -2x-3$, pentru orice $x\in[-1,+\infty)$; $(x+1)^2\geq 0$, pentru orice $x\in[-1,+\infty)$.

b) $\int f(x)dx = \int(2x^2-5x+3)dx = \frac{2}{3}x^3-\frac{5}{2}x^2+3x+C, C\in\mathbb{R}$.

c) f continuă pe $[0,1]$; $vol(C_f)=\pi\int_0^1(x\sqrt{3}+\sqrt{2})^2dx = \pi(3+\sqrt{6})$.

d) $F(x)=\int_{-1}^{x}(t^2+2t-3)dt=\frac{1}{3}x^3+x^2-3x-\frac{11}{3}$; F derivabila pe $\mathbb{R}$. $F'(x)=f(x)$, pentru orice $x\in\mathbb{R}$.

e) $f,g:[-1,-\frac{1}{2}]\to\mathbb{R}, f(x)=2x+\frac{1}{2x+3}, g(x)=-1$; continue pe $[-1,-\frac{1}{2}]$; $f\geq g$;

$\int_{-1}^{-\frac{1}{2}}(2x+\frac{1}{2x+3})dx\geq -\int_{-1}^{-\frac{1}{2}}dx$ de unde $\int_{-1}^{-\frac{1}{2}}\frac{1}{2x+3}dx\geq\frac{1}{4}$.

f) $I=\int_0^2\left|x^2-1\right|dx = -\int_0^1(x^2-1)dx+\int_1^2(x^2-1)dx = 2$.