

## Soluții

$$\mathbf{1.a)} \left. \begin{array}{l} \overrightarrow{AD} = \overrightarrow{AB} + \overrightarrow{BD} = \vec{a} + \overrightarrow{BD} \\ \overrightarrow{CB} = \overrightarrow{CD} + \overrightarrow{DB} \end{array} \right\} \Rightarrow \overrightarrow{AD} + \overrightarrow{CB} = \overrightarrow{AB} + \overrightarrow{CD} = \vec{a} - \vec{b}$$

$$\vec{u} = p \cdot \vec{v}, p \in \mathbb{R}$$

$$\mathbf{1.b)} \begin{cases} 5 = -2p \Rightarrow p = -\frac{5}{2} \\ -7 + \alpha = 8 \cdot p \cdot \alpha \Rightarrow \alpha = \frac{1}{3} \end{cases}$$

$$AB + AC = 1 + \sqrt{3}$$

$$\mathbf{2.a)} \text{ Dacă } AB = x \Rightarrow BC = 2x \text{ și } AC = x\sqrt{3} \Rightarrow \\ x + x\sqrt{3} = 1 + \sqrt{3} \Rightarrow x = 1 \Rightarrow BC = 2$$

$$BC^2 = AB^2 + AC^2 - 2 \cdot AB \cdot AC \cdot \cos A$$

$$\mathbf{2.b)} \cos A = \frac{25 + 50 - 100}{2 \cdot 5\sqrt{50}} = \frac{-25}{10\sqrt{50}} = -\frac{1}{2\sqrt{2}}$$

$$\mathbf{3.a)} AC^2 + BC^2 = AB^2 \Leftrightarrow 4 + (k-1)^2 + 4 + (k+1)^2 = 16 + 4 \Rightarrow \\ 4 + 2k^2 + 2 = 16 \Rightarrow k = \sqrt{5}$$

$$m_{AB} = \frac{-1-1}{3+1} = -\frac{1}{2}$$

$$\mathbf{3.b)} \text{ Dacă } CD \text{ este înălțimea din } C \text{ pe } AB \text{ atunci } CD: \frac{y-y_k}{x-x_k} = -\frac{1}{m_{AB}} = 2 \Rightarrow$$

$$y - \sqrt{5} = 2(x-1) \Rightarrow CD: 2x - y + \sqrt{5} - 2$$