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$$1) U = (-1, 1), V = (9, 2) \text{ e } W = (9, 3)$$

$$W = K_1 U + K_2 V$$

$$(9, 3) = K_1(-1, 1) + K_2(9, 2)$$

$$(9, 3) = (-K_1, K_1) + (9K_2, 2K_2)$$

$$\begin{cases} -K_1 + 9K_2 = 9 \\ K_1 + 2K_2 = 3 \end{cases}$$

$$6K_2 = 12$$

$$K_2 = \frac{12}{6}$$

$$K_2 = 2,,$$

$$K_1 + 2K_2 = 3$$

$$K_1 + 2 \cdot 2 = 3$$

$$K_1 = 3 - 4$$

$$K_1 = -1,,$$

$$2) U = (-4, 3)$$

$$a) \|U\|^2 = 4^2 + 3^2 = 16 + 9 = 25 = \sqrt{25} = 5,,$$

$$U_2 = \left(\frac{x_1}{\|U\|}, \frac{y_1}{\|U\|} \right) = \left(\frac{-4}{5}, \frac{3}{5} \right) =$$

$$b) U = (-4, 3)$$

$$U = \frac{U}{\|U\|} \Rightarrow U = \frac{(-4, 3)}{5} \Rightarrow U = \left(\frac{-4}{5}, \frac{3}{5} \right),,$$

$$5) a) \|F_1\| = 3 \quad \|F_2\| = 2$$

$$\|F_1\| = 3 \rightarrow \sqrt{x^2 + y^2} = 3 \rightarrow \sqrt{x^2} = 3 \quad x = 3$$

$$\|F_2\| = 2$$

$$F_{2x} = 2 \cos 60^\circ = \frac{1}{2} \Rightarrow 1$$

$$F_{2y} = 2 \sin 60^\circ = \frac{\sqrt{3}}{2}$$

$$F_2 = F_1 + F_2$$

$$F = (3, 0) + (-1, -\sqrt{3})$$

$$F = (2, -\sqrt{3})$$

$$b) = \sqrt{(2)^2 + (-\sqrt{3})^2} = \sqrt{4+3} = \sqrt{7} = 1$$

$$c) \tan \alpha = \frac{-\sqrt{3}}{2} \Rightarrow \alpha \approx 90,89$$

$$9) A(1, 2) \quad B(5, -2) \quad C(x, y)$$

$$(x-1, y-2) = \frac{1}{2} (5-1, -2-2)$$

$$(x-1, y-2) = (2, -2)$$

$$x-1 = 2 \Rightarrow x = 2+1 = 3,$$

$$y-2 = -2 \Rightarrow y = -2+2 = 0,$$

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$$5) U = (3, -1) \quad V = (4, 2)$$

$$a) (3, -1) \cdot (4, 2)$$

$$12 + (-2) = 10,,$$

$$b) \cos \alpha = \frac{U \cdot V}{||U|| ||V||} \Rightarrow \frac{10}{\sqrt{3^2 + (-1)^2} \cdot \sqrt{4^2 + 2^2}} = \frac{10}{\sqrt{30}}$$

$$\frac{10}{\sqrt{30}} \cdot \frac{\sqrt{30}}{\sqrt{30}} = \frac{10\sqrt{30}}{30} = \frac{\sqrt{30}}{3} \Rightarrow \arccos \frac{\sqrt{30}}{3} //$$

$$c) P_V^U = \left(\frac{U \cdot V}{||V||^2} \right) = //$$

$$P_V^U = \left(\frac{10}{\sqrt{20}} \right) \cdot (4, 2)$$

$$P = \left(\frac{10}{20} \right) \cdot (4, 2)$$

$$P = \left(\frac{1}{2} \right) \cdot (4, 2)$$

$$P = (2, 1)$$

