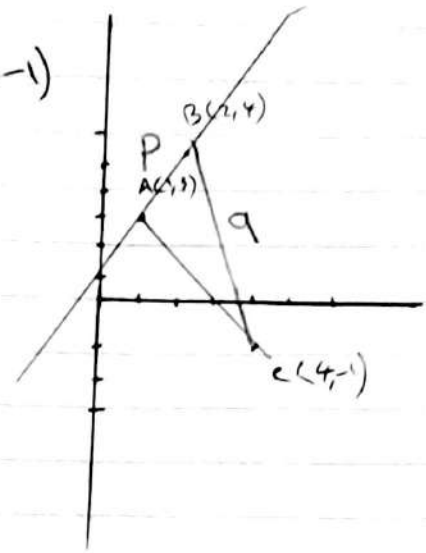
1.2.8

A- $A=(1,3), B=(2,4), C=(4,-1)$



$$Proj(P) = \frac{P \cdot q}{|q|^2} \cdot q$$

$$P = \vec{B} - \vec{A} = (1,1), |P| = \sqrt{2}$$
$$q = \vec{C} - \vec{B} = (2,-5), |q| = \sqrt{29}$$

$$Proj(P) = \frac{P \cdot q}{|q|^2} \cdot q = [redacted]$$

$$= \frac{(1 \cdot 2) + (1 \times -5)}{(\sqrt{29})^2} = \frac{2-5}{29} = \frac{3}{29} \cdot (2,-5)$$

$$Proj(P) = \left(\frac{6}{29}, \frac{-15}{29}\right)$$

B- Distance of A to BC

$$D = \vec{BA} - Proj(\vec{BA}), \quad \vec{BA} = A - B = (-1,-1)$$

$$D = (-1,-1) - \left(\frac{6}{29}, \frac{-15}{29}\right)$$

$$D = \frac{6}{29}, \frac{-14}{29}$$

$$|D| = \sqrt{\left(\frac{6}{29}\right)^2 + \left(\frac{-14}{29}\right)^2} = \sqrt{0.04 + 0.230} = \sqrt{0.27}$$

$$Dist = 0.51$$

C- $Area = Distance * |BC| * \frac{1}{2}$

$$= 0.51 \cdot \sqrt{29} \cdot \frac{1}{2}$$

$$= 0.25 \sqrt{29}$$

$$\approx 1.3$$