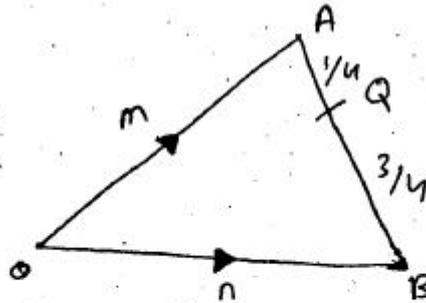


ANSWERS

VECTORS PROOF

Q1-

①



$$\vec{AB} = -m + n$$

$$\vec{OQ} = l(3m + n)$$

$$\vec{AQ} = \frac{1}{4}(-m + n)$$

$$\vec{OQ} = m + \frac{1}{4}(-m + n)$$

$$= m - \frac{1}{4}m + \frac{1}{4}n$$

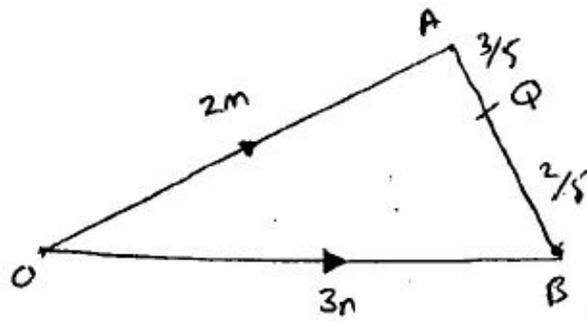
$$= \frac{3}{4}m + \frac{1}{4}n$$

$$= \frac{1}{4}(3m + n)$$

$$l = \frac{1}{4}$$

Q2-

(2)



$$\vec{OQ} = \frac{1}{5}(4m + 9n)$$

$$\vec{AB} = -2m + 3n$$

$$\vec{AQ} = \frac{3}{5}(-2m + 3n)$$

$$\vec{OQ} = 2m + \frac{3}{5}(-2m + 3n)$$

$$= 2m - \frac{6}{5}m + \frac{9}{5}n$$

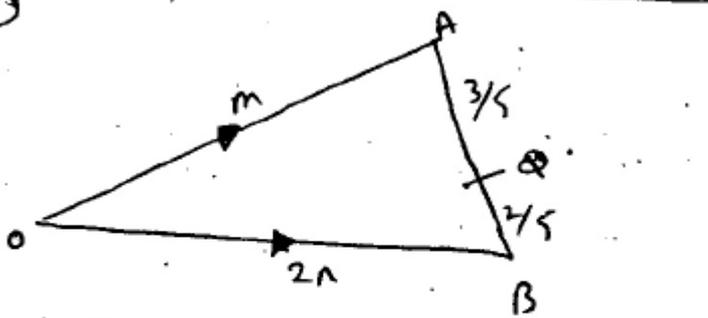
$$= \frac{4}{5}m + \frac{9}{5}n$$

$$= \frac{1}{5}(4m + 9n)$$

$$l = \frac{1}{5}$$

Q3-

(3)



$$\vec{AB} = -m + 2n$$

$$\vec{AQ} = \frac{3}{5} (-m + 2n)$$

$$\vec{OQ} = m + \frac{3}{5} (-m + 2n)$$

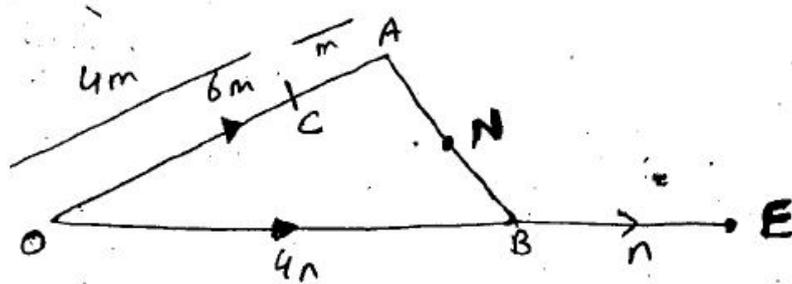
$$= m - \frac{3}{5}m + \frac{6}{5}n$$

$$= \frac{2}{5}m + \frac{6}{5}n$$

$$= \frac{2}{5}(m + 3n) \quad l = \frac{2}{5}$$

Q5-

(5)



$$\vec{OA} = 6m, \quad \vec{OB} = 4n$$

$$\vec{AB} = -6m + 4n$$

$$\vec{AN} = \frac{1}{2}(-6m + 4n)$$

$$\vec{CN} = m + \frac{1}{2}(-6m + 4n)$$

$$= m - \frac{6}{2}m + \frac{4}{2}n$$

$$= m - 3m + 2n$$

$$= -2m + 2n$$

$$\vec{CE} = -4m + 4n$$

$$\vec{CN} = 2(-m + n), \quad \vec{CE} = 4(-m + n)$$

So, \vec{CN} is $2(-m + n)$ and $\vec{CE} = 4(-m + n)$

and both are multiples of $-m + n$ and both pass through C.

Q6-

⑥

$$\vec{OA} = 2m$$

$$\vec{OB} = 2n$$

$$\vec{OC} = 2m + 2n$$

$$\vec{OE} = \frac{2}{3}(2m + 2n)$$

$$\vec{AE} = -2m + \frac{2}{3}(2m + 2n)$$

$$= -2m + \frac{4}{3}m + \frac{4}{3}n$$

$$= -\frac{2}{3}m + \frac{4}{3}n$$

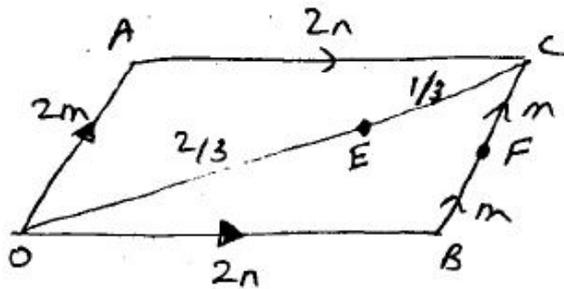
$$= \frac{2}{3}(-m + 2n)$$

$$\vec{AF} = 2n - m$$

$$= -m + 2n$$

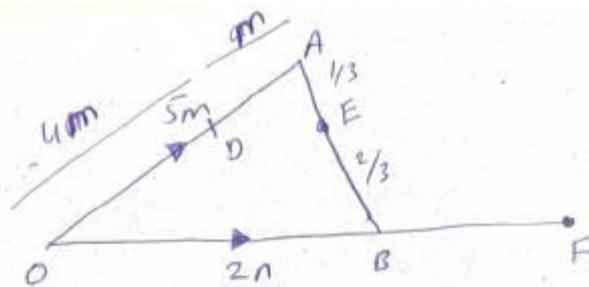
\vec{AE} and \vec{AF} are multiples of $-m + 2n$

and they both pass through A



Q7-

(7)



$$\vec{AB} = -5m + 2n$$

$$\vec{AE} = \frac{1}{3}(-5m + 2n)$$

$$\vec{DE} = m + \frac{1}{3}(-5m + 2n)$$

$$= m - \frac{5}{3}m + \frac{2}{3}n$$

$$= -\frac{2}{3}m + \frac{2}{3}n$$

\vec{DF} must be a multiple of $-\frac{2}{3}m + \frac{2}{3}n$

$$= \frac{2}{3}(-m + n)$$

$$\vec{DF} = -4m + 2n$$

$$= -4m + 4n \quad \therefore n \text{ must be } 4$$

$$\therefore \vec{BF} = 2n$$