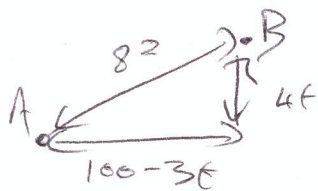


1985 HLC : Q5. (a)

(quick way)



$$82^2 = (100-3t)^2 + (4t)^2$$

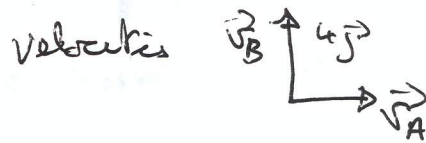
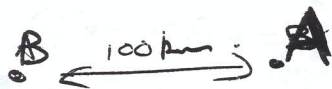
$$\Rightarrow 25t^2 - 600t + 3276 = 0$$

$$\Rightarrow t = 8.4 \text{ or } 15.6$$

$$\Rightarrow \Delta t = 15.6 - 8.4 = 7.2 \text{ secs}$$

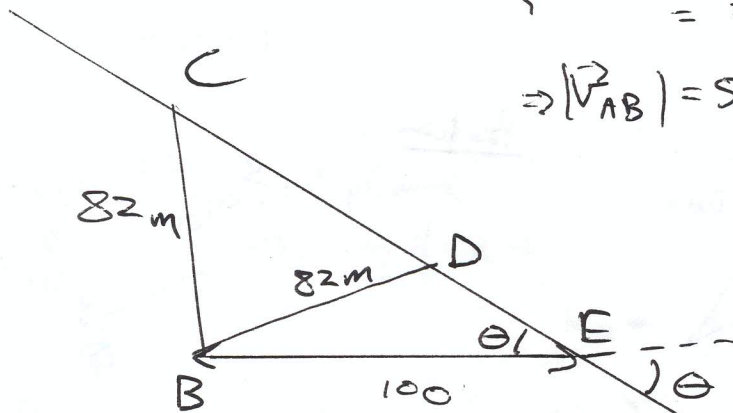
1985 Q5 (like 1987 Question)

Position



$$\vec{v}_{AB} = \vec{v}_A - \vec{v}_B = 3\hat{i} - 4\hat{j}$$

$$\Rightarrow |\vec{v}_{AB}| = 5 \text{ and } \tan \theta = \frac{4}{3}$$



relative path of A relative to B.

Time when distance between cars is not greater

then 82m is  $\frac{|CD|}{|\vec{v}_{AB}|} = \frac{|CD|}{5}$

Find  $|CE|$  or  $|DE|$  by using Cosine rule on  $\triangle CBE$  or  $\triangle DBE$ .

$$82^2 = 100^2 + x^2 - 2(100)x \cos \theta$$

$$\Rightarrow 6724 = 10000 + x^2 - 200x \cdot \frac{3}{5}$$

$$\Rightarrow 6724 = 10000 + x^2 - 120x$$

$$\Rightarrow \boxed{x^2 - 120x + 3276 = 0} \text{ solve for } x$$

$$x = \frac{120 \pm \sqrt{(120)^2 - 4(3276)}}{2} = \frac{120 \pm 36}{2}$$

$$= \frac{156}{2} \text{ or } \frac{84}{2} = 78 \text{ or } 42$$

$$\Rightarrow |CE| = 78m \text{ and } |DE| = 42m \Rightarrow |CD| = 36m$$

$$\Rightarrow \text{Time is } \frac{36}{5} = 7.2 \text{ secs.}$$