2007

2. **(a)** Ship B is travelling west at 24 km/h. Ship A is travelling north at 32 km/h.

At a certain instant ship B is 8 km north-east of ship A.

(i) Find the velocity of ship A relative to ship B.

(ii) Calculate the length of time, to the nearest minute, for which the ships are less than or equal to 8 km apart.

(*i*) $\vec{V}_A = \quad 0\,\vec{i} + 32\,\vec{j}$

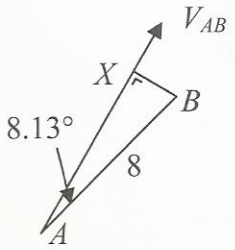
$\vec{V}_B = -24\,\vec{i} + 0\,\vec{j}$

$\vec{V}_{AB} = \vec{V}_A - \vec{V}_B$ — 5

$= 24\,\vec{i} + 32\,\vec{j}$ — 5

magnitude : 40 km/h

direction : East 53.13° North — 5



(*ii*) $\text{time} = \dfrac{2|AX|}{\vec{V}_{AB}}$ — 5

$= \dfrac{16\cos 8.13°}{40}$ — 5

$= 0.396$ hours

$= 24$ minutes — 5

30