

1998

2 (a) The driver of a speedboat travelling in a straight line at 20 m/s wishes to intercept a yacht travelling at 5 m/s in a direction 40° East of North. Initially the speedboat is positioned 5 km South-East of the yacht. Find

- the direction of the speedboat if it intercepts the yacht
- how long the journey takes.

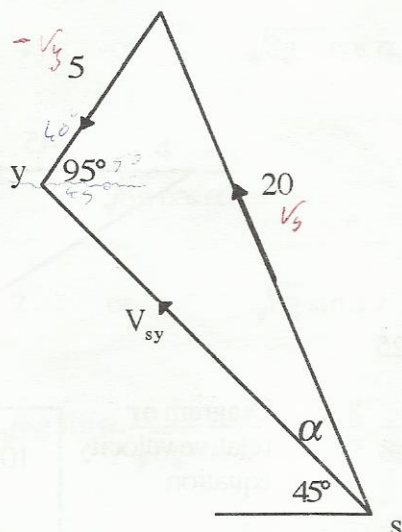


Diagram or
vector approach

10

For interception to occur V_{sy} must be in the direction sy

5

$$\frac{\sin \alpha}{5} = \frac{\sin 95}{20}$$

$$\alpha = 14.42^\circ$$

5

\therefore direction is $W 59.42^\circ N$

$$\frac{V_{sy}}{\sin 70.8^\circ} = \frac{20}{\sin 95^\circ}$$

$$V_{sy} = 18.93 \text{ m/s}$$

$$\text{time} = \frac{5000}{V_{sy}} = 264.13 \text{ s}$$

5

25