

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

Exam style practice papers

Exercise MM1B, Question 5

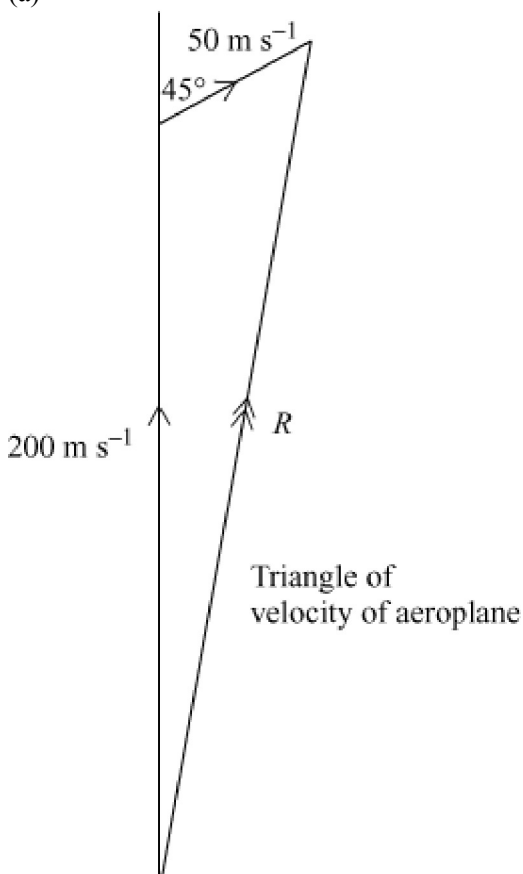
Question:

An aeroplane heads due north at a speed of 200 m s^{-1} . A wind is blowing north east and has speed 50 m s^{-1} .

- (a) Sketch a velocity triangle. (1 mark)
- (b) Calculate the resultant speed of the aeroplane. (4 marks)
- (c) Find the bearing on which the aeroplane actually moves. Give your answer to the nearest 0.1° . (4 marks)

Solution:

(a)



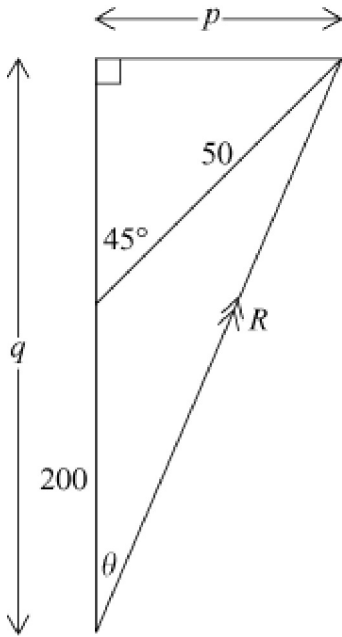
$$\begin{aligned} \text{By cosine rule } R^2 &= 200^2 + 50^2 - 2 \times 50 \times 200 \cos 135^\circ \\ &= 42500 + 14142 \end{aligned}$$

$$\begin{aligned} (b) \quad &= 56642 \\ R &= 237.995 \end{aligned}$$

Resultant speed is 238 m s^{-1}

(c) In the triangle shown,

$$\begin{aligned}
 P &= 50 \sin 45^\circ \\
 q &= 200 + 50 \cos 45^\circ \\
 \tan \theta &= \frac{p}{q} \\
 &= \frac{50 \sin 45^\circ}{200 + 50 \cos 45^\circ} \\
 &= 0.15022 \\
 \therefore \theta &= 8.54^\circ \\
 \therefore \text{Bearing is } 008.5^\circ .
 \end{aligned}$$



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