

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

4 Forces

Exercise B, Question 5

Question:

The resultant of two forces of magnitude P and Q has magnitude 15 N. If $Q = 6$ N and the angle between the two forces is 60° , find P .

Solution:

cosine rule

$$15^2 = P^2 + 6^2 - 2 \times P \times 6 \times \cos 120^\circ$$

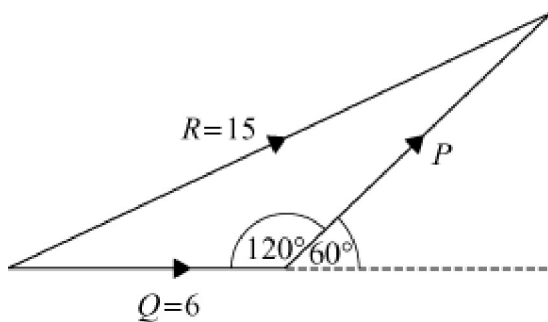
$$\therefore 0 = P^2 - (12 \times \cos 120^\circ) \times P + 6^2 - 15^2$$

$$0 = P^2 - (12 \times \cos 120^\circ) \times P - 189$$

$$\therefore P = \frac{-(-12 \times \cos 120^\circ) \pm \sqrt{(-12 \times \cos 120^\circ)^2 - 4 \times 1 \times (-189)}}{2 \times 1}$$

$$P = 11.071... \text{ N or } P = -17.071... \text{ N (impossible for } 60^\circ \text{ angle between the forces)}$$

$$\text{i.e. } P = 11.1 \text{ N (3 s.f.)}$$



© Harcourt Education Ltd 2005