7.13 The Cosine Rule: 10-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

The Cosine Rule: Fluency and Exam Drill

Revision Library original resource, written for Edexcel 1MA1 (Higher tier)

The cosine rule connects the three sides of a triangle with one of its angles. For a triangle with sides a, b and c, and angle A opposite side a:

a^2 = b^2 + c^2 - 2*b*c*cos(A)

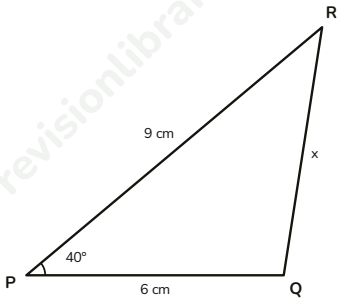
Rearranged to find an angle when all three sides are known:

cos(A) = (b^2 + c^2 - a^2) / (2*b*c)

Use the cosine rule whenever you know two sides and the included angle (to find the third side), or all three sides (to find any angle). A calculator is allowed and expected throughout; give lengths correct to 3 significant figures and angles correct to 1 decimal place unless told otherwise. Questions 1 to 14 build fluency with the rule in both directions. Questions 15 to 20 apply it to exam-style problems, including bearings, perimeters, a combined area calculation, a two-triangle quadrilateral problem and an algebraic setup. The final two questions are grade 9 stretch problems requiring an exact surd answer and multi-step reasoning.

1 In triangle PQR, PQ = 6 cm, PR = 9 cm and angle QPR = 40 degrees. Calculate the length of QR. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

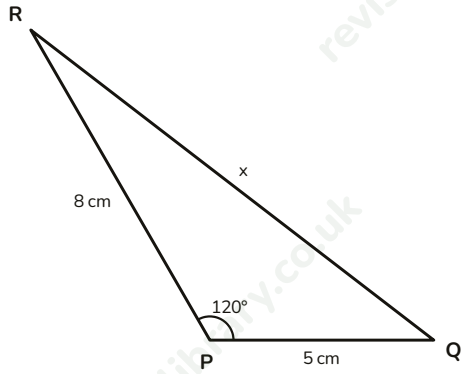


(Total for Question 1 is 2 marks)

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2 In triangle PQR, PQ = 5 cm, PR = 8 cm and angle QPR = 120 degrees. Work out the length of QR. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

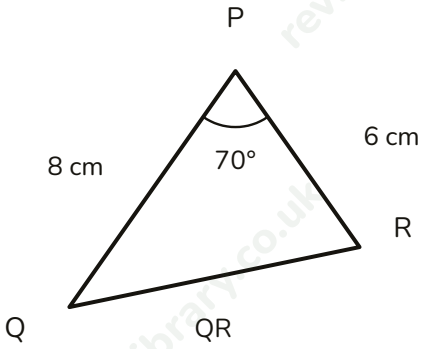


(Total for Question 2 is 2 marks)

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3 In triangle PQR, PQ = 8 cm, PR = 6 cm and angle QPR = 70 degrees. Calculate the length of QR. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn

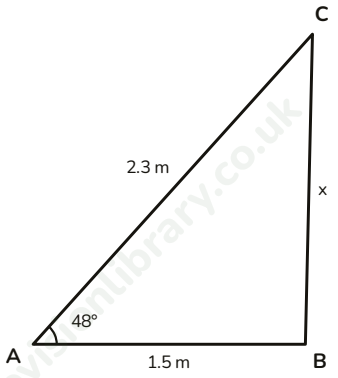


(Total for Question 3 is 3 marks)

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4 Fatima is fencing a triangular flower bed in her garden. Two of the sides measure 1.5 m and 2.3 m, with an angle of 48 degrees between them. Calculate the length of the third side. Give your answer correct to 3 significant figures.

Diagram NOT accurately drawn



(Total for Question 4 is 2 marks)

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Mark scheme · 7.13 The Cosine Rule: 10-minute Pack

Question 1

correct substitution, e.g. $QR^2 = 6^2 + 9^2 - 2*6*9*\cos(40)$ oe	**M1**
QR = 5.85 cm (awrt 5.85), cao	**A1**

Answer: QR = 5.85 cm (3 s.f.)

Question 2

correct substitution, e.g. $QR^2 = 5^2 + 8^2 - 2*5*8*\cos(120)$ oe	**M1**
QR = 11.4 cm (awrt 11.4), cao	**A1**

Answer: QR = 11.4 cm (3 s.f.)

Question 3

$QR^2 = 8^2 + 6^2 - 2 \times 8 \times 6 \times \cos70$ oe	**M1**
QR^2 = 67.2 awrt (dep)	**M1**
8.20 cm awrt	**A1**

Answer: 8.20 cm (3 sf)

Question 4

correct substitution, e.g. third side$^2 = 1.5^2 + 2.3^2 - 2*1.5*2.3*\cos(48)$ oe	**M1**
1.71 m (awrt 1.71), cao	**A1**

Answer: Third side = 1.71 m (3 s.f.)

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