AS Level Maths: Trigonometric Ratios

1 In triangle ABC, side AB has length 15cm, side AC has length 12cm and $\angle BAC = 60^o$

(a) Find the length of side BC. **(3)**

(b) Find the area of triangle ABC. **(2)**

(Total for question 1 is 5 marks)

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2 In triangle ABC, side AB has length 8cm, side BC has length 7cm and side AC has length 6cm.

(a) Find the size of angle ABC. **(3)**

(b) Find the area of triangle ABC. **(2)**

(Total for question 2 is 5 marks)

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3 In triangle DEF, ED = 5cm and EF = 6cm.

Given that $\sin(\angle DEF) = \frac{2}{3}$ and $\angle DEF$ is acute.

(a) Find the exact value of $\cos(\angle DEF)$ **(2)**

(b) Find the length of DF. **(4)**

(c) Find $\angle EFD$. **(3)**

(Total for question 3 is 9 marks)

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4 In triangle PQR, side PQ has length 9cm and side PR has length 10cm.

Given the area of PQR is 30cm^2

(a) Find the length of side QR. **(5)**

(b) Find $\angle PQR$ **(3)**

(Total for question 4 is 8 marks)

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5 In the triangle ABC, AB = 13cm, BC =10cm and angle $BAC = 30^o$

Find the two possible sizes of angle ABC, giving your answers to two decimal places.

(Total for question 5 is 6 marks)

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6 In the triangle ABC, $AB = (x + 3)$cm, $BC = (x + 2)$ cm, $AC = x$ cm and angle $BAC = 60^o$

Find the value of x.

(Total for question 6 is 5 marks)

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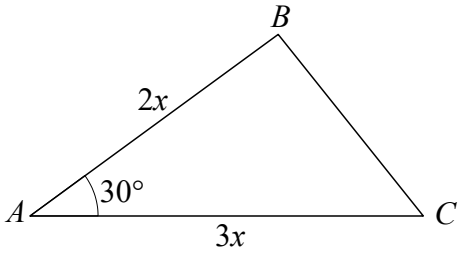
7 In triangle ABC, side AB has length 6 cm, side AC has length 10 cm and $\angle BAC = \theta$, where θ is measured in degrees. The area of triangle ABC is 18 cm^2

(a) Find the two possible values of $\cos\theta$. **(4)**

(b) Given that BC is the longest side of the triangle, find the exact length of BC. **(2)**

(Total for question 7 is 6 marks)

8



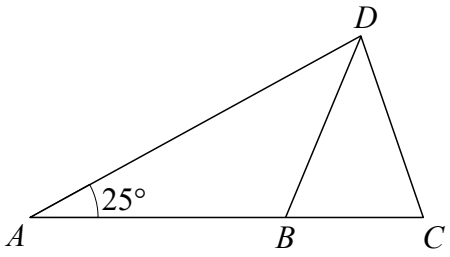
Given the area of triangle ABC is 12 cm^2

(a) Find the exact value of x. **(3)**

(b) Find the length of BC. **(3)**

(Total for question 8 is 6 marks)

9



Given $AD = 12$ cm, $BD = CD = 8$ cm and angle $DAC = 25°$

(a) Find the size of angle ABD to one decimal place. **(3)**

(b) Find the length of AC **(3)**

(Total for question 9 is 6 marks)

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10 A parallelogram $ABCD$ has area 55 cm^2
Given AB has length 5 cm, BC has length 12 cm and angle ABC is obtuse.

(a) Find the size of angle ABC to 2 decimal places. **(3)**

(b) Find the length of the diagonal AC to 1 decimal place. **(2)**

(Total for question 10 is 5 marks)

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11 In triangle ABC, $AB = 12$ cm and angle $B = 40°$

(a) Given $AC = 10$ cm, find the two possible values for angle C, correct to 1 decimal place. **(4)**

(b) Given instead that the area of the triangle is $75\sqrt{2}$ cm^2, find BC. **(2)**

(Total for question 11 is 6 marks)

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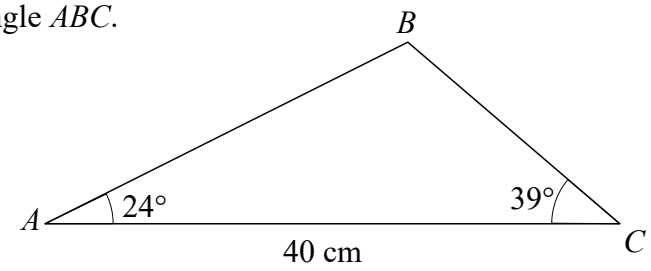
12 Find the area of triangle ABC.



(Total for question 12 is 3 marks)

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13 Sketch the graph of $y = \sin(x) + 1$ for $0 \leq x \leq 360$

(Total for question 13 is 3 marks)

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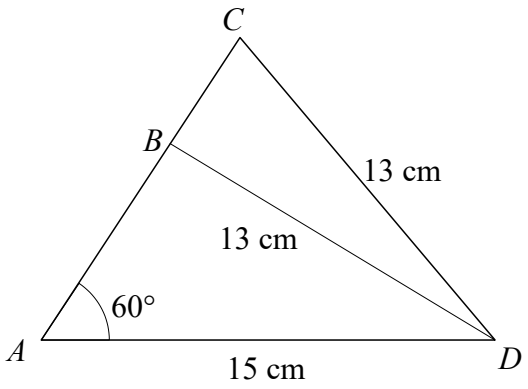
14 Sketch the graph of $y = \cos(x + 90)$ for $0 \leq x \leq 360$

(Total for question 14 is 3 marks)

15



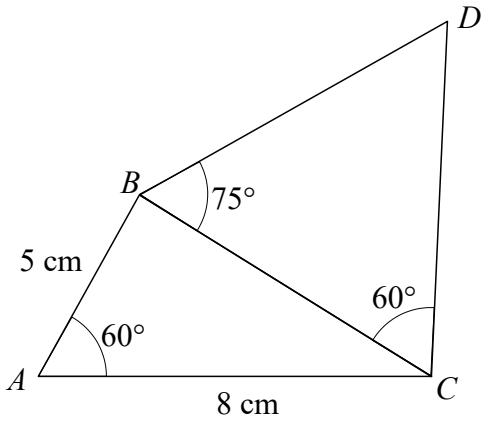
ACD is a triangle and B lies on AC. Angle $CAD = 60°$, $AD = 15$ cm, $BD = CD = 13$ cm

(a) Find the length of AC **(3)**

(b) Hence, or otherwise, find the length of AB **(1)**

(Total for question 15 is 4 marks)

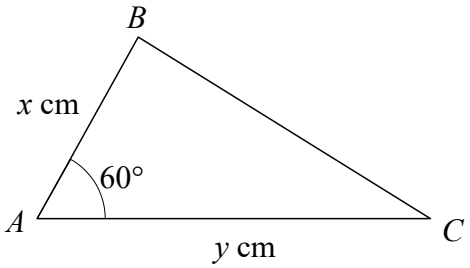
16



Calculate the exact value of the length BD.

(Total for question 16 is 4 marks)

17



In triangle ABC, $AB = x$, $AC = y$ and angle $A = 60°$. It is given the area of $ABC = 2\sqrt{3}(x+y)\text{cm}^2$.

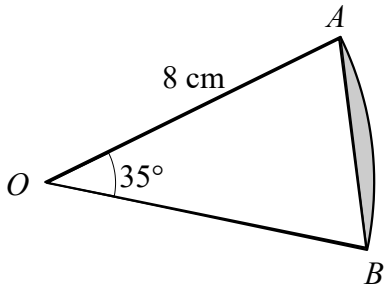
(a) Show that $8x + 8y = xy$ **(2)**

When the vertices of the triangle are placed on the circumference of a circle, AC is a diameter of the circle.

(b) Determine the value of x and the value of y. **(4)**

(Total for question 17 is 6 marks)

18



The diagram shows sector AOB of a circle with centre O and radius 8 cm. Angle $AOB = 35°$

(a) Calculate the length of the straight line AB. **(2)**

(b) Find the area of the shaded segment. **(3)**

(Total for question 18 is 5 marks)

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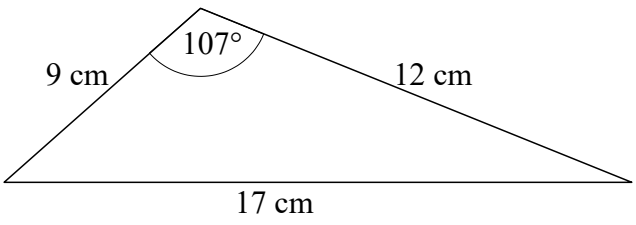
19 In triangle ABC, side AB has length 5cm, side BC has length 9cm and side AC has length 7cm.

(a) Find the cosine of angle ACB, giving your answer as a fraction in its simplest form. **(2)**

(b) Find the exact area of the triangle. **(3)**

(Total for question 19 is 5 marks)

20



Calculate the area of the triangle giving your answer correct to 3 significant figures.

(Total for question 20 is 2 marks)
