



Pure Year 1 exam questions Edexcel

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Ch. 9: Trigonometric Ratios

June 2022 Question 4

4.

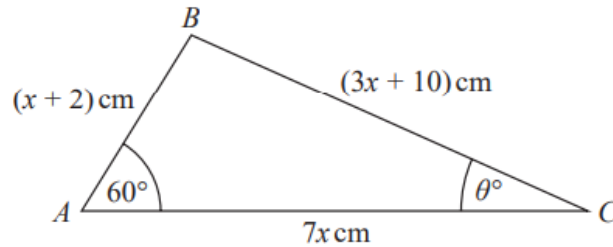


Figure 1

Figure 1 shows a sketch of triangle ABC with $AB = (x + 2)$ cm, $BC = (3x + 10)$ cm, $AC = 7x$ cm, angle $BAC = 60^\circ$ and angle $ACB = \theta^\circ$

- (a) (i) Show that $17x^2 - 35x - 48 = 0$ (3)
- (ii) Hence find the value of x . (1)
- (b) Hence find the value of θ giving your answer to one decimal place. (2)

ANSWER

Question	Scheme	Marks	AOs
4(a)(i)	$(3x+10)^2 = (x+2)^2 + (7x)^2 - 2(x+2)(7x)\cos 60^\circ$ oe	M1	3.1a
	Uses $\cos 60^\circ = \frac{1}{2}$, expands the brackets and proceeds to a 3 term quadratic equation	dM1	1.1b
	$17x^2 - 35x - 48 = 0$ *	A1*	2.1
		(3)	
		(1)	
(ii)	$x = 3$	B1	3.2a
		(1)	
(b)	$\frac{5}{\sin ACB} = \frac{19}{\sin 60^\circ} \Rightarrow \sin ACB = \dots \left(\frac{5\sqrt{3}}{38} \right)$ or e.g. $5^2 = 21^2 + 19^2 - 2 \times 19 \times 21 \cos ACB \Rightarrow \cos ACB = \dots \left(\frac{37}{38} \right)$	M1	1.1b
	$\theta = \text{awrt } 13.2$	A1	1.1b
		(2)	
(6 marks)			

Video solution:

<https://youtu.be/Wi1gGRu3eXQ>

November 2021 Question 7

7. A parallelogram $PQRS$ has area 50 cm^2

Given

- PQ has length 14 cm
- QR has length 7 cm
- angle SPQ is obtuse

find

(a) the size of angle SPQ , in degrees, to 2 decimal places,

(3)

(b) the length of the diagonal SQ , in cm, to one decimal place.

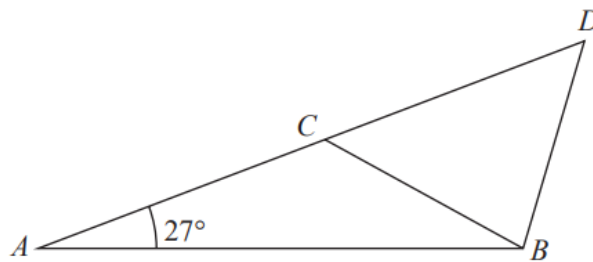
(2)

ANSWER

Question	Scheme	Marks	AOs
7 (a)	Sets $50 = 7 \times 14 \sin(SPQ)$ oe	B1	1.2
	Finds $180^\circ - \arcsin\left(\frac{50}{98}\right)$	M1	1.1b
	$= 149.32^\circ$	A1	1.1b
		(3)	
(b)	Method of finding SQ $SQ^2 = 14^2 + 7^2 - 2 \times 14 \times 7 \cos 149.32^\circ$	M1	1.1b
	$= 20.3\text{ cm}$	A1	1.1b
		(2)	
			(5 marks)

November 2020 Question 5

5.



Not to scale

Figure 1

Figure 1 shows the design for a structure used to support a roof.

The structure consists of four steel beams, AB , BD , BC and AD .

Given $AB = 12\text{ m}$, $BC = BD = 7\text{ m}$ and angle $BAC = 27^\circ$

(a) find, to one decimal place, the size of angle ACB .

(3)

The steel beams can only be bought in whole metre lengths.

(b) Find the minimum length of steel that needs to be bought to make the complete structure.

(3)

ANSWER

Question	Scheme	Marks	AOs
5 (a)	States $\frac{\sin \theta}{12} = \frac{\sin 27}{7}$	M1	1.1b
	Finds $\theta =$ awrt 51° or awrt 129°	A1	1.1b
	$=$ awrt 128.9°	A1	1.1b
		(3)	
(b)	Attempts to find part or all of AD Eg $AD^2 = 7^2 + 12^2 - 2 \times 12 \times 7 \cos 101.9 = (AD = 15.09)$	M1	1.1b
	Eg $(AC)^2 = 7^2 + 12^2 - 2 \times 12 \times 7 \cos(180 - "128.9" - 27)$		
	Eg $12 \cos 27$ or $7 \cos "51"$		
	Full method for the total length $= 12 + 7 + 7 + "15.09" =$	dM1	3.1a
	$= 42$ m	A1	3.2a
		(3)	
			(6 marks)

June 2019 Question 6

6.

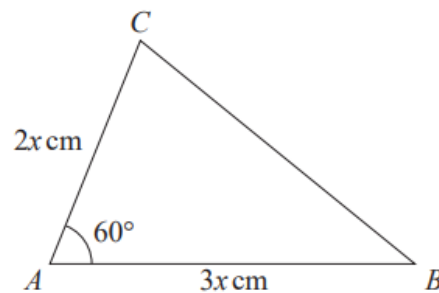


Figure 1

Figure 1 shows a sketch of a triangle ABC with $AB = 3x$ cm, $AC = 2x$ cm and angle $CAB = 60^\circ$

Given that the area of triangle ABC is $18\sqrt{3}$ cm²

(a) show that $x = 2\sqrt{3}$ (3)

(b) Hence find the exact length of BC , giving your answer as a simplified surd. (3)

ANSWER

Question	Scheme	Marks	AOs
6 (a)	Uses $18\sqrt{3} = \frac{1}{2} \times 2x \times 3x \times \sin 60^\circ$	M1	1.1a
	Sight of $\sin 60^\circ = \frac{\sqrt{3}}{2}$ and proceeds to $x^2 = k$ oe	M1	1.1b
	$x = \sqrt{12} = 2\sqrt{3}$ *	A1*	2.1
		(3)	
(b)	Uses $BC^2 = (6\sqrt{3})^2 + (4\sqrt{3})^2 - 2 \times 6\sqrt{3} \times 4\sqrt{3} \times \cos 60^\circ$	M1	1.1b
	$BC^2 = 84$	A1	1.1b
	$BC = 2\sqrt{21}$ (cm)	A1	1.1b
		(3)	
(6 marks)			

June 2018 Question 7

7. In a triangle ABC , side AB has length 10 cm, side AC has length 5 cm, and angle $BAC = \theta$ where θ is measured in degrees. The area of triangle ABC is 15 cm^2

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

(4)

Given that BC is the longest side of the triangle,

(b) find the exact length of BC .

(2)

ANSWER

Question	Scheme	Marks	AOs
7 (a)	Uses $15 = \frac{1}{2} \times 5 \times 10 \times \sin \theta$	M1	1.1b
	$\sin \theta = \frac{3}{5}$ oe	A1	1.1b
	Uses $\cos^2 \theta = 1 - \sin^2 \theta$	M1	2.1
	$\cos \theta = \pm \frac{4}{5}$	A1	1.1b
		(4)	
(b)	Uses $BC^2 = 10^2 + 5^2 - 2 \times 10 \times 5 \times \frac{4}{5}$	M1	3.1a
	$BC = \sqrt{205}$	A1	1.1b
		(2)	
			(6 marks)