G57...Trigonometry - The Sine Rule

OCR

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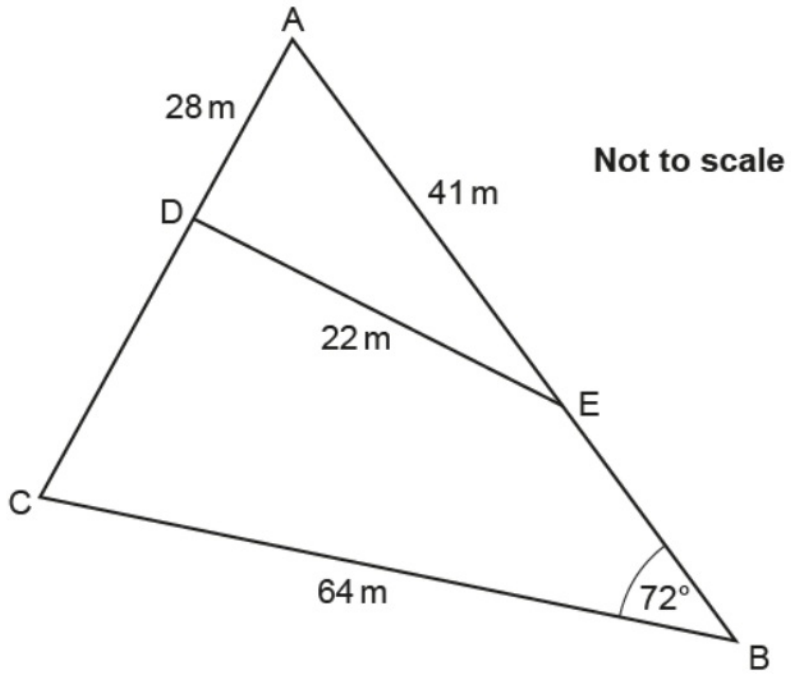
14 The diagram shows triangle ABC with D on AC and E on AB.
DE is a straight line.



AD = 28 m, AE = 41 m, DE = 22 m and BC = 64 m.

Calculate the length CD.

..... m **[6]**

14 The diagram shows triangle ABC with D on AC and E on AB.
DE is a straight line.

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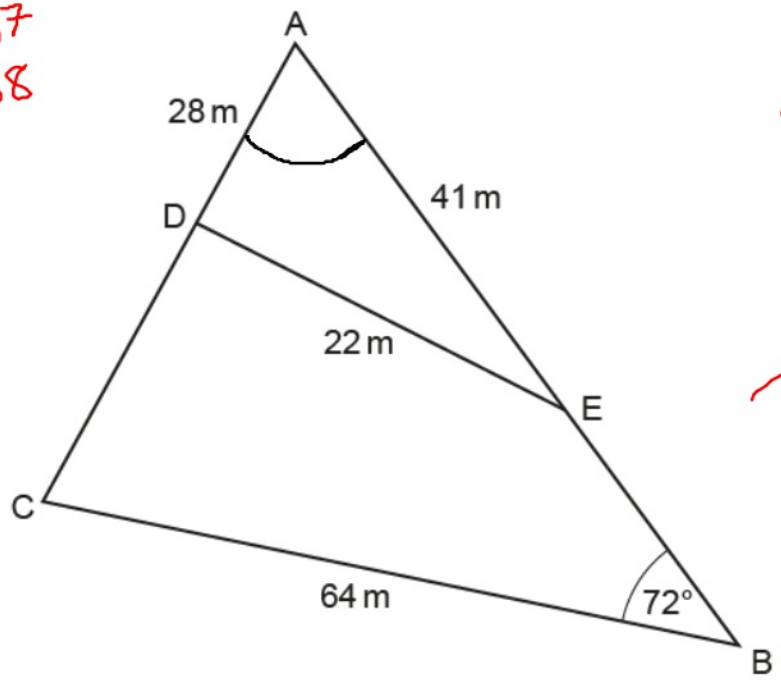
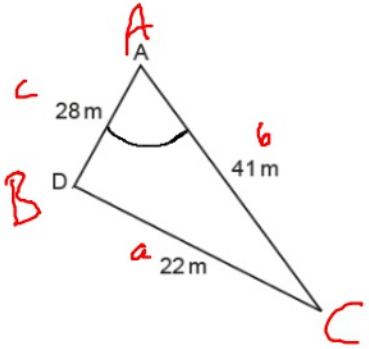
G57
G58





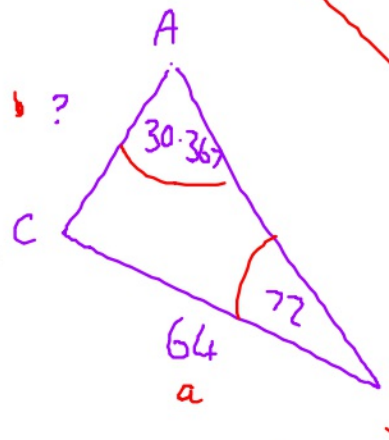
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos A = \frac{41^2 + 28^2 - 22^2}{2(41)(28)}$$

$$\cos A = 0.862\ldots$$

$$A = \cos^{-1} 0.862$$

$$A = 30.367^\circ$$



$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{64}{\sin 30.367} = \frac{b}{\sin 72}$$

$$b = 120.4\text{cm} = AC$$

AD = 28 m, AE = 41 m, DE = 22 m and BC = 64 m.

Calculate the length CD.

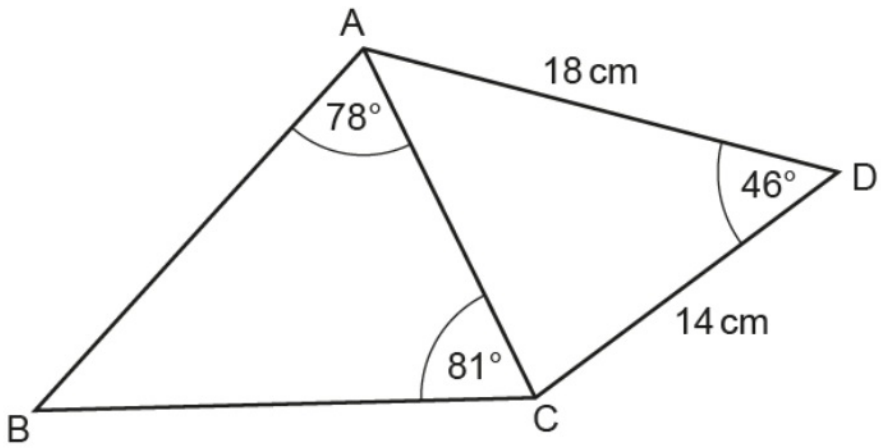
$$CD = 120.4 - 28$$

92.28 → 92.6m ✓ ✓

$$CD = 92.4\text{m}$$

..... m **[6]**

ABC and ACD are triangles.



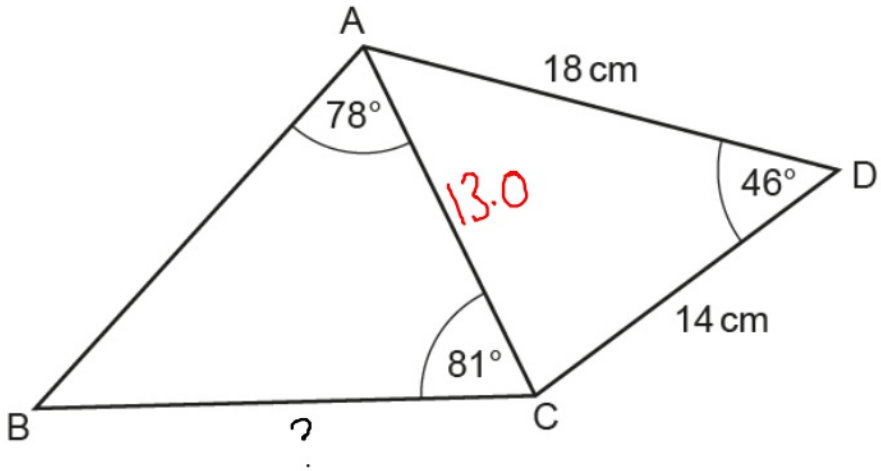
Not to scale

(b) Calculate BC.

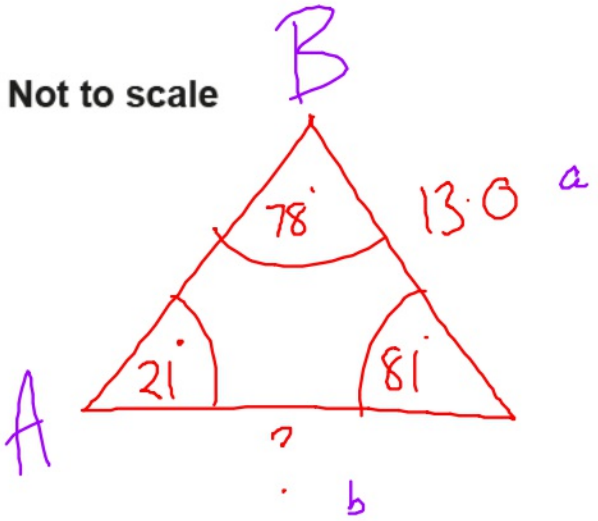
GS7

(b) ..... cm **[3]**

ABC and ACD are triangles.



Not to scale



(b) Calculate BC.

GS7

$\frac{a}{\sin A} = \frac{b}{\sin B} \rightarrow \frac{13}{\sin 21} = \frac{b}{\sin 78}$

$35.48 = b$

35.48 ✓

(b) ..... 35.48 ..... cm **[3]**

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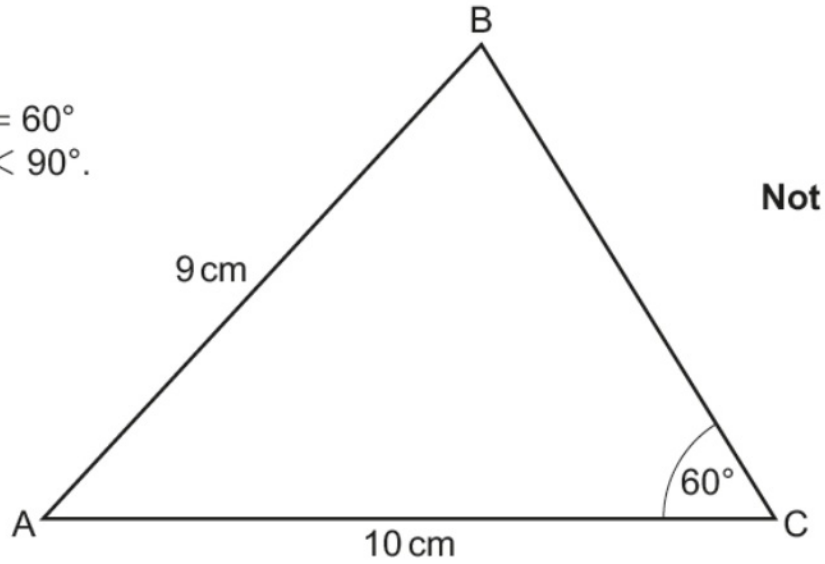
19 In this triangle:

- AB = 9 cm
- AC = 10 cm
- BC > 5 cm
- angle BCA = 60°
- angle ABC < 90°.

G57
G59



Not to scale

Calculate the area of triangle ABC.

..... cm^2 **[6]**

Video created by W Neill

19 In this triangle:

- AB = 9 cm
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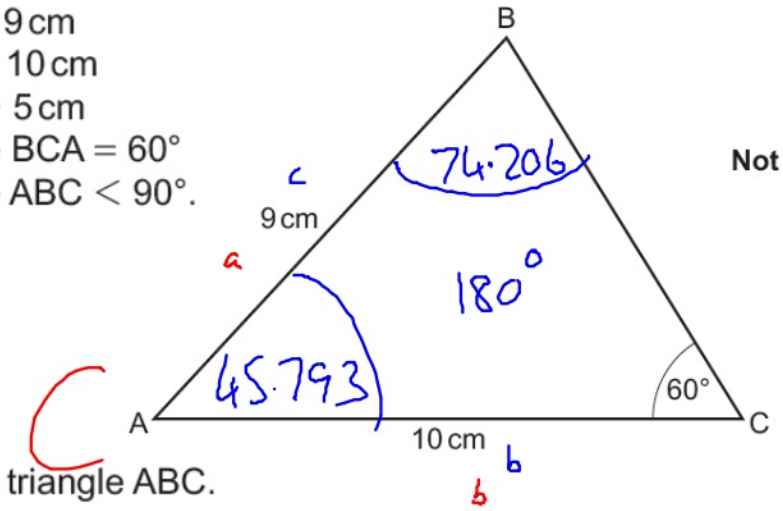
G57
G59



Not to scale

$\frac{\sin B}{b} = \frac{\sin C}{c}$

$\frac{\sin B}{10} = \frac{\sin 60}{9}$ → x

$\sin B = 0.962$

$B = \sin^{-1} 0.962$

$B = 74.206°$

Calculate the area of triangle ABC.

$\frac{1}{2}ab\sin C$

Area $= \frac{1}{2}ab\sin C$

$= \frac{1}{2}(9)(10)\sin 45.793$

$=$

32.257 cm² ..... cm² **[6]**

Edexcel

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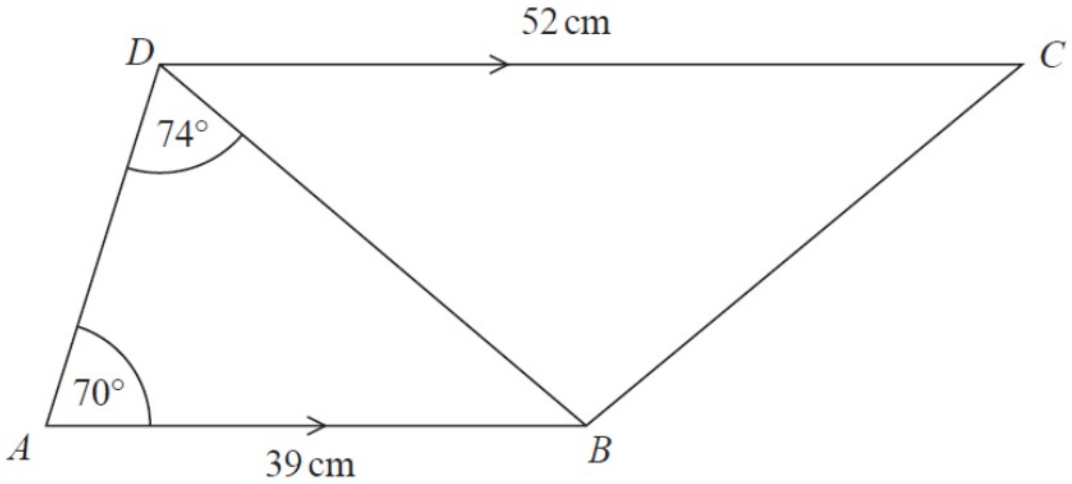
G7
G57
G59

15 Here is trapezium $ABCD$.



AB and DC are parallel.

Work out the area of triangle BCD.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 15 is 5 marks)

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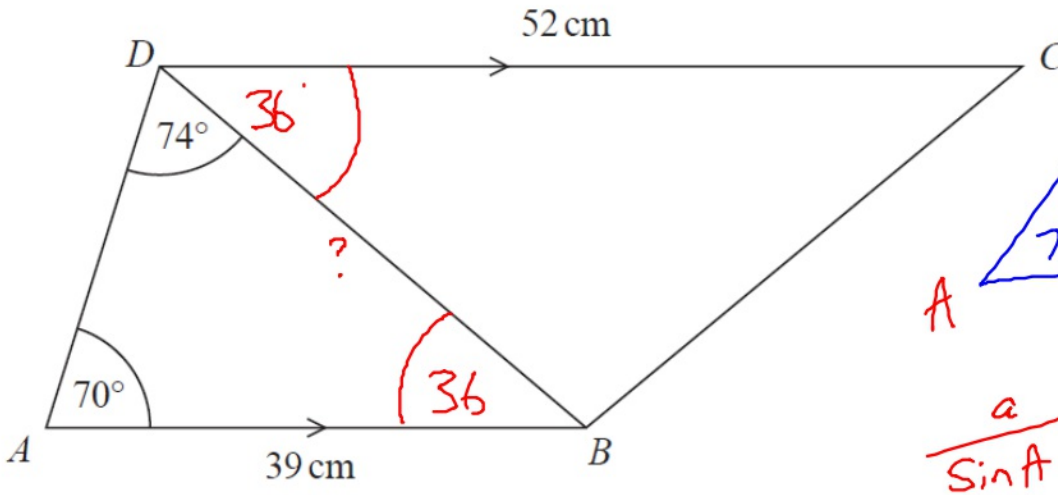
15 Here is trapezium $ABCD$.

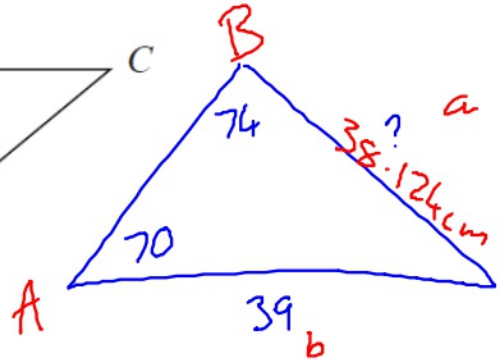
G7
G57
G59



AB and DC are parallel.

Work out the area of triangle BCD.
Give your answer correct to 3 significant figures.

$\frac{1}{2}ab\sin C$

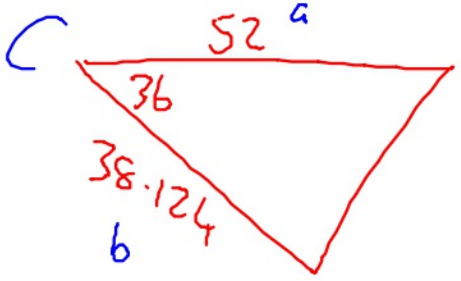


$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$= \frac{a}{\sin 70} = \frac{39}{\sin 74}$$

$$a = 38.124 \text{ cm}$$

Area

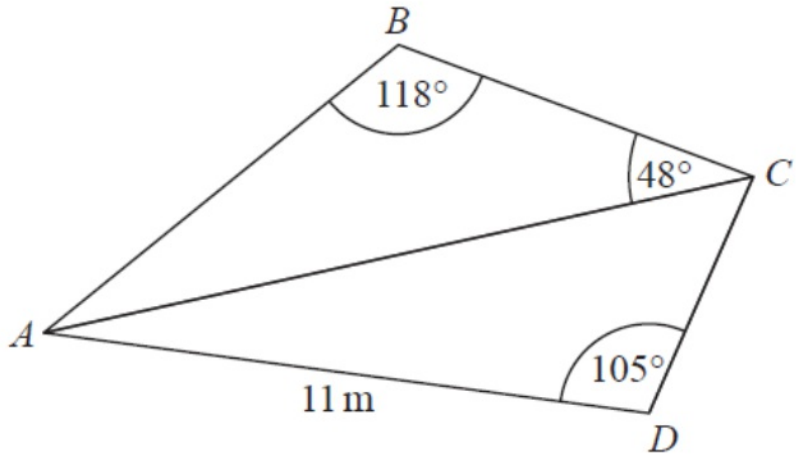


$$= \frac{1}{2}ab\sin C$$

$$\left(\tfrac{1}{2}\right) \times (38.124) \times (52) \times \sin 36 = 583 \text{ cm}^2$$

(Total for Question 15 is 5 marks)

17 ABC and ADC are triangles.



The area of triangle ADC is $56\,m^2$

Work out the length of AB.
Give your answer correct to 1 decimal place.

..... m

(Total for Question 17 is 5 marks)

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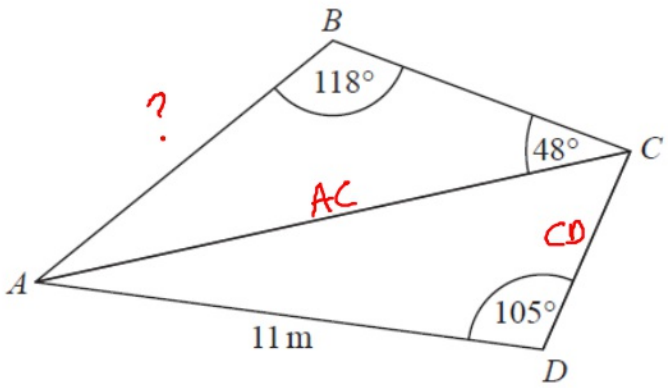
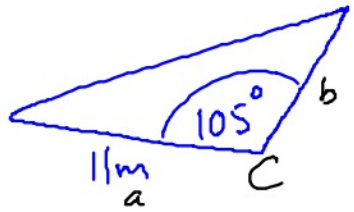
17 *ABC* and *ADC* are triangles.



Angle → opposite Side
Sine Rule

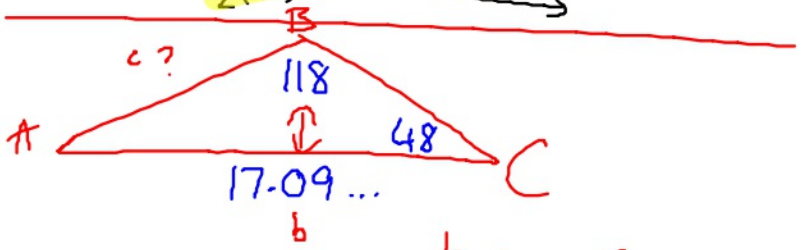
The area of triangle *ADC* is 56 m²

Work out the length of *AB*.
Give your answer correct to 1 decimal place.

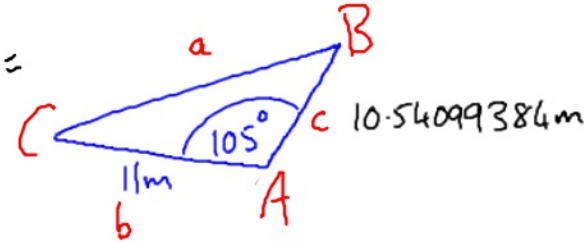


$\frac{1}{2}ab\sin C = 56m^2$

$\frac{1}{2}(11)\,b\,\sin 105 = 56$



AC =



$\frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{17.09}{\sin 118} = \frac{c}{\sin 48}$

$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 232.1125511 - -60.020...$

$a^2 = 292.133$

$a = \sqrt{\ }$

$a = 17.09190365$

14·4 ✓ m

(Total for Question 17 is 5 marks)

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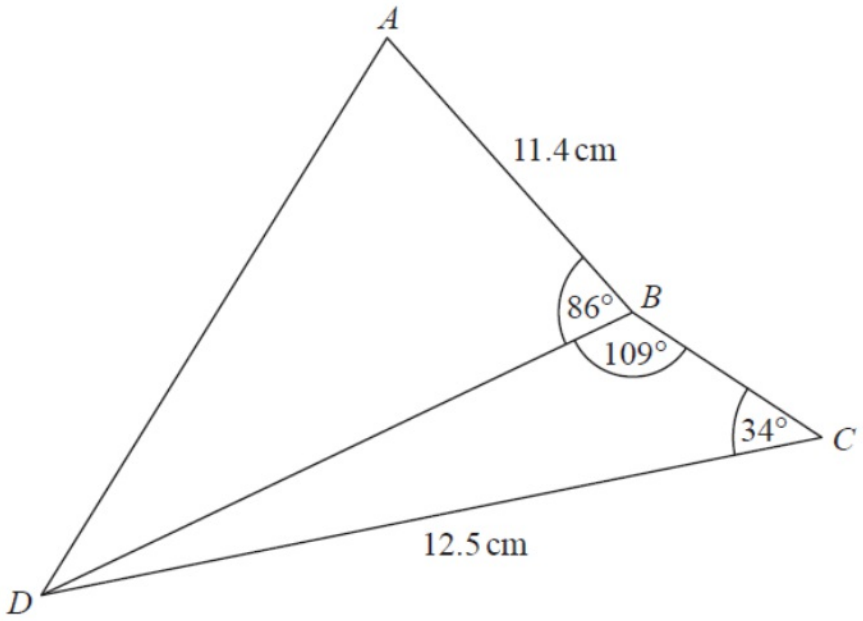
17

G57
G58



Work out the length of AD.
Give your answer correct to 3 significant figures.

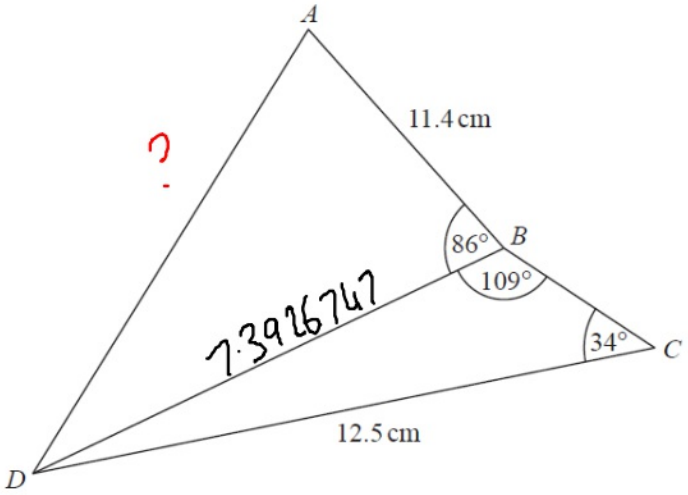
..... cm

(Total for Question 17 is 5 marks)

Video created by W Neill

17

G57
G58



Work out the length of AD.
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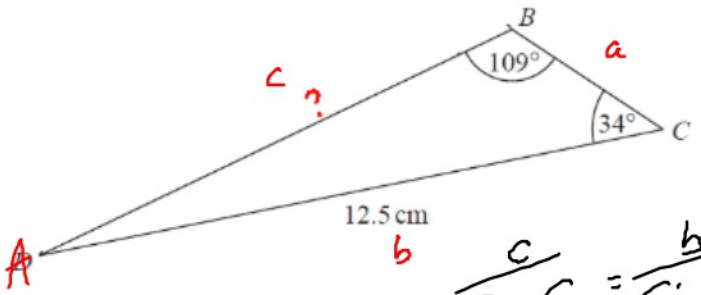
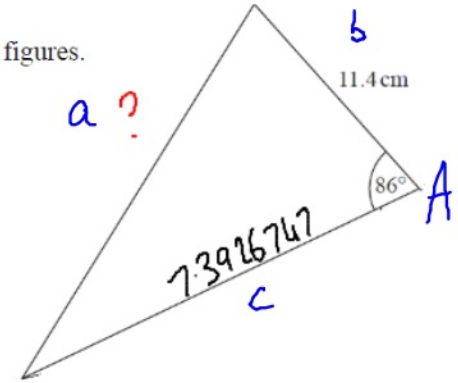


$$\frac{c}{\sin C} = \frac{b}{\sin B}$$

$$\frac{c}{\sin 34} = \frac{12.5}{\sin 109}$$

7.3926747 cm



$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 11.4^2 + 7.39^2 - [2 \times 11.4 \times 7.39 \times \cos 86$

$a^2 = 184.61 - [11.75766181]$

$a^2 = 172.85\ldots$ $a = 13.1$ cm ✓

(Total for Question 17 is 5 marks)

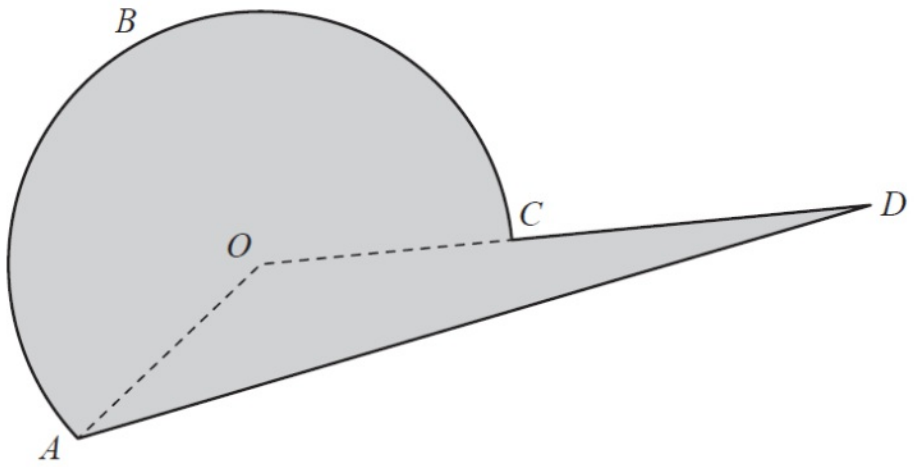
Video Created by W Neill

16 Here is a shaded shape $ABCD$.

The shape is made from a triangle and a sector of a circle, centre O and radius 6 cm.
OCD is a straight line.

$AD = 14$ cm
Angle $AOD = 140°$
Angle $OAD = 24°$

Calculate the perimeter of the shape.
Give your answer correct to 3 significant figures



G23
G57

..... cm

(Total for Question 16 is 5 marks)

Video Created by W Neill

16 Here is a shaded shape *ABCD*.

The shape is made from a triangle and a sector of a circle, centre *O* and radius 6 cm.
OCD is a straight line.

AD = 14 cm
Angle *AOD* = 140°
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Calculate the perimeter of the shape.
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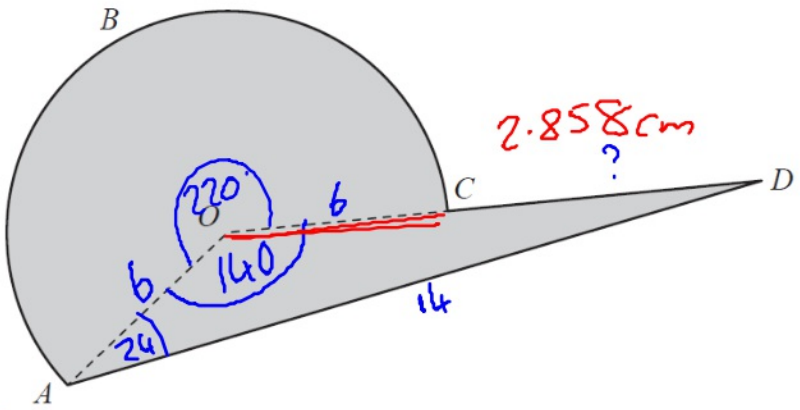
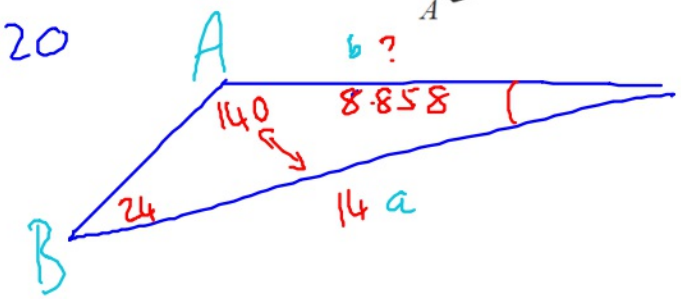


G23
G57 A→C ... D×π ÷360 ×220

= 12×π ÷360×220

= 23.038cm



$\frac{b}{\sin B} = \frac{a}{\sin A}$

$\frac{b}{\sin 24} = \frac{14}{\sin 140}$

b = 8.858

P = 23.038 + 2.858 + 14

= 39.9 cm

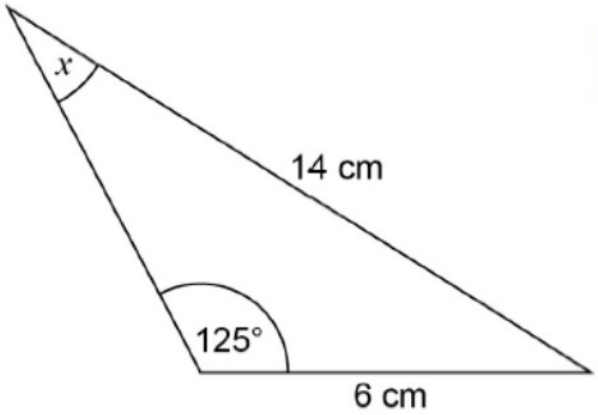
(Total for Question 16 is 5 marks)

AQA

Video created by W Neill

20 Work out the size of angle x.

G57



Not drawn accurately

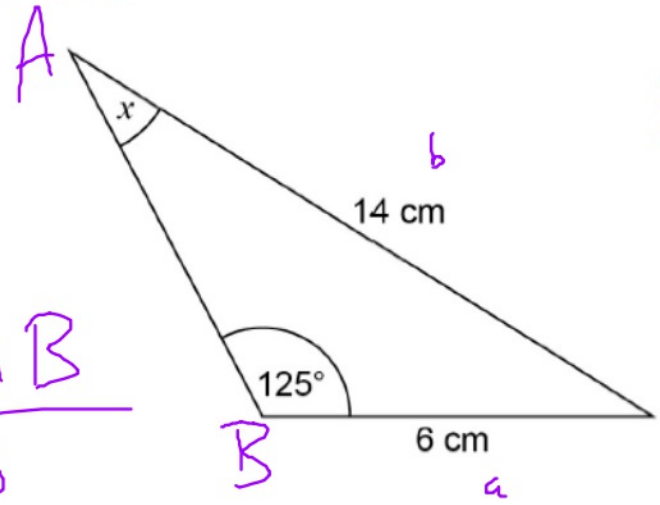
[3 marks]

Answer _____ degrees

Video created by W Neill

20 Work out the size of angle x.

G57



Not drawn accurately

[3 marks]

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin A}{6} = \frac{\sin 125^\circ}{14}$$

$\times$

$$\sin A = 0.351\ldots$$

$$A = \sin^{-1} 0.351$$

$$A =$$

Answer 20.6° degrees

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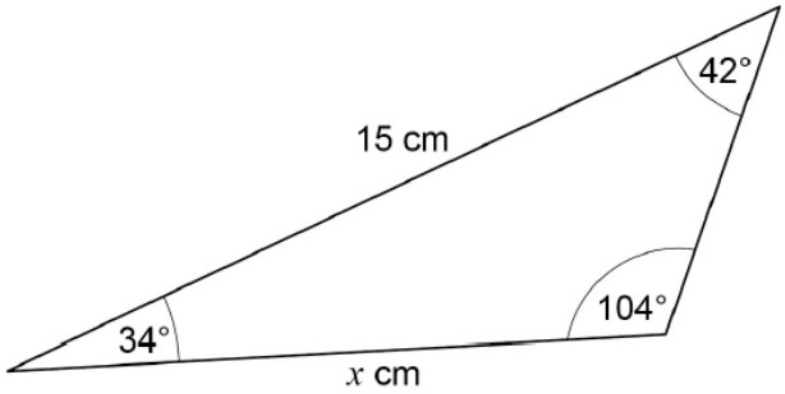
17 Here is a triangle.

G57



Not drawn accurately

Circle the correct equation.

[1 mark]

$$\frac{\sin x}{42} = \frac{\sin 15°}{104} \qquad \frac{x}{\sin 42°} = \frac{15}{\sin 104°}$$

$$\frac{\sin x}{34} = \frac{\sin 15°}{104} \qquad \frac{x}{\sin 42°} = \frac{15}{\sin 34°}$$

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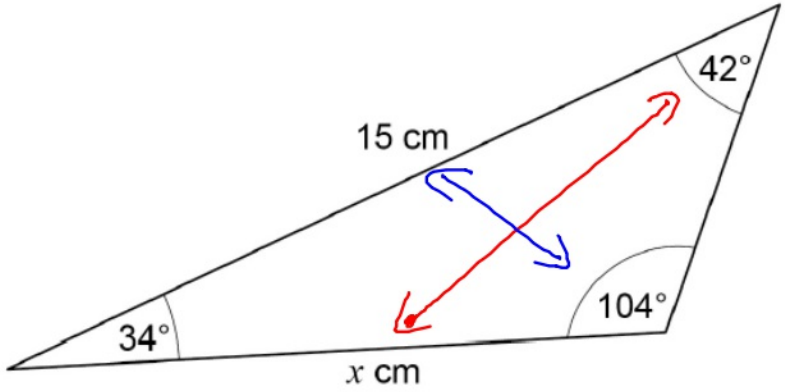
17 Here is a triangle.

G57



Not drawn accurately

$$\frac{x}{\sin 42} = \frac{15}{\sin 104}$$

Circle the correct equation.

[1 mark]

$$\frac{\sin x}{42} = \frac{\sin 15°}{104}$$

$$\frac{x}{\sin 42°} = \frac{15}{\sin 104°}$$

$$\frac{\sin x}{34} = \frac{\sin 15°}{104}$$

$$\frac{x}{\sin 42°} = \frac{15}{\sin 34°}$$

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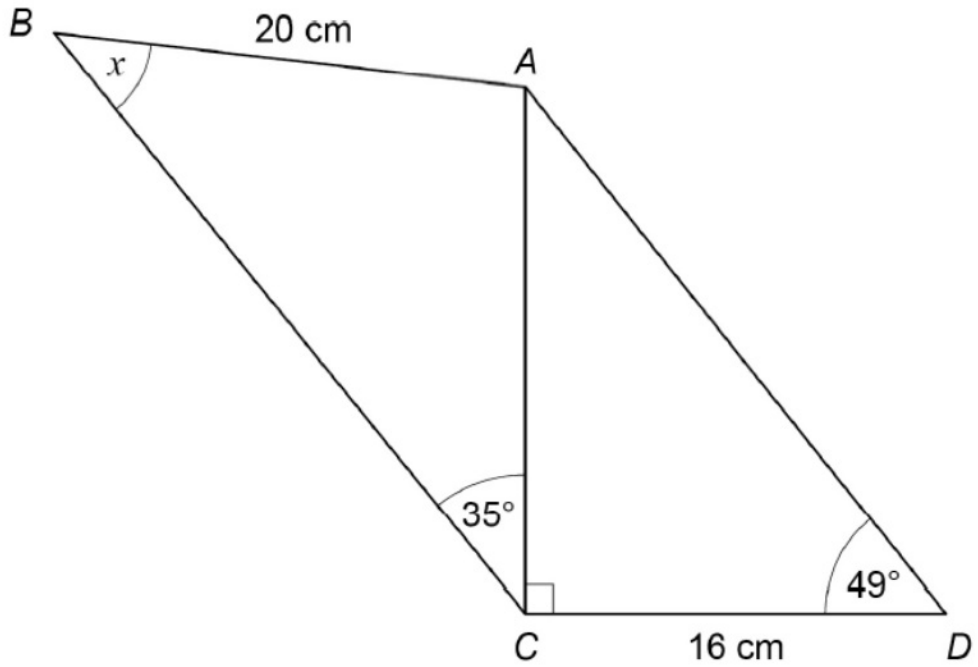
25 *ABC* and *ACD* are triangles.

G46
G57



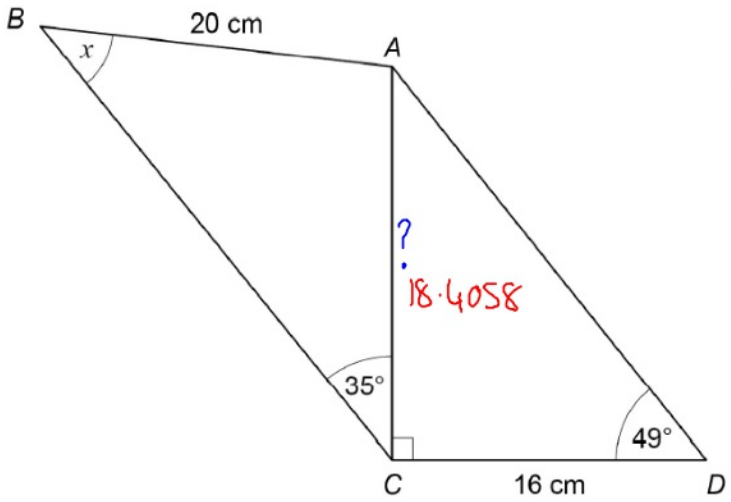
Work out the size of angle x. **[5 marks]**

Answer _____ degrees

Video created by W Neill

25 *ABC* and *ACD* are triangles.

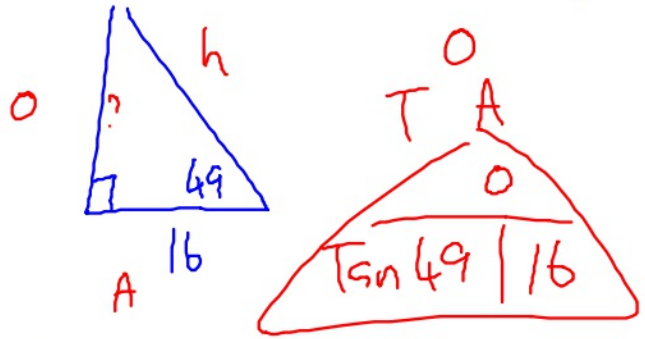
G46
G57

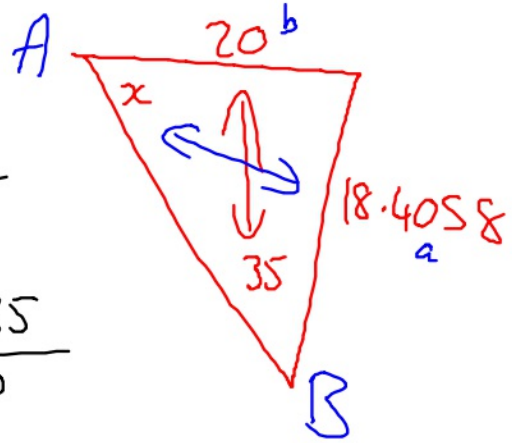


Not drawn accurately

Work out the size of angle x.

[5 marks]





$$\frac{\sin A}{a} = \frac{\sin B}{b}$$

$$\frac{\sin A}{18.4058} = \frac{\sin 35}{20}$$

$$\sin A = 0.527$$

$$A = \sin^{-1} 0.527$$

Answer 31.9° degrees