

Name: _____

GCSE (1 – 9)

The Sine Rule

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

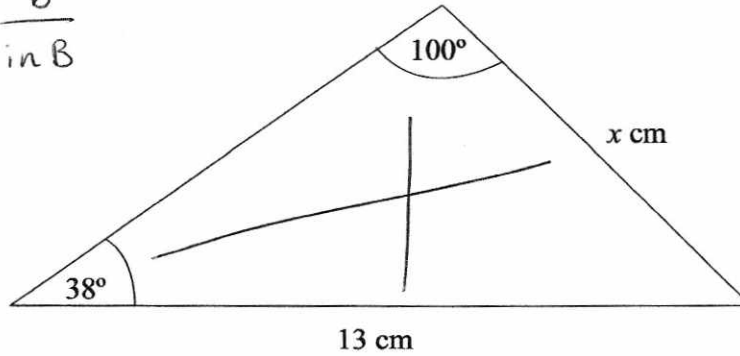
- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1

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



Work out the value of x .
Give your answer to 1 decimal place.

$$\frac{x}{\sin(38)} = \frac{13}{\sin(100)}$$

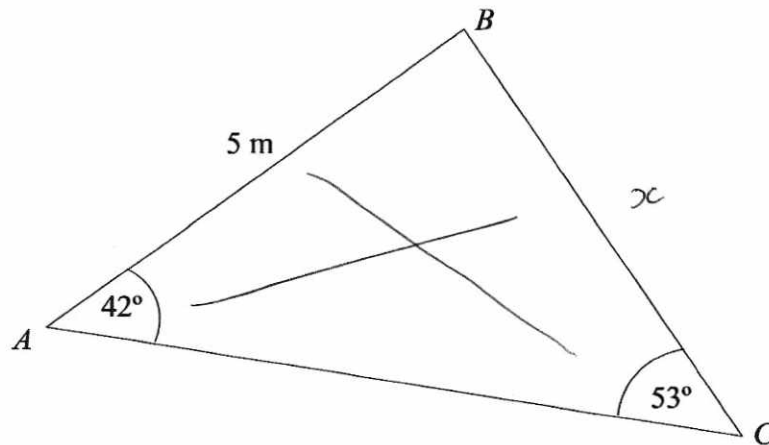
$$x = \frac{13}{\sin(100)} \times \sin(38)$$

$$= 8.1 \text{ (1dp)}$$

.....8.1.....

(Total for question 1 is 3 marks)

2



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

$$\frac{x}{\sin(42)} = \frac{5}{\sin(53)}$$

$$x = \frac{5}{\sin(53)} \times \sin(42)$$

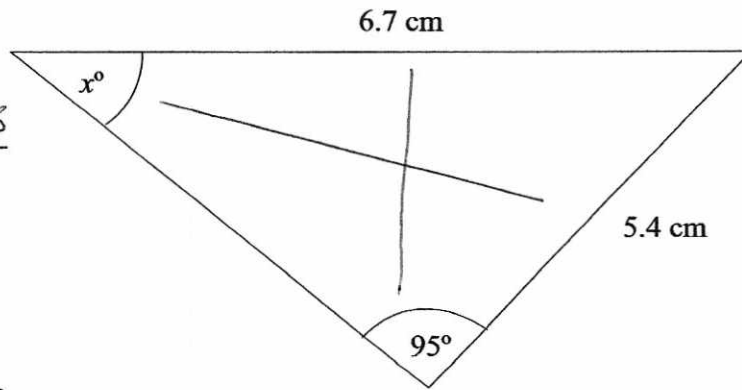
$$= 4.19 \text{ (3sf)}$$

.....4.19.....m

(Total for question 2 is 3 marks)

3

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



Work out the value of x .
Give your answer to 3 significant figures.

$$\frac{\sin x}{5.4} = \frac{\sin(95)}{6.7}$$

$$\sin x = \frac{\sin(95)}{6.7} \times 5.4$$

$$= 0.8029\dots$$

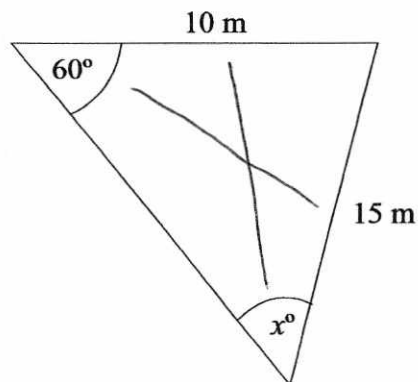
$$x = \sin^{-1}(\text{Ans})$$

$$= 53.4 \text{ (3sf)}$$

53.4

(Total for question 3 is 3 marks)

4



Work out the size of angle x .
Give your answer to 3 significant figures.

$$\frac{\sin x}{10} = \frac{\sin 60}{15}$$

$$\sin x = \frac{\sin(60)}{15} \times 10$$

$$\sin x = \frac{\sqrt{3}}{3}$$

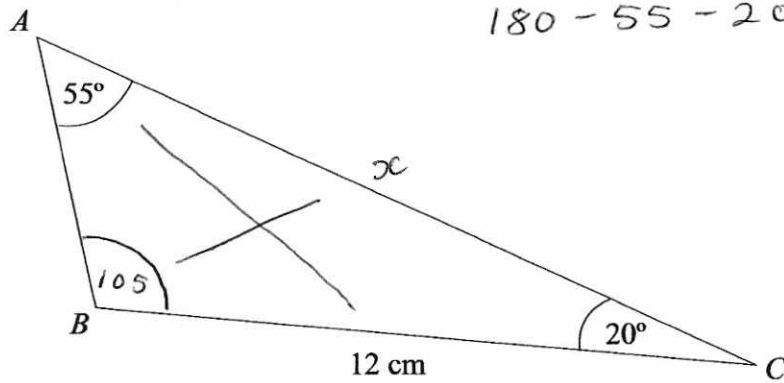
$$x = \sin^{-1}(\text{Ans})$$

$$= 35.3 \text{ (3sf)}$$

35.3

(Total for question 4 is 3 marks)

5



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

$$\frac{x}{\sin(105)} = \frac{12}{\sin(55)}$$

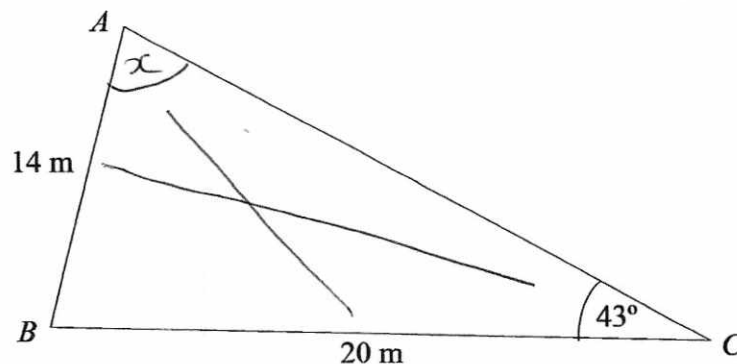
$$x = \frac{12}{\sin(55)} \times \sin(105)$$

$$= 14.2 \text{ (1dp)}$$

.....14.2.....cm

(Total for question 5 is 3 marks)

6



Work out the size of angle BAC.
Give your answer to 3 significant figures.

$$\frac{\sin x}{20} = \frac{\sin(43)}{14}$$

$$\sin x = \frac{\sin(43)}{14} \times 20$$

$$\sin x = 0.97428 \dots$$

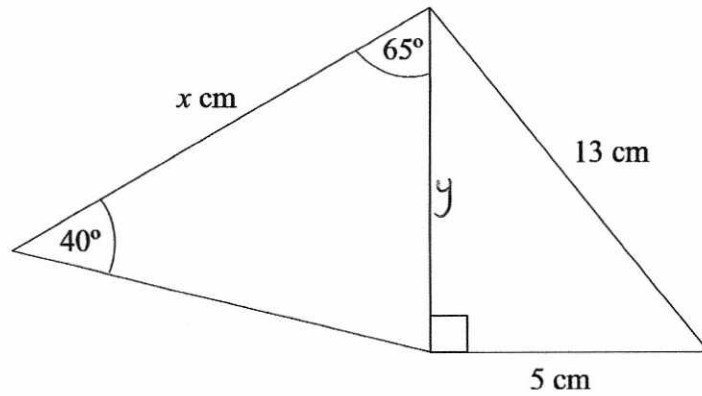
$$x = \sin^{-1}(\text{Ans})$$

$$= 77.0 \text{ (3sf)}$$

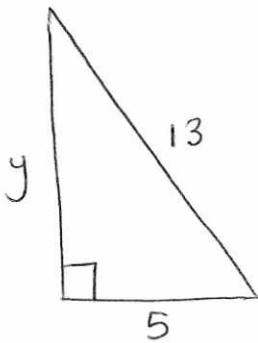
.....77.0.....°

(Total for question 6 is 3 marks)

7



Work out the value of x .
Give your answer to 1 decimal place.



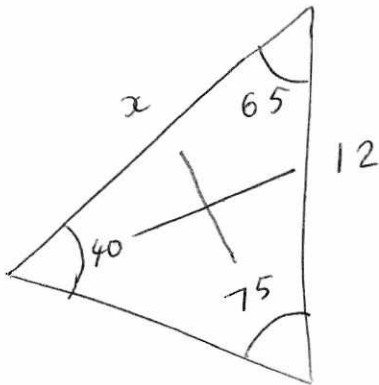
$$y^2 + 5^2 = 13^2$$

$$y^2 = 13^2 - 5^2$$

$$y^2 = 144$$

$$y = 12$$

$$180 - 65 - 40 = 75$$



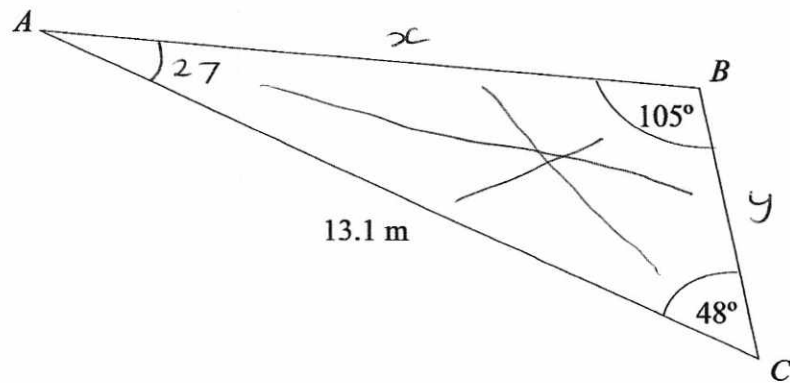
$$\frac{x}{\sin(75)} = \frac{12}{\sin(40)}$$

$$x = \frac{12}{\sin(40)} \times \sin(75)$$

$$= 18.0 \text{ (1dp)}$$

18.0

(Total for question 7 is 5 marks)



Work out the perimeter of triangle ABC .
Give your answer to 3 significant figures.

$$180 - 105 - 48 = 27$$

$$\frac{x}{\sin(48)} = \frac{13.1}{\sin(105)}$$

$$x = \frac{13.1}{\sin(105)} \times \sin(48)$$

$$= 10.07861779$$

$$\frac{y}{\sin(27)} = \frac{13.1}{\sin(105)}$$

$$y = \frac{13.1}{\sin(105)} \times \sin(27)$$

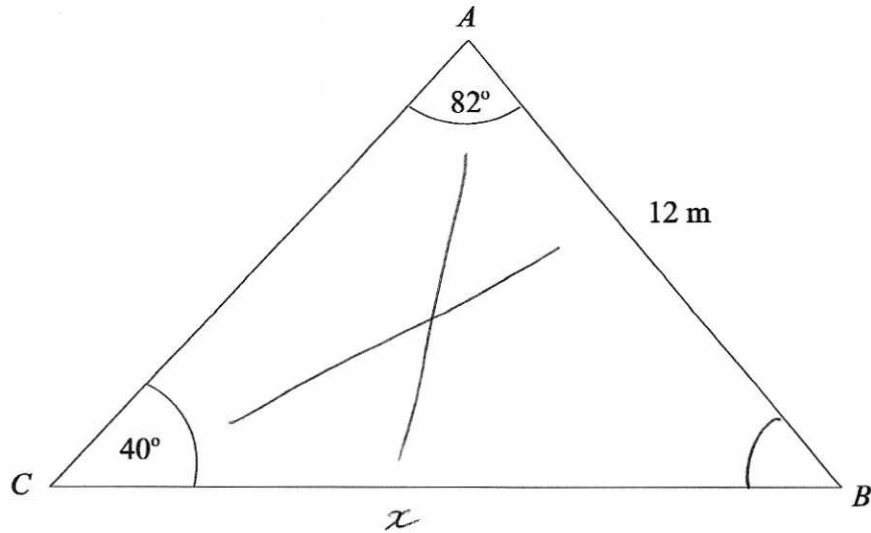
$$= 6.157072712$$

$$x + y + 13.1 = 29.3 \text{ m (3sf)}$$

$$\underline{\underline{29.3 \text{ m}}}$$

(Total for question 8 is 4 marks)

9



Work out the area of triangle ABC

Give your answer to 1 decimal place.

$$\frac{x}{\sin(82)} = \frac{12}{\sin(40)}$$

$$x = \frac{12}{\sin(40)} \times \sin(82)$$

$$x = 18.487\dots$$

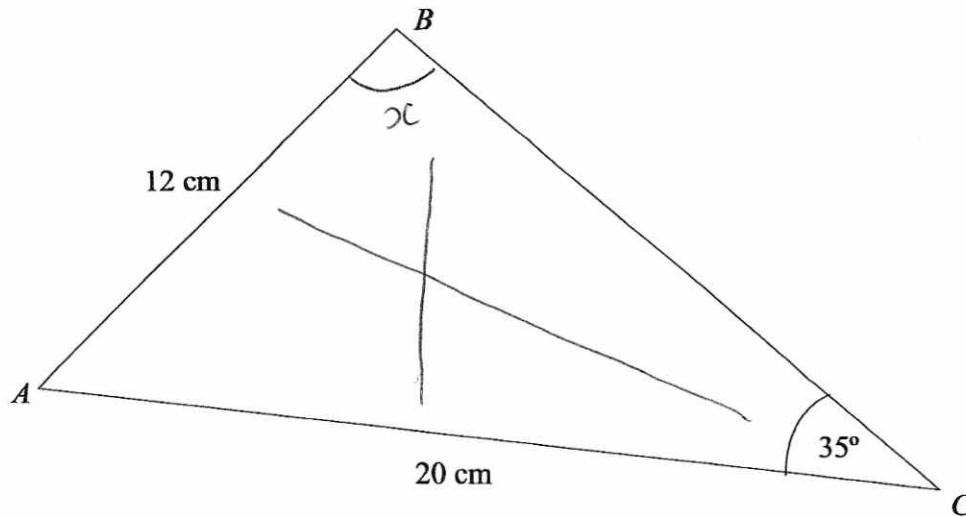
$$\begin{aligned} \text{Angle } ABC &= 180 - 82 - 40 \\ &= 58 \end{aligned}$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} (18.487\dots)(12) \sin(58) \\ &= \underline{\underline{94.1 \text{ m}^2}} \quad 1 \text{ dp} \end{aligned}$$

.....94.1.....m²

(Total for question 9 is 5 marks)

10



Angle ABC is obtuse.

Work out the size of angle ABC .

Give your answer to 3 significant figures.

$$\frac{\sin x}{20} = \frac{\sin(35)}{12}$$

$$\sin(x) = \frac{\sin(35)}{12} \times 20$$

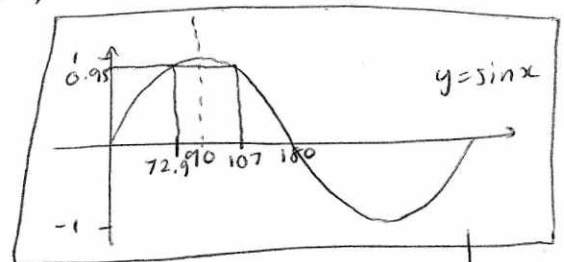
$$\sin(x) = 0.95596\dots$$

$$x = \sin^{-1}(\text{Ans})$$

$$= 72.9$$

But ABC is obtuse...

$$180 - 72.9 = \underline{\underline{107}} \quad (3\text{sf})$$



The sine graph is symmetrical about 90°

.....107.....°

(Total for question 10 is 4 marks)