

Write your name here

Surname

Other Names

# AS/A Level Mathematics

## Sine Rule, Cosine Rule, Area of any Triangle

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

### Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled..
- Answer the questions in the spaces provided  
– there may be more space than you need.
- You should show sufficient working to make your methods clear.  
Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

### 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.
- Try to answer every question.
- Check your answers if you have time at the end.

- 1 In triangle  $ABC$ , side  $AB$  has length 15cm, side  $AC$  has length 12cm and  $\angle BAC = 60^\circ$
- (a) Find the length of side  $BC$ . (3)
- (b) Find the area of triangle  $ABC$ . (2)
- 
- (Total for question 1 is 5 marks)**

- 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)**

- 3 In triangle  $DEF$ ,  $ED = 5\text{cm}$  and  $EF = 6\text{cm}$ .
- 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)**

- 4 In triangle  $PQR$ , side  $PQ$  has length 9cm and side  $PR$  has length 10cm.
- Given the area of  $PQR$  is  $30\text{cm}^2$
- (a) Find the length of side  $QR$ . (5)
- (b) Find  $\angle PQR$  (3)
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- (Total for question 4 is 8 marks)**

- 5 In the triangle  $ABC$ ,  $AB = 13\text{cm}$ ,  $BC = 10\text{cm}$  and angle  $BAC = 30^\circ$
- Find the two possible sizes of angle  $ABC$ , giving your answers to two decimal places.
- 
- (Total for question 5 is 6 marks)**

- 6 In the triangle  $ABC$ ,  $AB = (x + 3)\text{cm}$ ,  $BC = (x + 2)\text{cm}$ ,  $AC = x\text{cm}$  and angle  $BAC = 60^\circ$
- Find the value of  $x$ .
- 
- (Total for question 6 is 5 marks)**