

# Sine & Cosine Rule

## Question Paper 11

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Trigonometry
Sub-Topic	Sine & Cosine Rule
Booklet	Question Paper 11

**Time Allowed:** 83 minutes

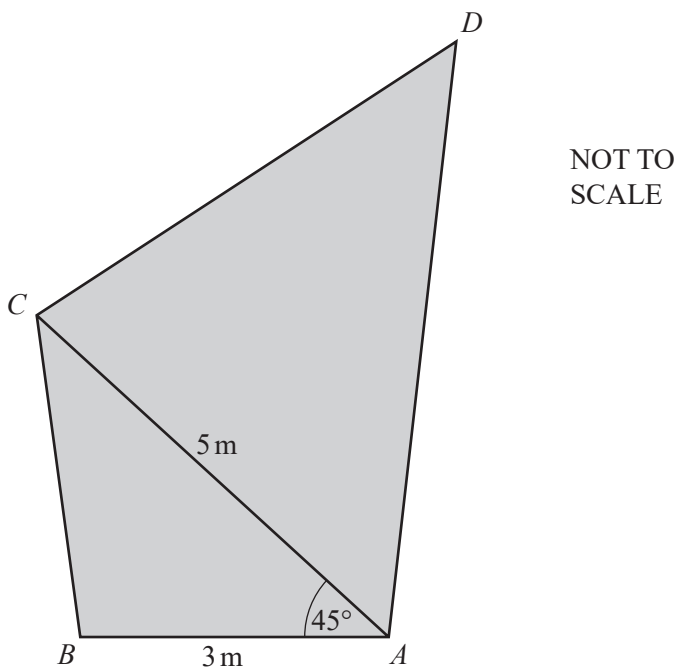
**Score:** /69

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1



Parvatti has a piece of canvas  $ABCD$  in the shape of an irregular quadrilateral.

$AB = 3\text{ m}$ ,  $AC = 5\text{ m}$  and angle  $BAC = 45^\circ$ .

- (a) Calculate the length of  $BC$  and show that it rounds to  $3.58\text{ m}$ , correct to 2 decimal places.

You must show all your working.

*Answer(a)(i)*

[4]

- (ii) Calculate angle  $BCA$ .

*Answer(a)(ii)* Angle  $BCA = \dots\dots\dots$  [3]

(b)  $AC = CD$  and angle  $CDA = 52^\circ$ .

(i) Find angle  $DCA$ .

Answer(b)(i) Angle  $DCA = \dots\dots\dots$  [1]

(ii) Calculate the area of the canvas.

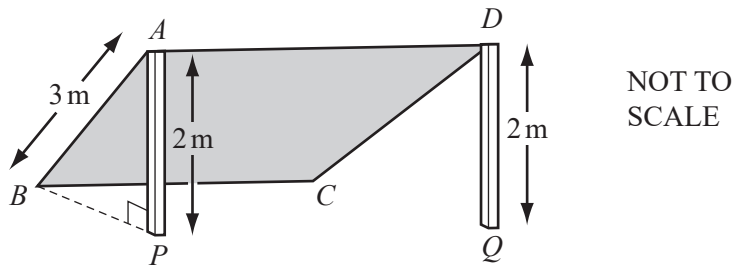
Answer(b)(ii)  $\dots\dots\dots$  m<sup>2</sup> [3]

(c) Parvatti uses the canvas to give some shade.

She attaches corners  $A$  and  $D$  to the top of vertical poles,  $AP$  and  $DQ$ , each of height 2 m.

Corners  $B$  and  $C$  are pegged to the horizontal ground.

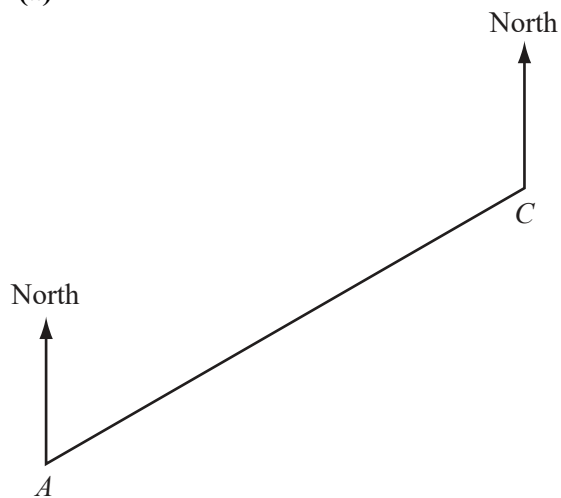
$AB$  is a straight line and angle  $BPA = 90^\circ$ .



Calculate angle  $PAB$ .

Answer(c) Angle  $PAB = \dots\dots\dots$  [2]

2 (a)



The scale drawing shows the positions of two towns  $A$  and  $C$  on a map. On the map, 1 centimetre represents 20 kilometres.

- (i) Find the distance in kilometres from town  $A$  to town  $C$ .

Answer(a)(i) ..... km [2]

- (ii) Measure and write down the bearing of town  $C$  from town  $A$ .

Answer(a)(ii) ..... [1]

- (iii) Town  $B$  is 140 km from town  $C$  on a bearing of  $150^\circ$ .

Mark accurately the position of town  $B$  on the scale drawing. [2]

- (iv) Find the bearing of town  $C$  from town  $B$ .

Answer(a)(iv) ..... [1]

- (v) A lake on the map has an area of  $0.15 \text{ cm}^2$ .

Work out the actual area of the lake.

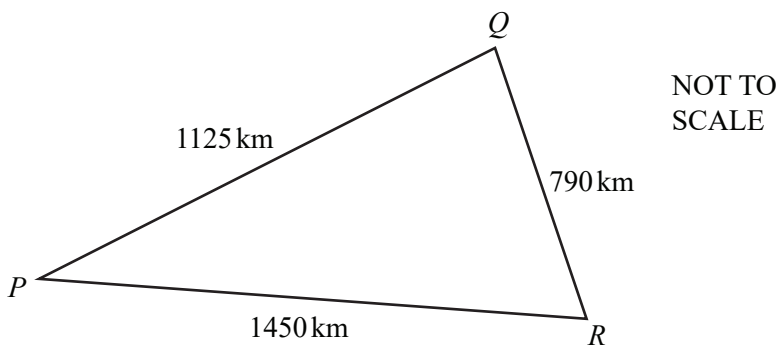
Answer(a)(v) .....  $\text{km}^2$  [2]

(b) A plane leaves town  $C$  at 11 57 and flies 1500 km to another town, landing at 14 12.

Calculate the average speed of the plane.

Answer(b) ..... km/h [3]

(c)

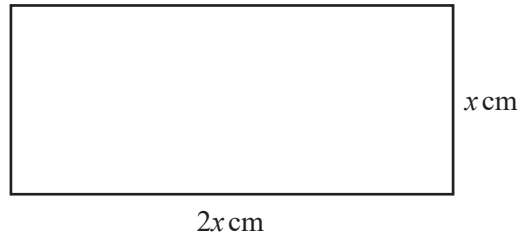
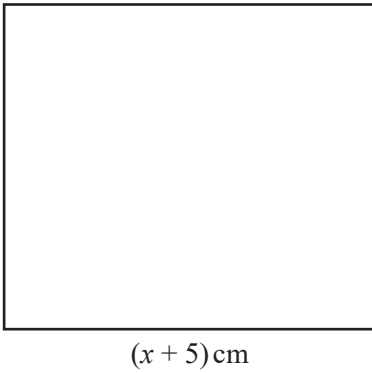


The diagram shows the distances between three towns  $P$ ,  $Q$  and  $R$ .

Calculate angle  $PQR$ .

Answer(c) Angle  $PQR =$  ..... [4]

3



NOT TO  
SCALE

The diagram shows a square of side  $(x + 5)$  cm and a rectangle which measures  $2x$  cm by  $x$  cm.

The area of the square is  $1 \text{ cm}^2$  more than the area of the rectangle.

(a) Show that  $x^2 - 10x - 24 = 0$ .

*Answer(a)*

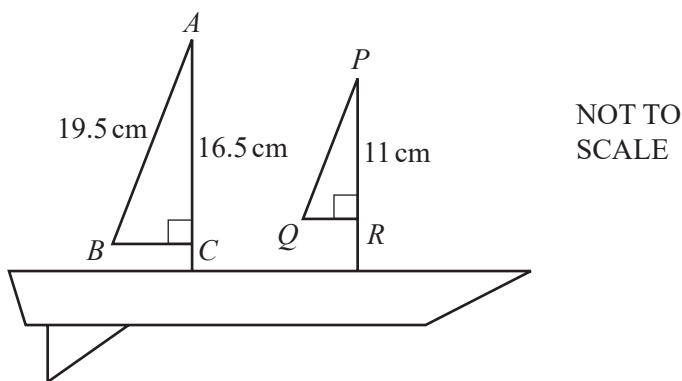
**(b)** Find the value of  $x$ .

*Answer(b)*  $x =$  ..... [3]

**(c)** Calculate the acute angle between the diagonals of the rectangle.

*Answer(c)* ..... [3]

4 (a)



The diagram shows a toy boat.  
 $AC = 16.5$  cm,  $AB = 19.5$  cm and  $PR = 11$  cm.  
 Triangles  $ABC$  and  $PQR$  are **similar**.

(i) Calculate  $PQ$ .

Answer(a)(i)  $PQ =$  ..... cm [2]

(ii) Calculate  $BC$ .

Answer(a)(ii)  $BC =$  ..... cm [3]

(iii) Calculate angle  $ABC$ .

Answer(a)(iii) Angle  $ABC =$  ..... [2]

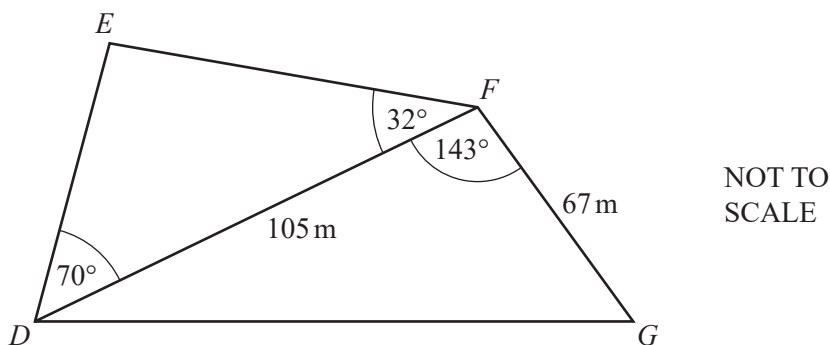


- (iv) The toy boat is mathematically similar to a real boat.  
 The length of the real boat is 32 times the length of the toy boat.  
 The fuel tank in the toy boat holds 0.02 litres of diesel.

Calculate how many litres of diesel the fuel tank of the real boat holds.

Answer(a)(iv) ..... litres

(b)



The diagram shows a field  $DEFG$ , in the shape of a quadrilateral, with a footpath along the diagonal  $DF$ .

$DF = 105$  m and  $FG = 67$  m.

Angle  $EDF = 70^\circ$ , angle  $EFD = 32^\circ$  and angle  $DFG = 143^\circ$ .

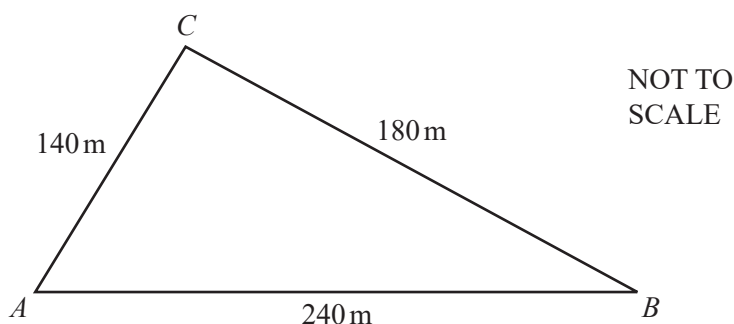
- (i) Calculate  $DG$ .

Answer(b)(i)  $DG =$  ..... m [4]

- (ii) Calculate  $EF$ .

Answer(b)(ii)  $EF =$  ..... m [4]

5



The boundary of a park is in the shape of a triangle  $ABC$ .  
 $AB = 240$  m,  $BC = 180$  m and  $CA = 140$  m.

**In part (a), show clearly all your construction arcs.**

- (a) (i) Using a scale of 1 centimetre to represent 20 metres, **construct** an **accurate** scale drawing of triangle  $ABC$ . The line  $AB$  has already been drawn for you.



- (ii) Using a straight edge and compasses only, **construct** the bisector of angle  $ACB$ . [2]  
 Label the point  $D$ , where this bisector meets  $AB$ . [2]
- (iii) Using a straight edge and compasses only, construct the locus of points, inside the triangle, which are equidistant from  $A$  and from  $D$ . [2]
- (iv) Flowers are planted in the park so that they are nearer to  $AC$  than to  $BC$  **and** nearer to  $D$  than to  $A$ .  
 Shade the region inside your triangle which shows where the flowers are planted. [1]

**In part (b), use trigonometry.**

**You must show your working and must NOT use any measurements from your construction in part (a).**

**(b) (i)** Show clearly that angle  $ACB$  is  $96.4^\circ$ .

*Answer(b)(i)*

[3]

**(ii)** Calculate the area of the park.

*Answer(b)(ii)* .....  $\text{m}^2$  [2]

**(iii)** Use the sine rule to calculate angle  $ABC$ .

*Answer(b)(iii)* Angle  $ABC =$  ..... [3]