Chhetri Academy

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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 40

Sine rule, cosine rule and ½ab sin C

Higher tier

Past paper question booklet

49	2003-2025	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

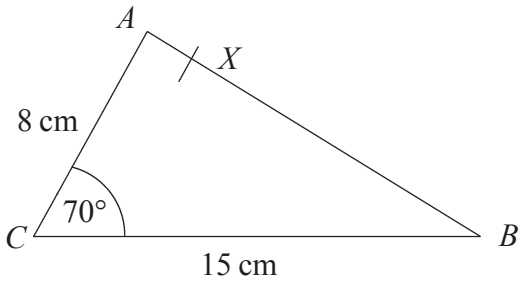
Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

14.

Diagram **NOT** accurately drawn

Leave blank



In triangle ABC,
$AC = 8$ cm,
$CB = 15$ cm,
Angle $ACB = 70°$.

(a) Calculate the area of triangle ABC.
Give your answer correct to 3 significant figures.

.....cm^2
(2)

X is the point on AB such that angle $CXB = 90°$.

(b) Calculate the length of CX.
Give your answer correct to 3 significant figures.

.....cm
(4)

Page Total

12.

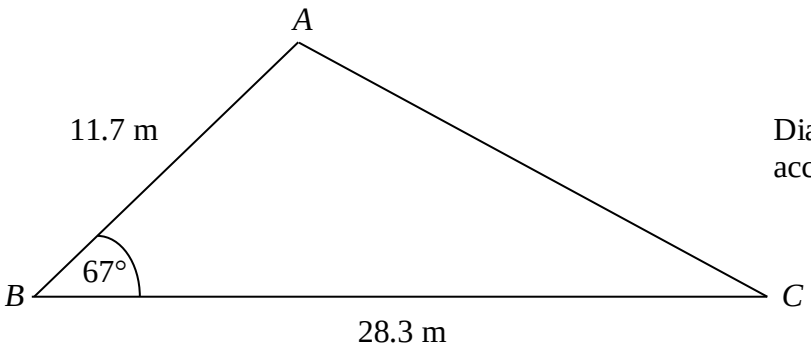


Diagram **NOT** accurately drawn

$AB = 11.7$ m.
$BC = 28.3$ m.
Angle $ABC = 67°$.

(a) Calculate the area of the triangle ABC.
Give your answer correct to 3 significant figures.

..... m^2
(2)

(b) Calculate the length of AC.
Give your answer correct to 3 significant figures.

..... m
(3)

13.

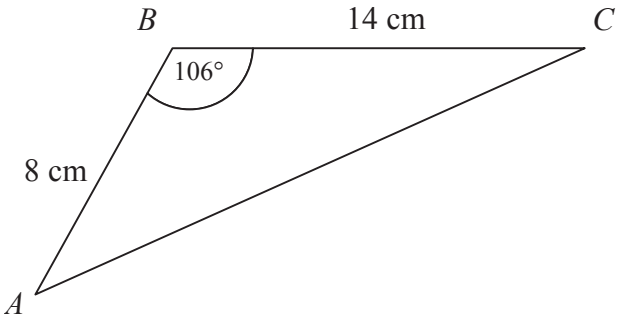


Diagram **NOT** accurately drawn

ABC is a triangle.
AB = 8 cm
BC = 14 cm
Angle ABC = 106°

Calculate the area of the triangle.
Give your answer correct to 3 significant figures.

..... cm^2

(Total 3 marks)

Q13

24.

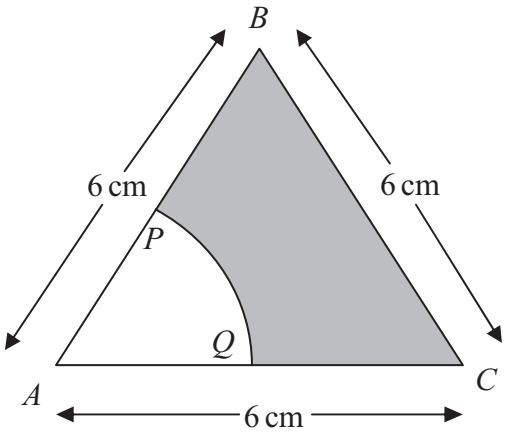


Diagram **NOT** accurately drawn

The diagram shows an equilateral triangle ABC with sides of length 6 cm.

P is the midpoint of AB.
Q is the midpoint of AC.
APQ is a sector of a circle, centre A.

Calculate the area of the shaded region.
Give your answer correct to 3 significant figures.

..... cm^2

(Total 4 marks)

Q24

26.

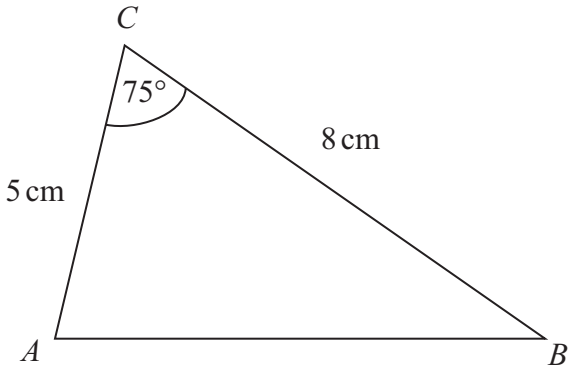


Diagram **NOT** accurately drawn

In triangle ABC,

$AC = 5$ cm.
$BC = 8$ cm.
Angle $ACB = 75°$.

(a) Calculate the area of triangle ABC.
Give your answer correct to 3 significant figures.

..... cm^2
(2)

(b) Calculate the length of AB.
Give your answer correct to 3 significant figures.

..... cm
(3)

Q26

(Total 5 marks)

28.

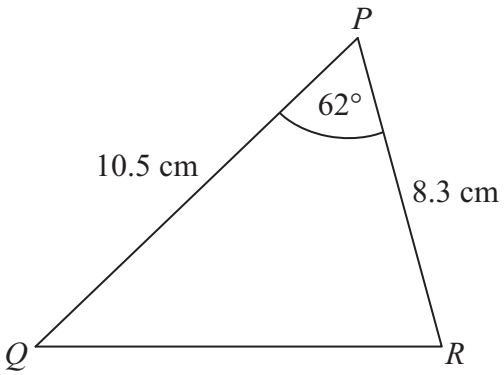


Diagram **NOT** accurately drawn

In triangle PQR,

$PQ = 10.5$ cm,
$PR = 8.3$ cm.
angle $QPR = 62°$.

(a) Calculate the area of triangle PQR.
Give your answer correct to 3 significant figures.

.....cm^2
(2)

(b) Calculate the length of QR.
Give your answer correct to 3 significant figures.

.....cm
(3)

(Total 5 marks)

Q28

24

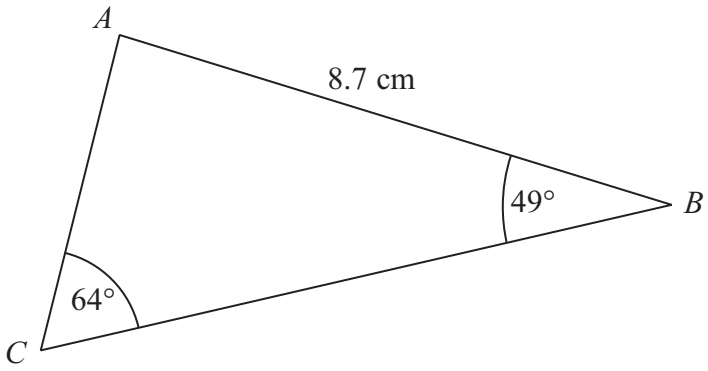


Diagram **NOT** accurately drawn

ABC is a triangle.

$AB = 8.7$ cm.
Angle $ABC = 49°$.
Angle $ACB = 64°$.

Calculate the area of triangle ABC.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 24 is 5 marks)

18 $ABCD$ is a quadrilateral.

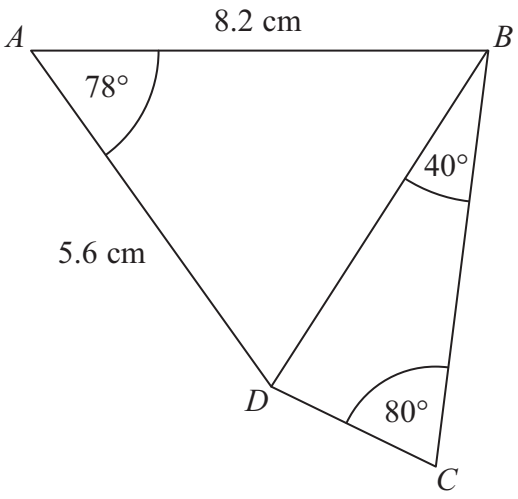


Diagram **NOT** accurately drawn

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

..... cm

(Total for Question 18 is 6 marks)

***25** The diagram shows the triangle PQR.

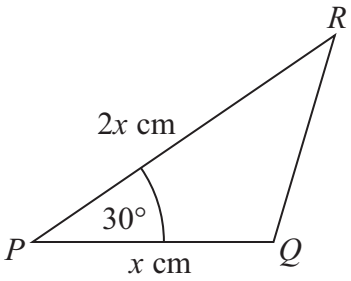


Diagram **NOT** accurately drawn

$PQ = x$ cm
$PR = 2x$ cm
Angle $QPR = 30°$

The area of triangle $PQR = A$ cm^2

Show that $x = \sqrt{2A}$

(Total for Question 25 is 3 marks)

19

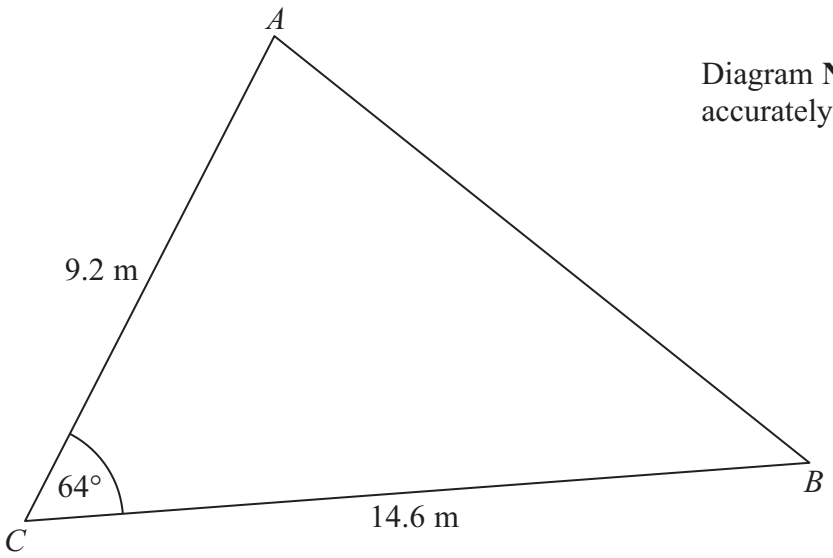


Diagram **NOT** accurately drawn

$AC = 9.2$ m
$BC = 14.6$ m
Angle $ACB = 64°$

(a) Calculate the area of the triangle ABC.
Give your answer correct to 3 significant figures.

..... m^2
(2)

(b) Calculate the length of AB.
Give your answer correct to 3 significant figures.

..... m
(3)

(Total for Question 19 is 5 marks)

20

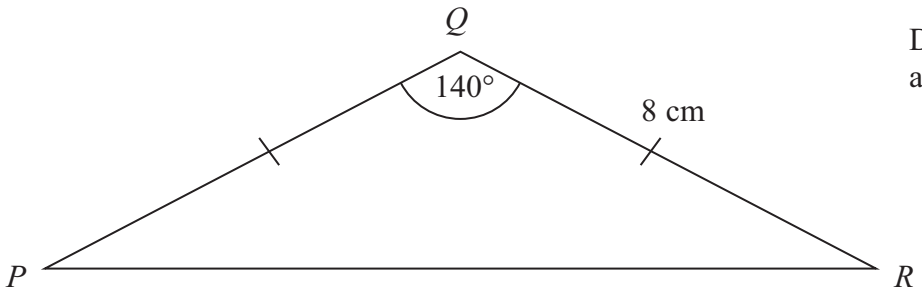


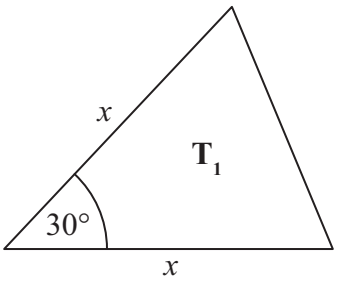
Diagram **NOT** accurately drawn

Calculate the length of PR.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 20 is 3 marks)

25 Here are two triangles $\mathbf{T}_1$ and $\mathbf{T}_2$.



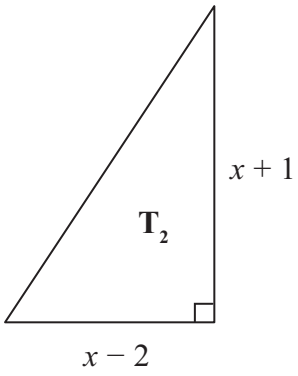


Diagram **NOT** accurately drawn

The lengths of the sides are in centimetres.

The area of triangle $\mathbf{T}_1$ is equal to the area of triangle $\mathbf{T}_2$.

Work out the value of x, giving your answer in the form $a + \sqrt{b}$ where a and b are integers.

.....

(Total for Question 25 is 5 marks)

24 ABC is a triangle.

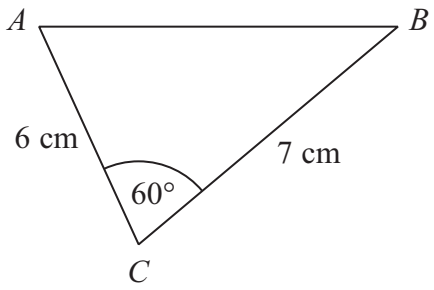


Diagram **NOT** accurately drawn

(a) Work out the area of triangle ABC.
Give your answer correct to 3 significant figures.

..... cm^2
(2)

(b) Work out the length of the side AB.
Give your answer correct to 3 significant figures.

..... cm
(3)

(Total for Question 24 is 5 marks)

19 ABC is a triangle.

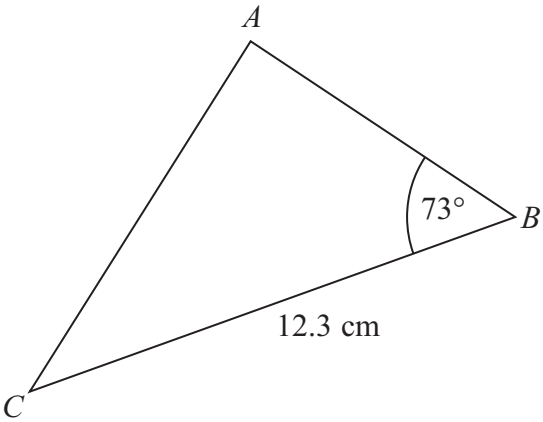


Diagram **NOT** accurately drawn

$BC = 12.3$ cm
Angle $ABC = 73°$

The area of triangle ABC is 50 cm^2.

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

..... cm

(Total for Question 19 is 6 marks)

18 ABC is an isosceles triangle.

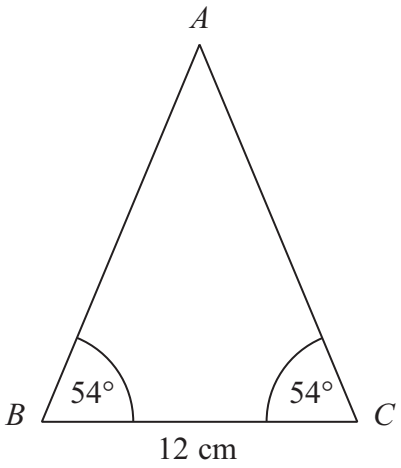


Diagram **NOT** accurately drawn

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

..... cm^2

(Total for Question 18 is 4 marks)

26 The diagram shows triangle LMN.

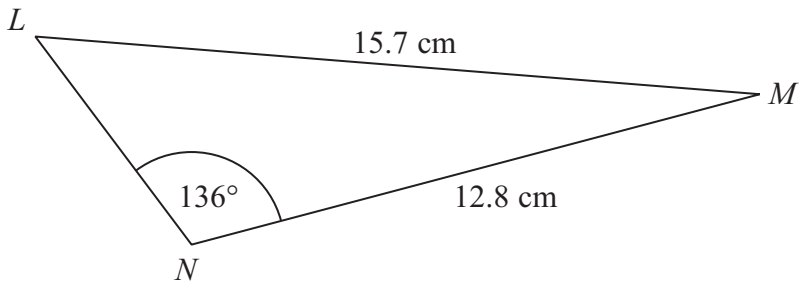


Diagram **NOT** accurately drawn

Calculate the length of LN.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 26 is 5 marks)

27 *ABCD* is a parallelogram.

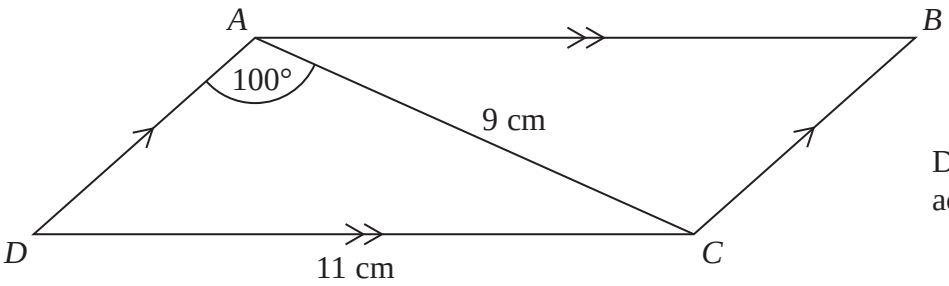


Diagram **NOT** accurately drawn

AC = 9 cm
DC = 11 cm
Angle *DAC* = 100°

Calculate the area of the parallelogram.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 27 is 5 marks)

20 Jerry wants to cover a triangular field, *ABC*, with fertiliser.

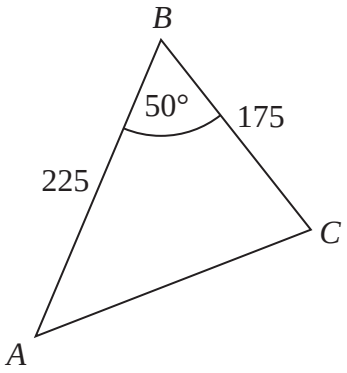


Diagram **NOT** accurately drawn

Here are the measurements Jerry makes

angle *ABC* = 50° correct to the nearest degree,
BA = 225 m correct to the nearest 5 m,
BC = 175 m correct to the nearest 5 m.

Work out the upper bound for the area of the field.
You must show your working.

..... m^2

(Total for Question 20 is 3 marks)

21

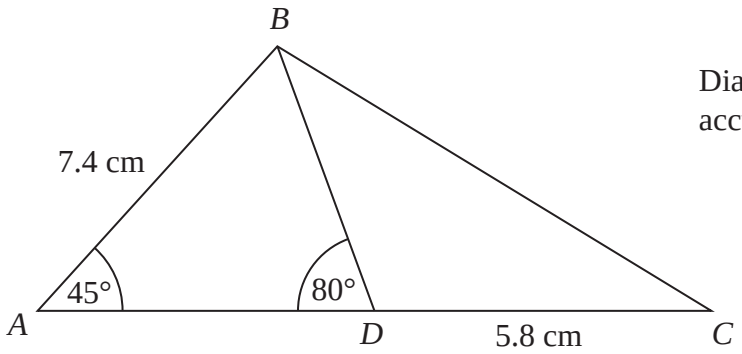


Diagram **NOT** accurately drawn

ABC is a triangle.
D is a point on *AC*.
Angle *BAD* = 45°
Angle *ADB* = 80°
AB = 7.4 cm
DC = 5.8 cm

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

..... cm

(Total for Question 21 is 5 marks)

23 Here is a parallelogram.

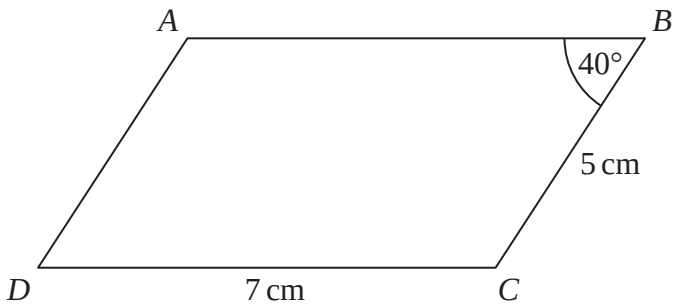


Diagram **NOT** accurately drawn

$DC = 7$ cm
$CB = 5$ cm
Angle ABC is 40°

Work out the area of the parallelogram.
Give your answer correct to 1 decimal place.

..... cm^2

(Total for Question 23 is 3 marks)

17 The diagram shows a regular pentagon *ABCDE*.

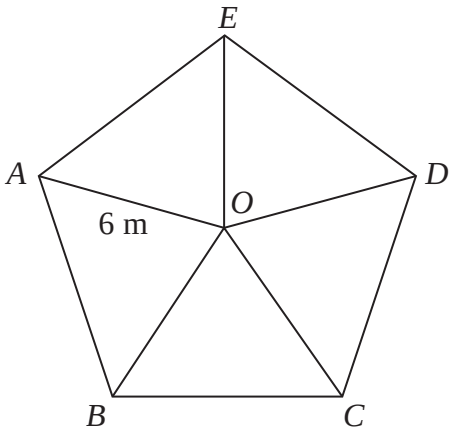


Diagram **NOT** accurately drawn

The pentagon is divided into 5 isosceles triangles.
$OA = OB = OC = OD = OE = 6$ m

Work out the area of the pentagon.
Give your answer correct to 1 decimal place.

..... m^2

(Total for Question 17 is 4 marks)

24 *ABC* is a triangle.

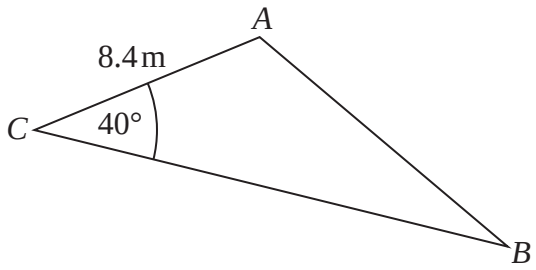


Diagram **NOT** accurately drawn

AC = 8.4 m
Angle *ACB* = 40°

The area of the triangle = 100 m^2.

Work out the length of *AB*.
Give your answer correct to 3 significant figures.
You must show all your working.

..... m

(Total for Question 24 is 5 marks)

25

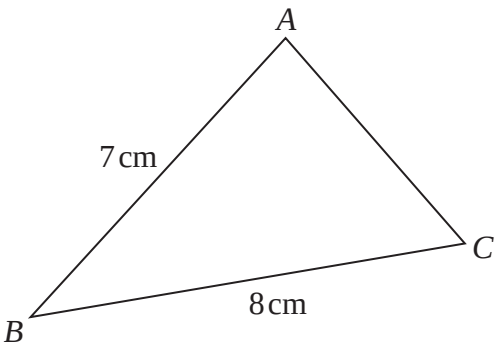


Diagram **NOT** accurately drawn

ABC is an acute-angled triangle.
BA = 7 cm
BC = 8 cm

The area of triangle *ABC* is 18 cm^2.

Work out the size of angle *BAC*.
Give your answer correct to 3 significant figures.
You must show all your working.

.....°

(Total for Question 25 is 6 marks)

18

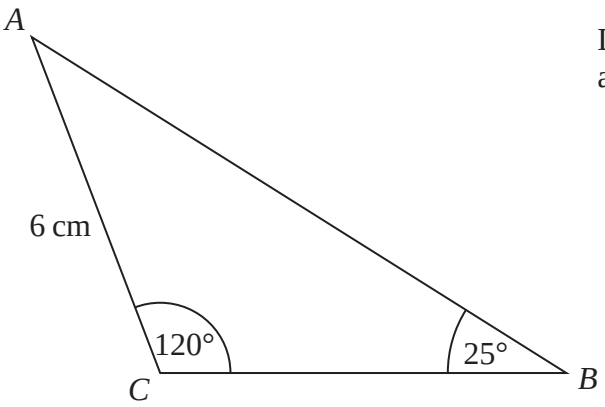


Diagram **NOT** accurately drawn

In triangle *ABC*,
AC = 6 cm
Angle *ACB* = 120°
Angle *ABC* = 25°

Work out the area of triangle *ABC*.
Give your answer correct to 1 decimal place.
You must show all your working.

..... cm^2

(Total for Question 18 is 4 marks)

20 Jarek uses the formula

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

to work out the area of a triangle.

For this triangle,

a = 7.8 cm correct to the nearest mm.
b = 5.2 cm correct to the nearest mm.
C = 63° correct to the nearest degree.

Calculate the lower bound for the area of the triangle.

..... cm^2

(Total for Question 20 is 3 marks)

22

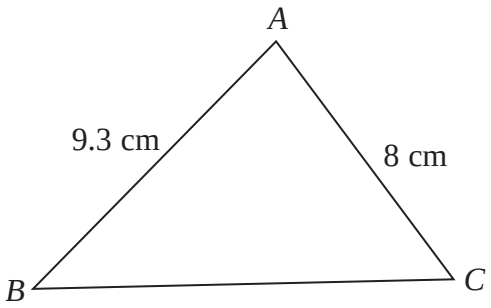


Diagram **NOT** accurately drawn

AB = 9.3 cm
AC = 8 cm
Angle *BAC* is an acute angle.

The area of triangle *ABC* is 32 cm^2.

Work out the length of *BC*.
You must show your working.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 22 is 5 marks)

25 ABC is an acute angled triangle.

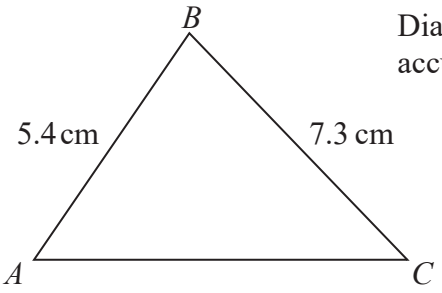


Diagram **NOT** accurately drawn

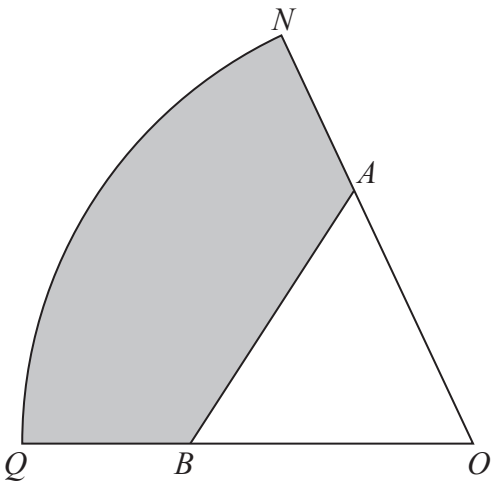
The area of triangle ABC is 19 cm^2.

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

.....°

(Total for Question 25 is 6 marks)

17



ONQ is a sector of a circle with centre *O* and radius 11 cm.

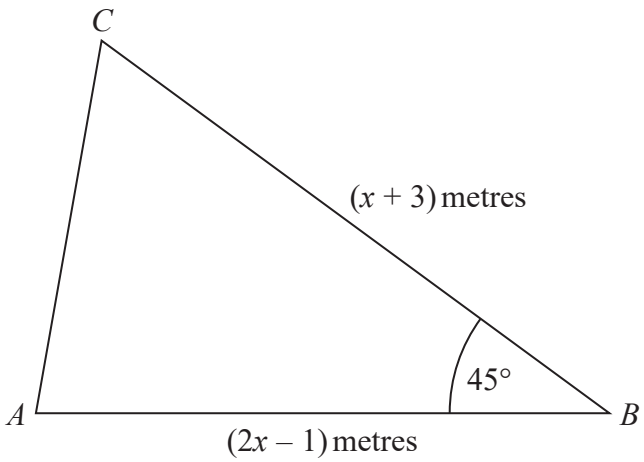
A is the point on *ON* and *B* is the point on *OQ* such that *AOB* is an equilateral triangle of side 7 cm.

Calculate the area of the shaded region as a percentage of the area of the sector *ONQ*.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 17 is 5 marks)

15



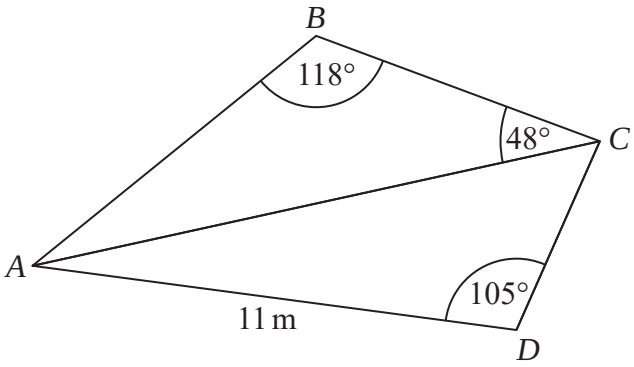
The area of triangle ABC is $6\sqrt{2}$ m^2.

Calculate the value of x.
Give your answer correct to 3 significant figures.

.....

(Total for Question 15 is 5 marks)

17 *ABC* and *ADC* are triangles.



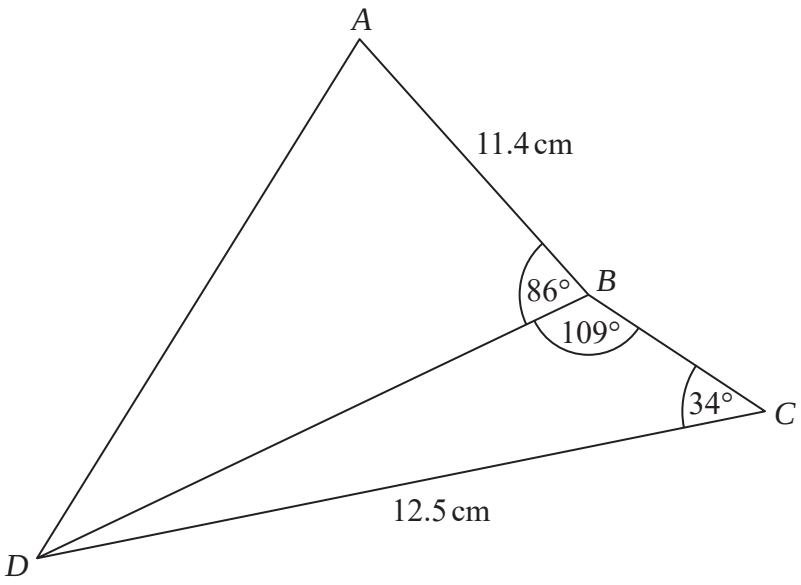
The area of triangle *ADC* is $56\,m^2$

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

..... m

(Total for Question 17 is 5 marks)

17

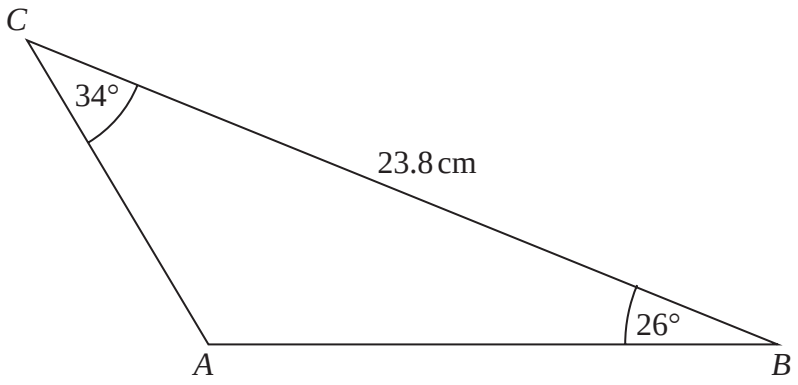


Work out the length of *AD*.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 17 is 5 marks)

13 Here is triangle *ABC*.

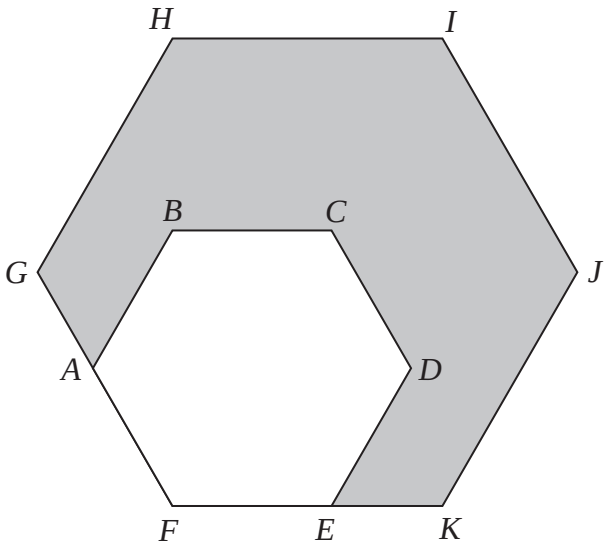


Work out the length of *AB*.
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 13 is 3 marks)

19

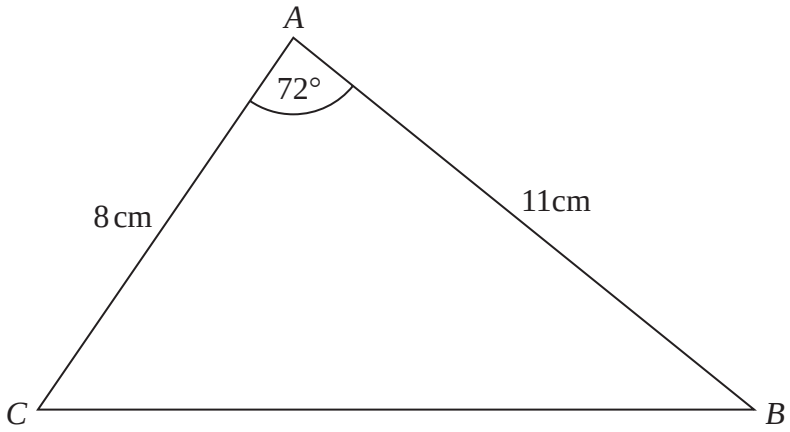


ABCDEF is a regular hexagon with sides of length x.
This hexagon is enlarged, centre F, by scale factor p to give hexagon *FGHIJK*.

Show that the area of the shaded region in the diagram is given by $\frac{3\sqrt{3}}{2}(p^2 - 1)x^2$

(Total for Question 19 is 4 marks)

15 Here is triangle *ABC*.



(a) Find the length of *BC*.
Give your answer correct to 3 significant figures.

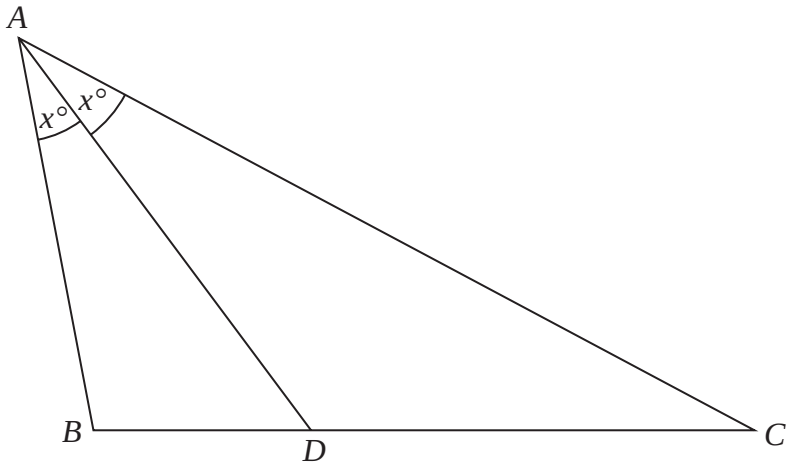
..... cm
(3)

(b) Find the area of triangle *ABC*.
Give your answer correct to 3 significant figures.

..... cm^2
(2)

(Total for Question 15 is 5 marks)

23 ABC is a triangle.



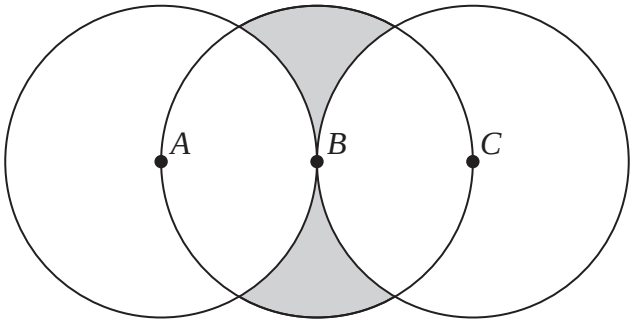
D is the point on BC such that angle BAD = angle DAC = $x°$

Prove that $\frac{AB}{BD} = \frac{AC}{DC}$

(Total for Question 23 is 4 marks)

21 The diagram shows three circles, each of radius 4 cm.

The centres of the circles are A, B and C such that ABC is a straight line and $AB = BC = 4$ cm.

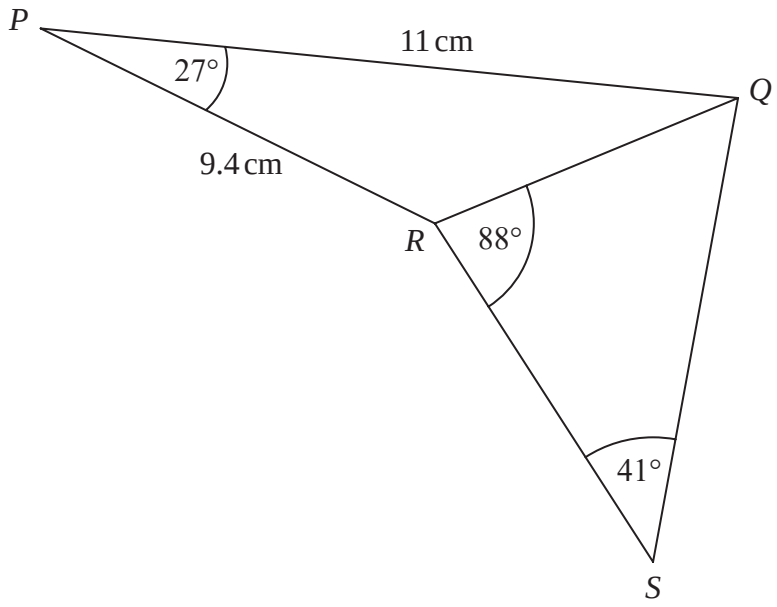


Work out the total area of the two shaded regions.
Give your answer in terms of π

..... cm^2

(Total for Question 21 is 5 marks)

18 *PQR* and *QRS* are triangles.

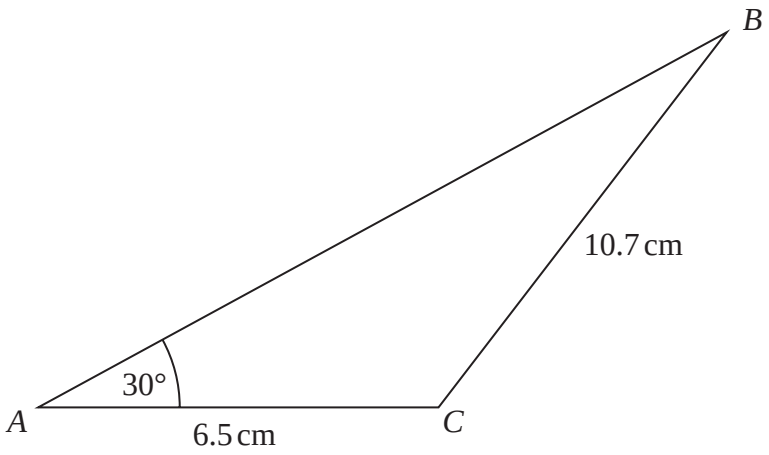


Calculate the length of *QS*.
Give your answer correct to 3 significant figures.
You must show all your working.

..... cm

(Total for Question 18 is 4 marks)

22 Here is a triangle ABC.



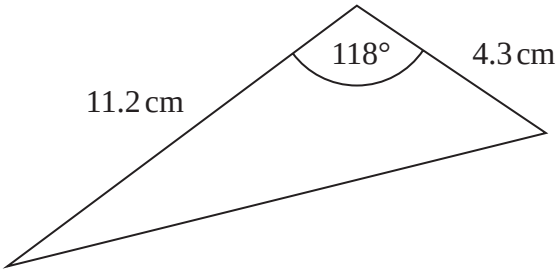
Work out the value of $\sin ABC$

Give your answer in the form $\frac{m}{n}$ where m and n are integers.

.....

(Total for Question 22 is 4 marks)

18 Here is a triangle.

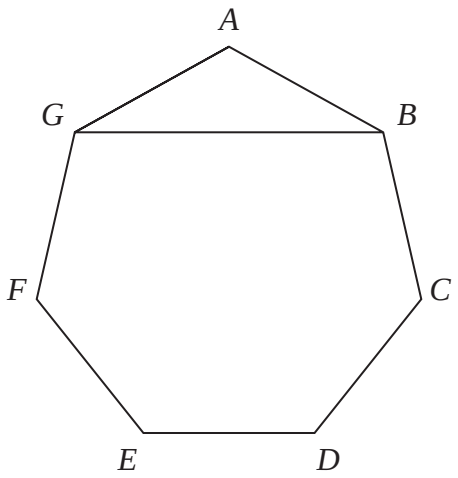


Work out the area of the triangle.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 18 is 2 marks)

26 *ABCDEFG* is a regular heptagon.



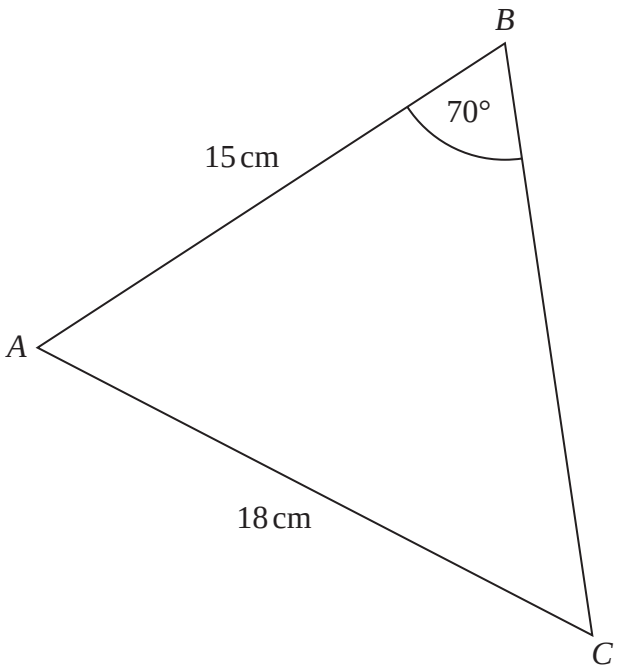
The area of triangle *ABG* is 30 cm^2

Calculate the length of *GB*.
Give your answer correct to 3 significant figures.
You must show all your working.

..... cm

(Total for Question 26 is 5 marks)

13 *ABC* is a triangle.

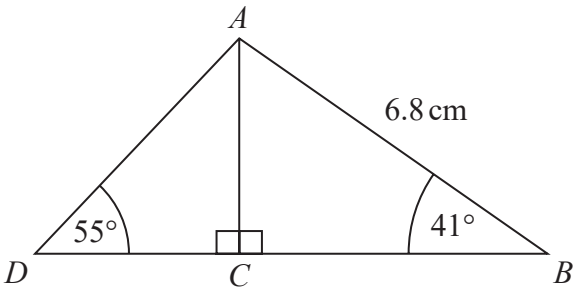


Calculate the size of angle *BAC*.
Give your answer correct to 1 decimal place.

.....°

(Total for Question 13 is 4 marks)

10 ABD is a triangle.
C is a point on BD.

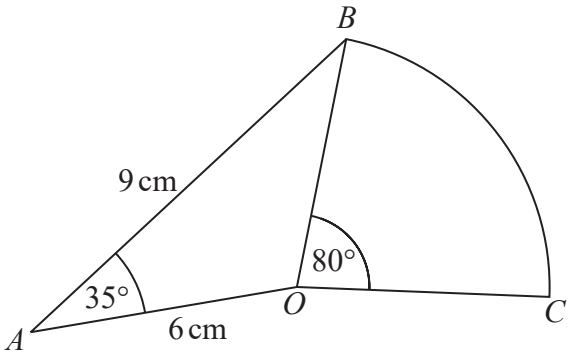


Work out the length of DC.
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 10 is 3 marks)

14 *OAB* is a triangle.
OBC is a sector of a circle, centre *O*.

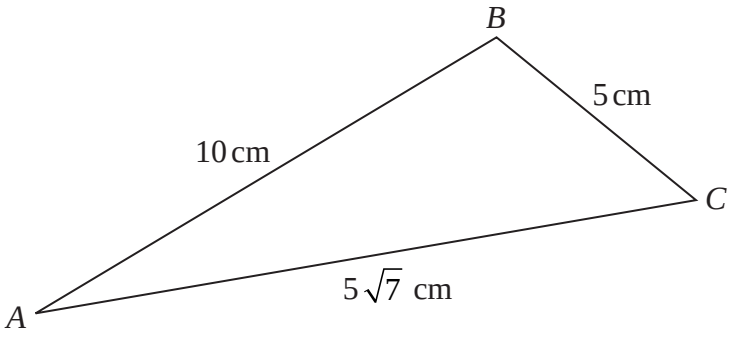


Calculate the area of *OBC*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 14 is 4 marks)

20 Here is triangle *ABC*.

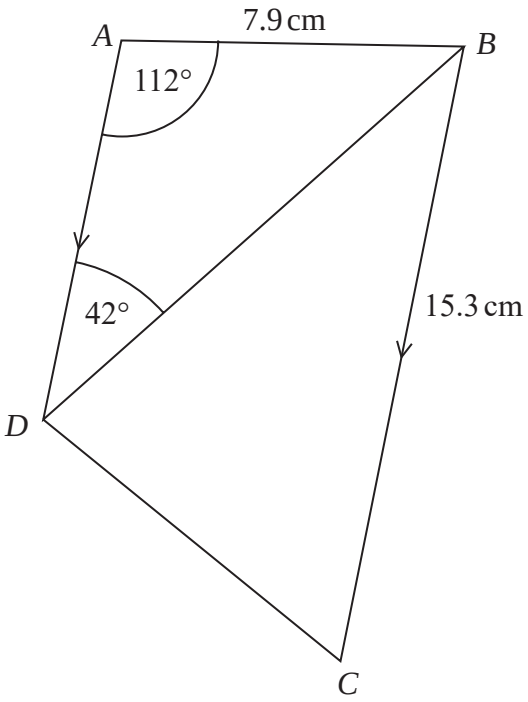


Find the size of angle *ABC*.
You must show all your working.

.....°

(Total for Question 20 is 4 marks)

16 *ABCD* is a trapezium.



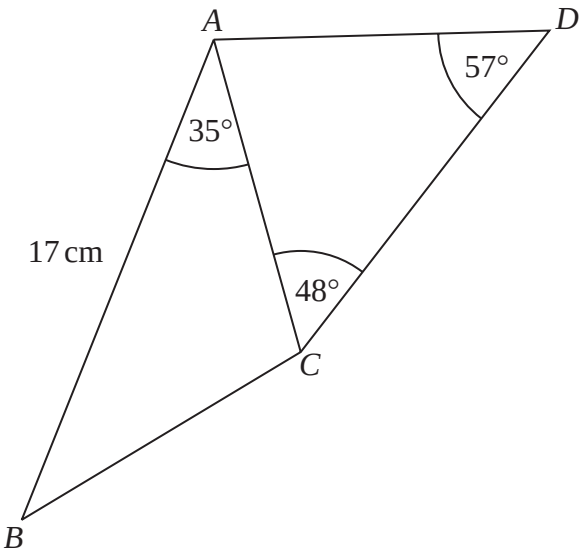
AD is parallel to *BC*.

Calculate the area of triangle *BCD*.
Give your answer correct to 1 decimal place.

..... cm^2

(Total for Question 16 is 4 marks)

18 *ABCD* is a quadrilateral.



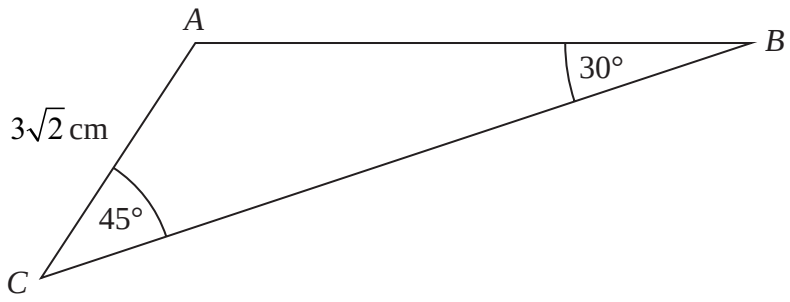
The area of triangle *ABC* is $54\,\text{cm}^2$

Calculate the area of triangle *ACD*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 18 is 5 marks)

14 *ABC* is a triangle.

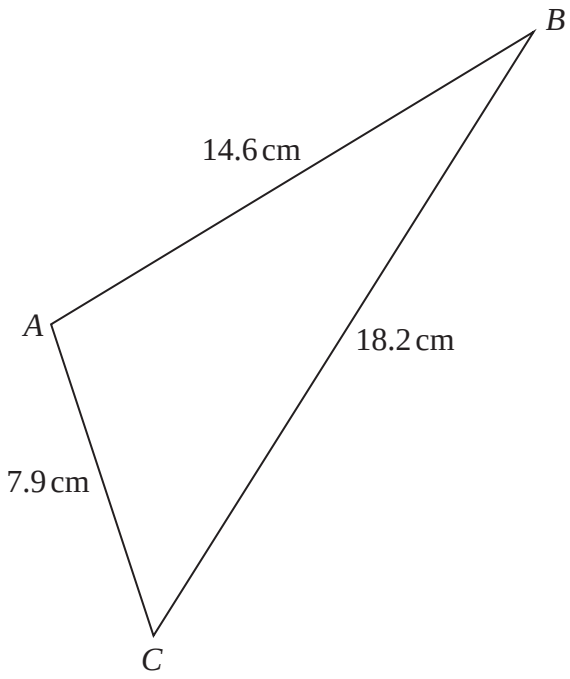


Work out the length of *AB*.

..... cm

(Total for Question 14 is 3 marks)

17 Here is triangle *ABC*.

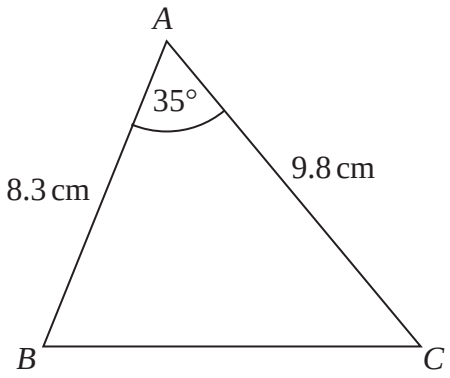


Work out the area of triangle *ABC*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 17 is 4 marks)

14 Here is triangle *ABC*.



Calculate the area of triangle *ABC*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 14 is 2 marks)