1 The diagram shows an isosceles triangle.

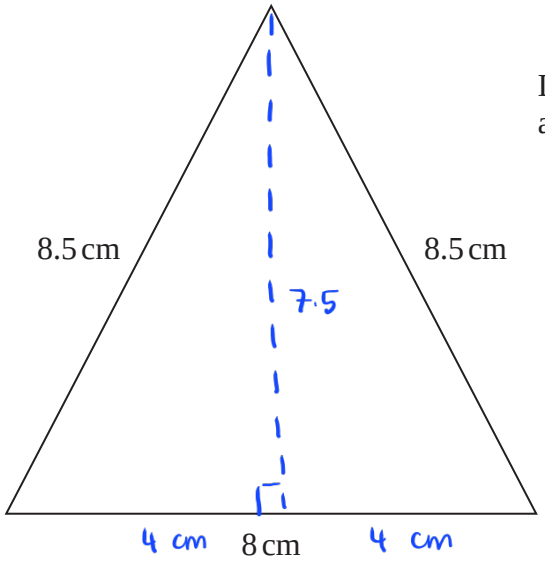
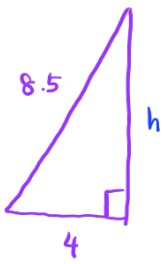


Diagram **NOT** accurately drawn

Work out the area of the triangle.

By using Pythagoras' theorem :



$h = \sqrt{8.5^2 - 4^2}$

$= \sqrt{56.25}$ (1)

$= 7.5$ cm (1)

Area of triangle : $\frac{1}{2}$ x base x height

$= \frac{1}{2} \times 8 \text{ cm} \times 7.5 \text{ cm}$ (1)

$= 30 \text{ cm}^2$ (1)

30 ..... cm^2

(Total for Question 1 is 4 marks)

2 The diagram shows a triangle.

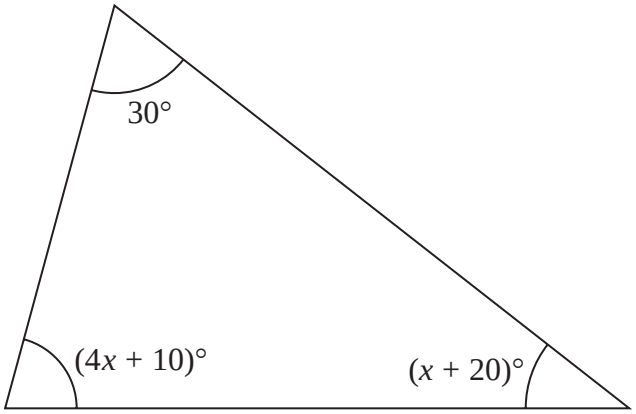


Diagram **NOT** accurately drawn

Work out the value of x. (Angles in a triangle sums up to 180°)

$30^\circ + (4x+10)^\circ + (x+20)^\circ = 180^\circ$

$5x + 30 + 30 = 180$

$5x + 60 = 180$ (1) $\rightarrow -60$

$5x = 180 - 60$ (1)

$5x = 120$ (1) $\rightarrow \div 5$

$x = \frac{120}{5}$

$= 24$ (1)

$x =$ 24

(Total for Question 2 is 4 marks)

3 The diagram shows the isosceles triangle ABC in which $AB = AC$

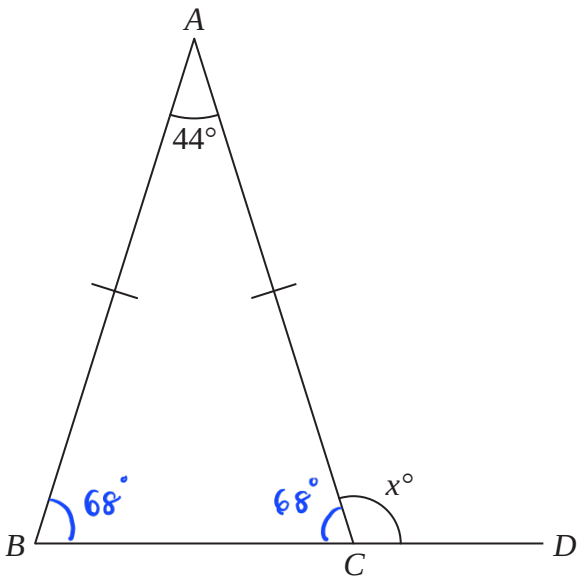


Diagram **NOT** accurately drawn

BCD is a straight line.

Work out the value of x.

angle ABC = angle ACB = $\frac{180^\circ - 44^\circ}{2}$ - base angles of isosceles triangles are the same

$= 68^\circ$ (1)

$x = 180^\circ - 68^\circ$ (1)

$= 112^\circ$ (1)

$x =$ 112

(Total for Question 3 is 3 marks)

4 Here is isosceles triangle *ABC*.

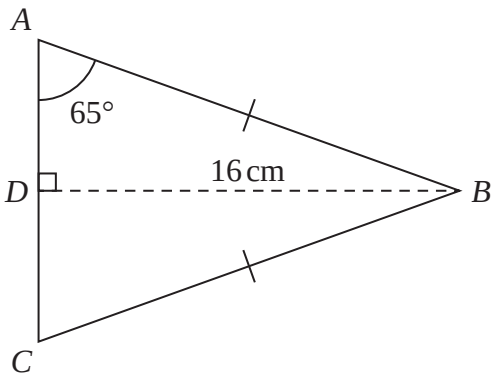


Diagram **NOT** accurately drawn

D is the midpoint of *AC* and *DB* = 16 cm.

Angle *DAB* = 65°

Work out the perimeter of triangle *ABC*.
Give your answer correct to one decimal place.

$AD = \dfrac{16}{\tan 65^\circ}$ (1)

$= 7.4609\ldots$ cm

$AB = \dfrac{16}{\sin 65^\circ}$

$= 17.654\ldots$ cm (1)

Perimeter $= 2(17.654\ldots) + 2(7.4609\ldots)$ (1)

$= 50.2$ cm (1dp) (1)

50.2 cm

(Total for Question 4 is 4 marks)

5 *A*, *B* and *C* are points on a circle with centre *O*.

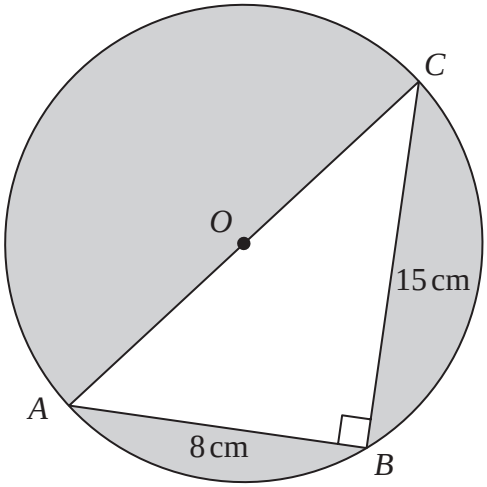


Diagram **NOT** accurately drawn

AOC is a diameter of the circle.

AB = 8 cm *BC* = 15 cm

Angle *ABC* = 90°

Work out the total area of the regions shown shaded in the diagram.
Give your answer correct to 3 significant figures.

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

Area of triangle $= \frac{1}{2} \times 8 \times 15 \times \sin 90°$

$= 60$

$AC = \sqrt{8^2 + 15^2}$ (1)

$= 17$ (1)

radius of circle $= 17 \div 2 = 8.5$ cm

Area of circle $= \pi r^2$

$= \pi (8.5)^2$

$= 226.98$ (1)

Area of shaded region $= 226.98 - 60$ (1)

$= 166.98$

$= 167$ (3sf) (1)

167

..... cm^2

(Total for Question 5 is 5 marks)

6 The diagram shows a shape *ABCDEFG* made from a square *ABDF* and three identical isosceles triangles *BCD*, *DEF* and *FGA*.

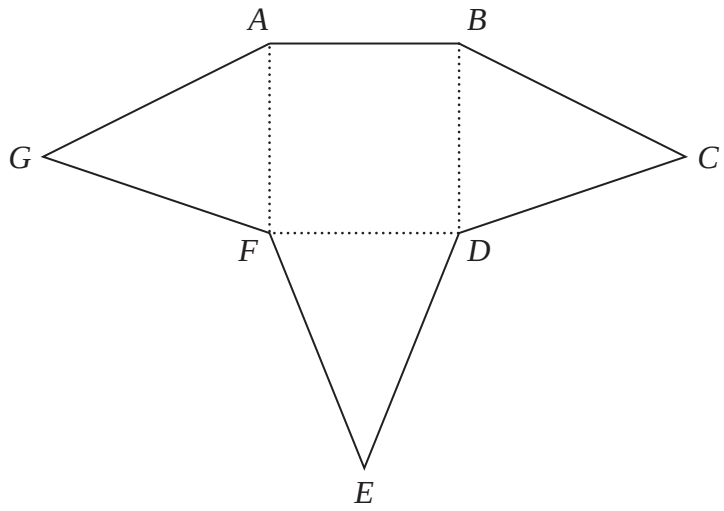


Diagram **NOT** accurately drawn

The perimeter of the square *ABDF* is 48 cm.
The perimeter of each isosceles triangle is 30 cm.

Work out the perimeter of the shape *ABCDEFG*.

length AB : $\frac{48}{4}$ = 12 cm (1)

length AG : $\frac{30-12}{2}$ = 9 cm (1)

Perimeter : (6 × 9) + 12

: 54 + 12 (1)

: 66 cm (1)

66 cm

(Total for Question 6 is 4 marks)

7 In the diagram, *ABC* is a right-angled triangle and *DEF* is a semicircular arc.

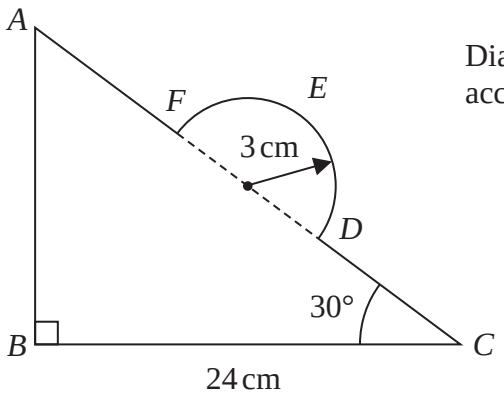


Diagram **NOT** accurately drawn

In triangle *ABC*

BC = 24 cm angle *ABC* = 90° angle *BCA* = 30°

The points *D* and *F* lie on *AC* so that *DF* is the diameter of the semicircular arc *DEF*
The radius of the semicircular arc is 3 cm.

Work out the length of *AFEDC*
Give your answer correct to 2 significant figures.

$\cos 30^\circ = \frac{24}{AC}$ (1)

$AC = \frac{24}{\cos 30^\circ} = 27.712\ldots$ (1)

$FED = \frac{1}{2} \times 2 \times \pi \times 3$ (1)

$= 3\pi = 9.424\ldots$

$AFEDC = 27.712 - 3 - 3 + 9.424$ (1)

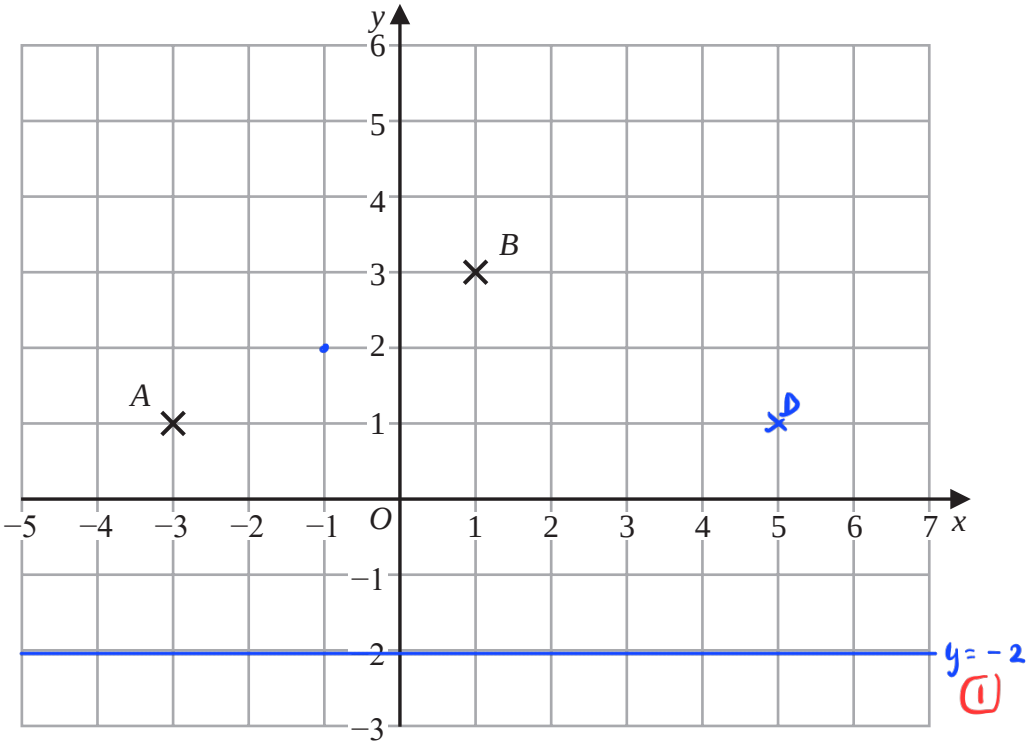
$= 31$ (1)

31

..... cm

(Total for Question 7 is 5 marks)

8 The diagram shows points A and B marked on a grid of squares.



D is the point with coordinates $(5, d)$ where $d > 0$
The triangle ABD is an isosceles triangle.

(c) Find the value of d

1 (1)

$d =$ .....

(1)

(Total for Question 8 is 1 marks)

9

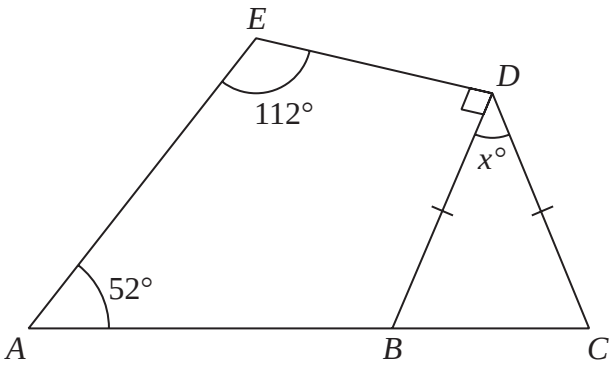


Diagram **NOT** accurately drawn

BCD is an isosceles triangle with *BD* = *CD*
ABC is a straight line.
ABDE is a quadrilateral.

Work out the value of *x*
Give a reason for each stage of your working.

ABD = 360 - 52 - 112 - 90

= 106 (1)

(angles in a quadrilateral add up to 360°) (1)

CBD = 180 - 106

= 74 (1)

(angles on a straight line add to 74°)

x = 180° - 2(74°) - (base angles in isosceles are equal)

= 180° - 148°

= 32° (1)

x = 32

(Total for Question 9 is 4 marks)

10 The diagram shows an isosceles triangle *ABC*

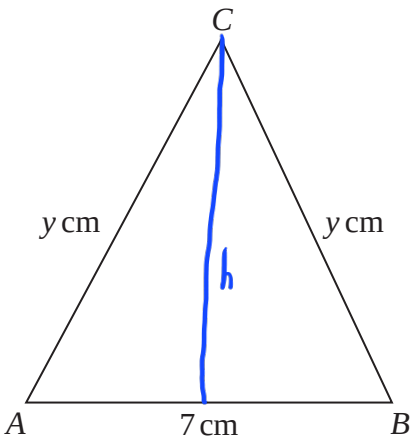


Diagram **NOT** accurately drawn

AB = 7 cm *AC* = *BC* = *y* cm

The area of the triangle is 42 cm^2

Work out the value of *y*

Area : $\frac{1}{2} \times 7 \times h = 42$

$h = 12$ (1)

$y^2 = 12^2 + 3.5^2$ (1)

$y = \sqrt{12^2 + 3.5^2}$ (1)

$= 12.5$ (1)

y = 12.5

(Total for Question 10 is 4 marks)

11 The diagram shows quadrilateral *ABCD*

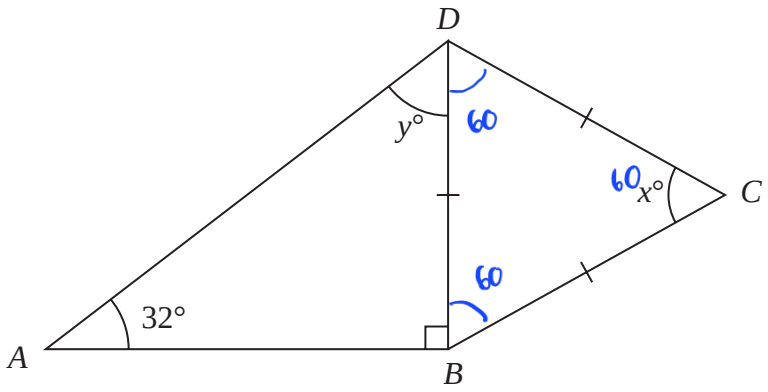


Diagram **NOT** accurately drawn

BC = *CD* = *DB*
angle *DBA* = 90° and angle *DAB* = 32°

(a) Work out the value of *x*

x = 60 (1)

(1)

(b) (i) Work out the value of *y*

180 − 90 − 32 = 58

y = 58 (1)

(1)

(ii) Give a reason for your answer to (b)(i).

Angles in a triangle add up to 180° (1)

(1)

(Total for Question 11 is 3 marks)