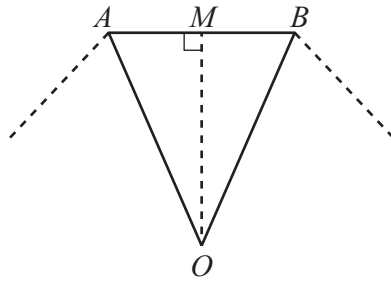


- 1 *ABCDEFGH* is a regular octagon with sides of length 6 cm.
The diagram shows part of the octagon.
O is the centre of the octagon and *M* is the midpoint of *AB*.



NOT TO
SCALE

- (a) (i) Show that angle OAM is 67.5° .

[2]

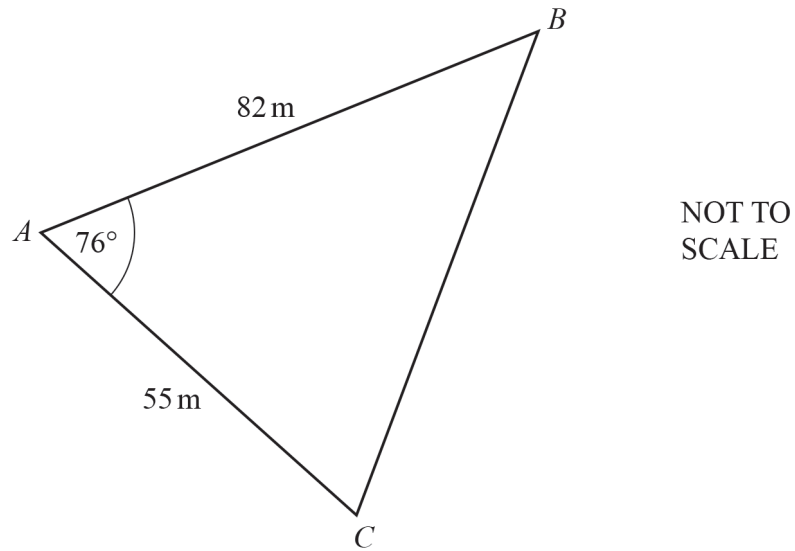
- (ii) Calculate the area of the octagon.

..... cm^2 [4]

- (b) Find the area of the circle that passes through the vertices of the octagon.

..... cm^2 [3]

[Total: 9]



The diagram shows a field ABC .

(a) Calculate BC .

$BC = \dots\dots\dots\text{ m}$ [3]

(b) Calculate angle ACB .

Angle $ACB = \dots\dots\dots$ [3]

- (c) A gate, G , lies on AB at the shortest distance from C .

Calculate AG .

$AG = \dots\dots\dots$ m [3]

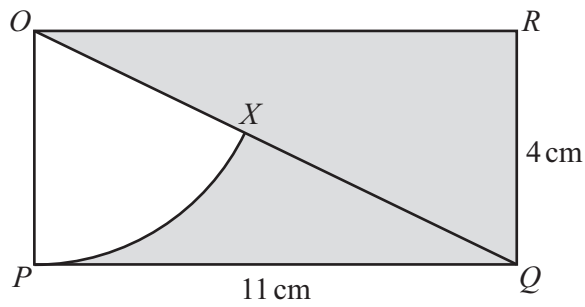
- (d) A different triangular field PQR has the same area as ABC .
 $PQ = 90$ m and $QR = 60$ m.

Work out the two possible values of angle PQR .

Angle $PQR = \dots\dots\dots$ or $\dots\dots\dots$ [5]

[Total: 14]

3

NOT TO
SCALE

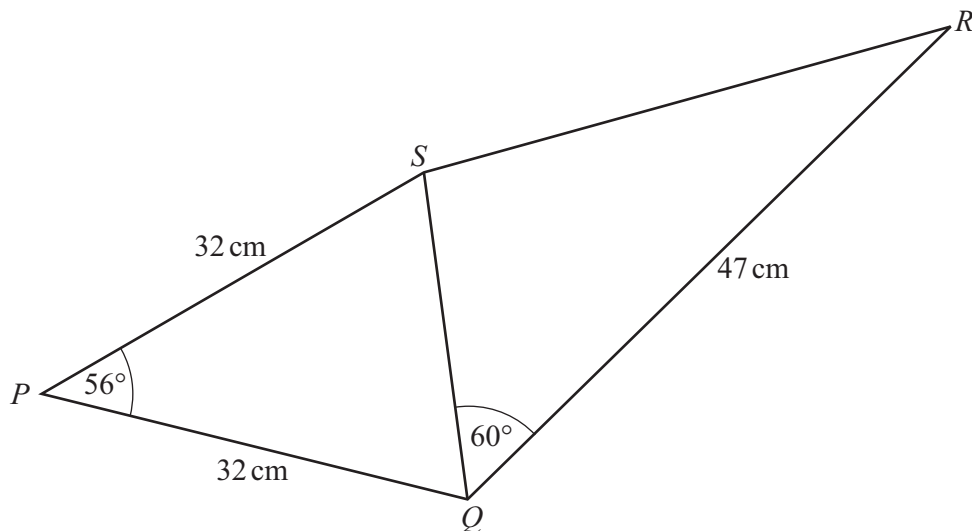
The diagram shows a rectangle $OPQR$ with length 11 cm and width 4 cm.
 OQ is a diagonal and OPX is a sector of a circle, centre O .

Calculate the percentage of the rectangle that is shaded.

..... % [5]

[Total: 5]

4

NOT TO
SCALE

The diagram shows a quadrilateral $PQRS$ formed from two triangles, PQS and QRS .
 Triangle PQS is isosceles, with $PQ = PS = 32$ cm and angle $SPQ = 56^\circ$.
 $QR = 47$ cm and angle $SQR = 60^\circ$.

(a) Calculate SR .

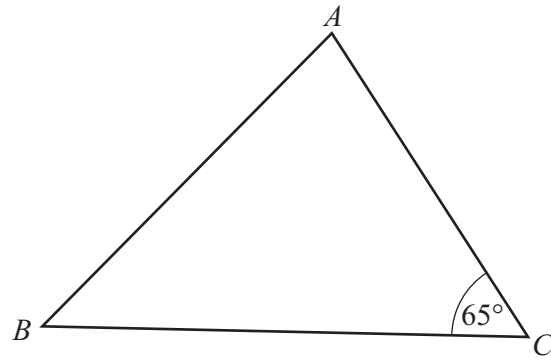
$SR = \dots\dots\dots$ cm [4]

(b) Calculate the shortest distance from P to SQ .

$\dots\dots\dots$ cm [3]

[Total: 7]

5



NOT TO
SCALE

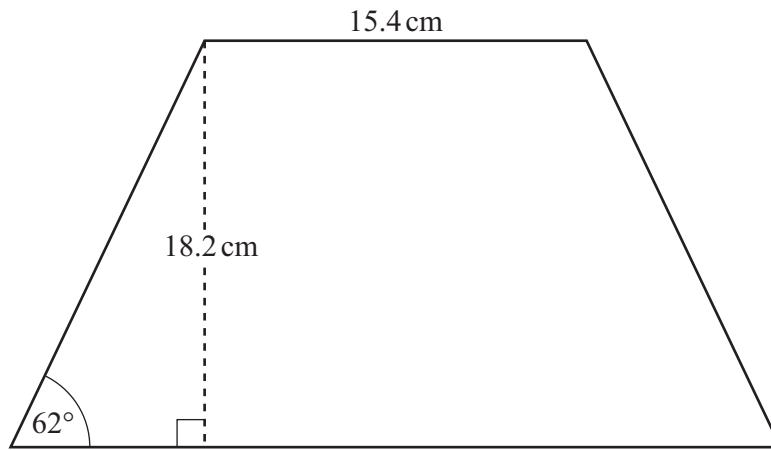
The shortest distance from B to AC is 12.8 cm.

Calculate BC .

$BC = \dots\dots\dots$ cm [3]

[Total: 3]

6



NOT TO
SCALE

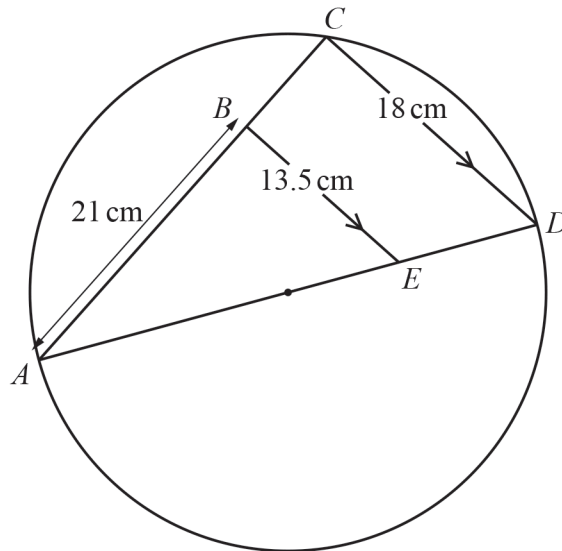
The diagram shows a trapezium.
The trapezium has one line of symmetry.

Work out the area of the trapezium.

..... cm^2 [4]

[Total: 4]

7



NOT TO
SCALE

C lies on a circle with diameter AD .

B lies on AC and E lies on AD such that BE is parallel to CD .

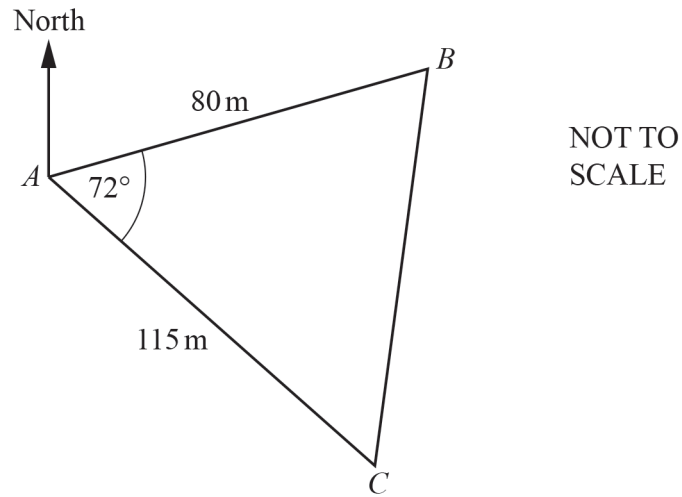
$AB = 21$ cm, $CD = 18$ cm and $BE = 13.5$ cm.

Work out the radius of the circle.

..... cm [5]

[Total: 5]

8



The diagram shows the positions of three points *A*, *B* and *C* in a field.

(a) Show that *BC* is 118.1 m, correct to 1 decimal place.

[3]

(b) Calculate angle *ABC*.

Angle *ABC* = [3]

- (c) The bearing of C from A is 147° .

Find the bearing of

- (i) A from B ,

..... [3]

- (ii) B from C .

..... [2]

- (d) Mitchell takes 35 seconds to run from A to C .

Calculate his average running speed in kilometres per hour.

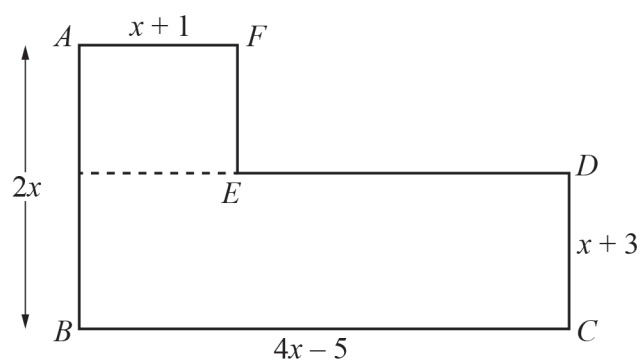
..... km/h [3]

- (e) Calculate the shortest distance from point B to AC .

..... m [3]

[Total: 17]

- 9 All the lengths in this question are in centimetres.



NOT TO
SCALE

The diagram shows a shape $ABCDEF$ made from two rectangles.
The total area of the shape is 342 cm^2 .

(a) Show that $x^2 + x - 72 = 0$.

[5]

(b) Solve by factorisation.

$$x^2 + x - 72 = 0$$

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(c) Work out the perimeter of the shape $ABCDEF$.

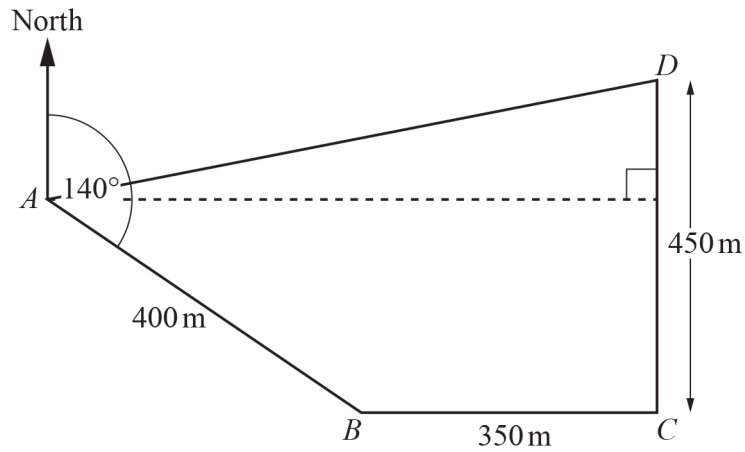
..... cm [2]

(d) Calculate angle DBC .

Angle $DBC =$ [2]

[Total: 12]

10

NOT TO
SCALE

The diagram shows a field $ABCD$.

The bearing of B from A is 140° .

C is due east of B and D is due north of C .

$AB = 400\text{ m}$, $BC = 350\text{ m}$ and $CD = 450\text{ m}$.

(a) Find the bearing of D from B .

..... [2]

- (b) Calculate the distance from D to A .

..... m [6]

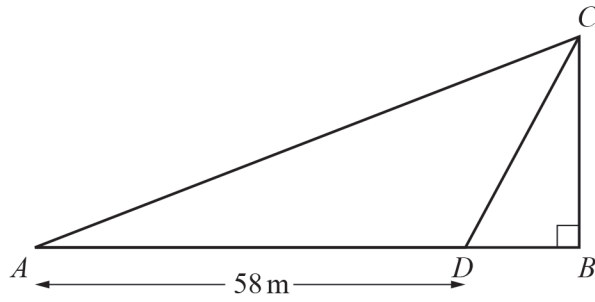
- (c) Jono runs around the field from A to B , B to C , C to D and D to A .
He runs at a speed of 3 m/s.

Calculate the total time Jono takes to run around the field.
Give your answer in minutes and seconds, correct to the nearest second.

..... min s [4]

[Total: 12]

11

NOT TO
SCALE

In the diagram, BC is a vertical wall standing on horizontal ground AB .

D is the point on AB where $AD = 58$ m.

The angle of elevation of C from A is 26° .

The angle of elevation of C from D is 72° .

(a) Show that $AC = 76.7$ m, correct to 1 decimal place.

[5]

(b) Calculate BD .

$BD = \dots\dots\dots$ m [3]

[Total: 8]