2021 ASSESSMENT MATERIALS

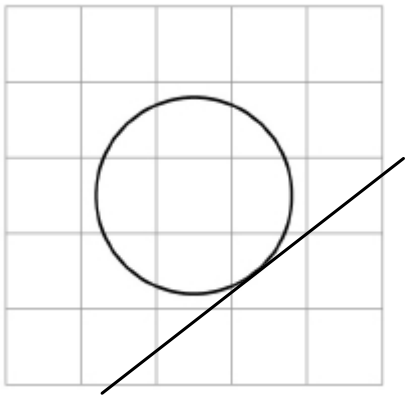
GCSE
MATHEMATICS (8300)
COMMON GRADES 4 & 5

Geometry

Total number of marks: 35 per optional item

Q13a

A circle is drawn on a centimetre grid.



(a) Draw a tangent to the circle.

(Total 1 mark)

Q10

Each shape below has an area of 24 cm^2

Complete the missing lengths.

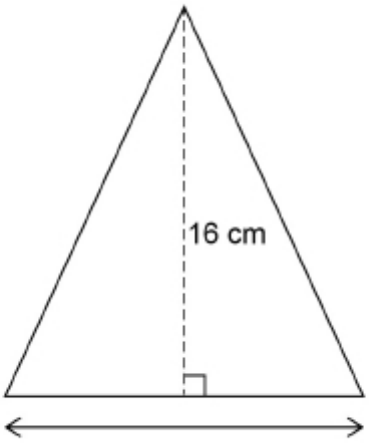
Rectangle

4 cm

6 cm

Not drawn accurately

Triangle



$\frac{1}{2} \times b \times h$

$= \frac{1}{2} \times b \times 16 = 24$

$b = 3$

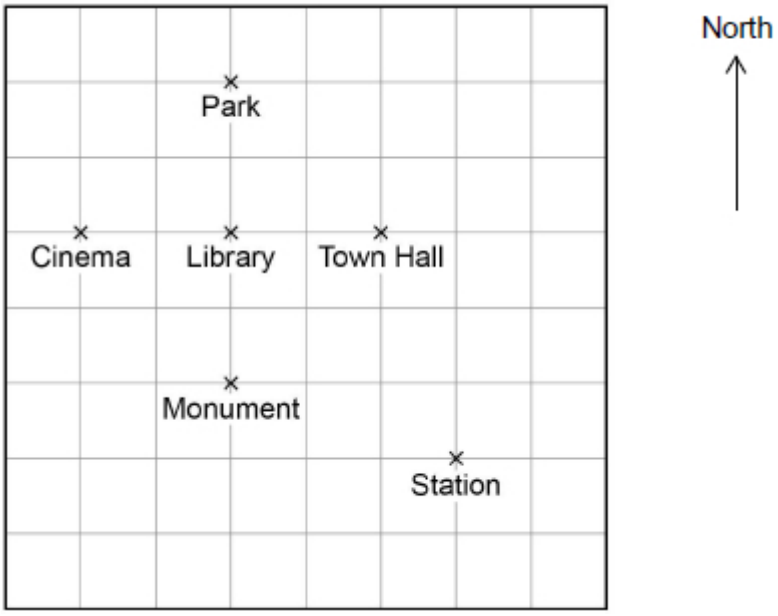
3 cm

(Total 3 marks)

Q8a

Here is a map of a town.

Scale: 1 cm represents 200 m



(a) Which place is exactly North West of the Station?
Circle your answer.

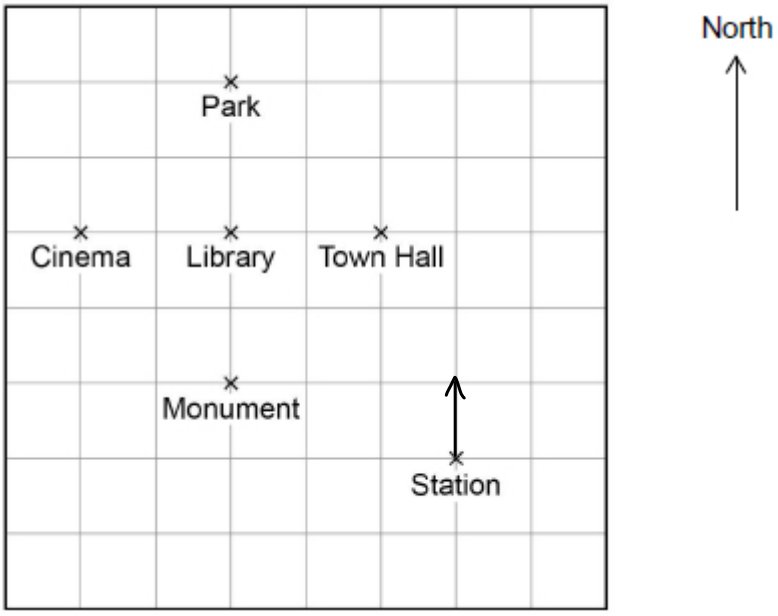
Cinema Town Hall Library Monument

(Total 1 mark)

Q8b

Here is a map of a town.

Scale: 1 cm represents 200 m



(b) Circle the three-figure bearing of the Monument from the Park.

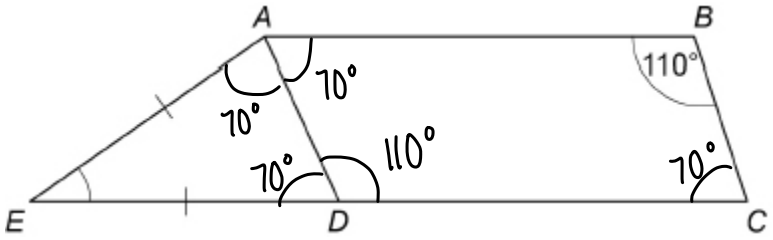
090° 180° 270° 360°

(Total 1 mark)

Q15

Trapezium *ABCE* is made from parallelogram *ABCD* and isosceles triangle *ADE*.

AE = *DE*



Not drawn accurately

Work out the size of angle *AED*.

ADC = 110° ∴ ADE = 180 − 110 = 70°

⇒ ∴ DAE = 70° because ADE is an isosceles triangle.

AED = 180 − 70 − 70 = 40°

Answer = 40° degrees

(Total 3 marks)

Q6

A and B are similar shapes.

B is an enlargement of A with scale factor 1.5

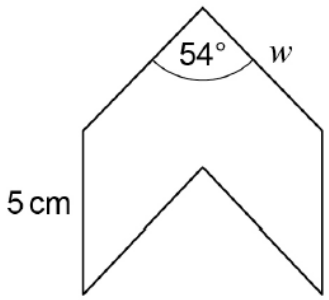
Not drawn accurately

L · SF = x

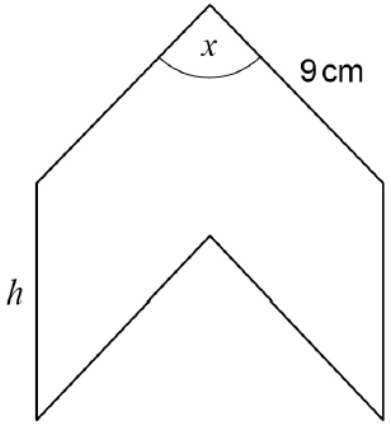
A · SF = x^2

V · SF = x^3

A



B



Work out the values of x, h and w.

x = 54 degrees

h = 7.5 cm

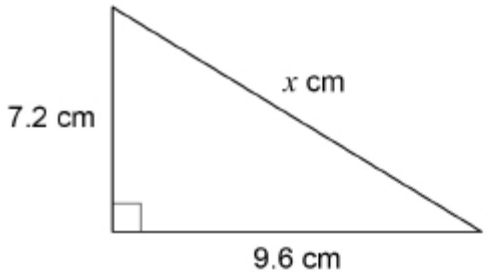
w = 6 cm

(Total 3 marks)

Q19

Here is a right-angled triangle.

Not drawn accurately



Show that $x = 12$

(Total 2 marks)

$(9.6)^2 + (7.2)^2 = x^2$

$92.16 + 51.84 = x^2$

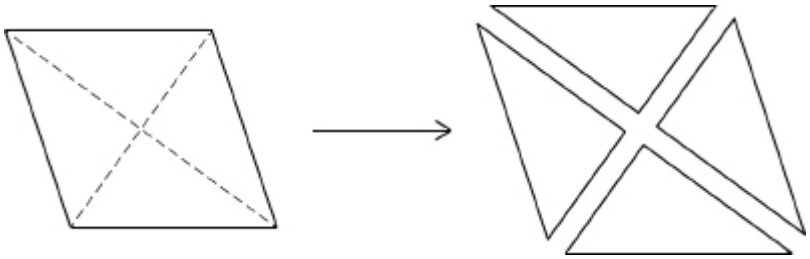
$\therefore \quad x^2 = 144$

$x = \sqrt{144} = 12$

Q19

A rhombus is cut along the diagonals to make four triangles.

Not drawn accurately



Which **three** statements are correct for any rhombus?

Tick **three** boxes.

- [x] All four triangles are right-angled
- [ ] All four triangles are isosceles
- [ ] All four triangles are congruent
- [x] Area of rhombus = 4 × area of one triangle
- [x] Perimeter of rhombus = 4 × perimeter of one triangle

(Total 2 marks)

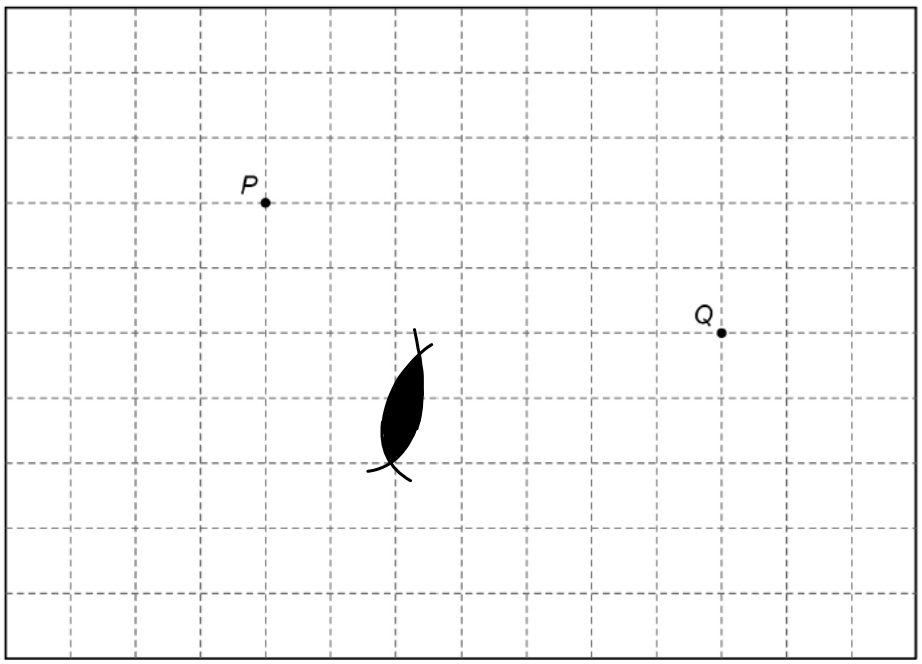
Q14

The scale drawing represents a garden.

Water from a sprinkler at *P* reaches up to 20 metres from *P*.

Water from a sprinkler at *Q* reaches up to 25 metres from *Q*.

Scale: 1 cm represents 5 m



Using a pair of compasses,

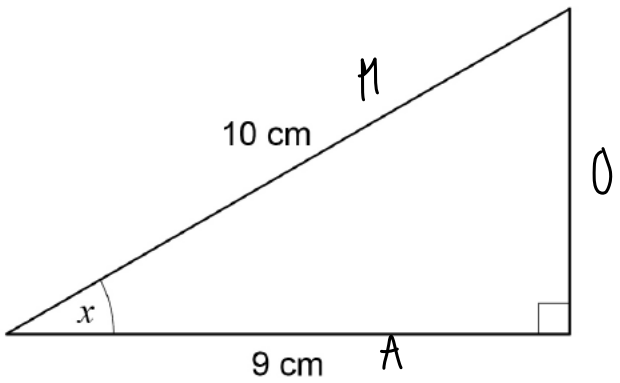
show the region that water from **both** sprinklers reaches.

(Total 2 marks)

Q11

Use trigonometry to work out the size of angle x.

Not drawn accurately



H

O

A

$\cos x = \frac{A}{H} = \frac{9}{10}$

$\Rightarrow x = \cos^{-1}(0.9)$

$x =$

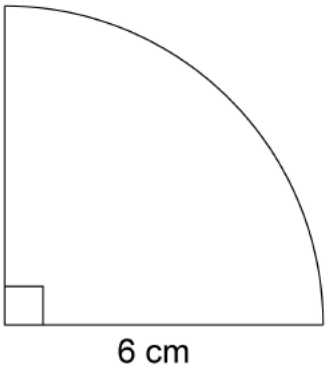
Answer 25.8 degrees

(Total 2 marks)

Q7

Here is a quarter circle of radius 6 cm

Not drawn accurately



$\text{area} = \frac{\pi r^2}{4}$

$= \frac{\pi(6)^2}{4} = \frac{36\pi}{4} = 9\pi$

Work out the area of the quarter circle.

Give your answer in terms of π.

Answer 9π cm^2

(Total 2 marks)

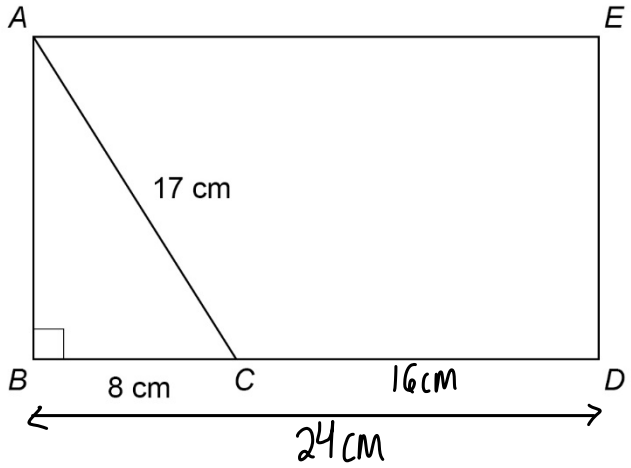
Q7

The diagram shows rectangle *ABDE* and right-angled triangle *ABC*.

AC = 17 cm

BC = 8 cm

Not drawn accurately



BC : *CD* = 1 : 2

Work out the area of rectangle *ABDE*.

Answer 360 cm^2

(Total 4 marks)

$c^2 = a^2 + b^2$

$\Rightarrow a^2 = c^2 - b^2$

$\Rightarrow AB^2 = 17^2 - 8^2$

$AB^2 = 225$

$AB = 15$

hence area of ABDE = $24 \times 15 = 360$

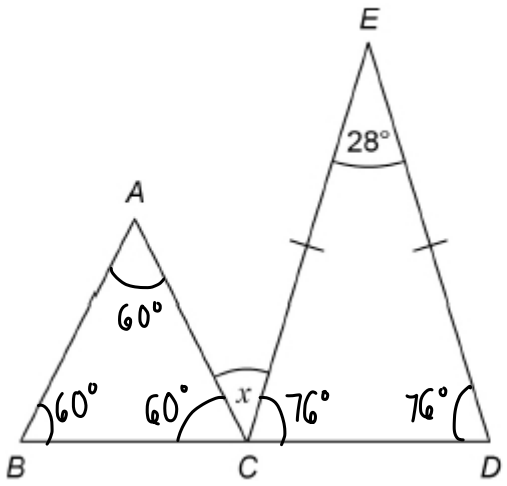
Q16a

(a) *BCD* is a straight line.

Triangle *ABC* is equilateral.

CE = *DE*

Not drawn accurately



$x = 180 - 60 - 76 = 44°$

Work out the size of angle x.

Answer 44° degrees

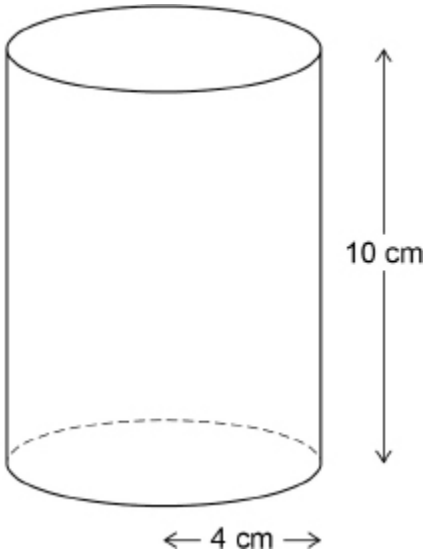
(Total 4 marks)

Q28

Here are two solids.

Cylinder

radius 4 cm height 10 cm



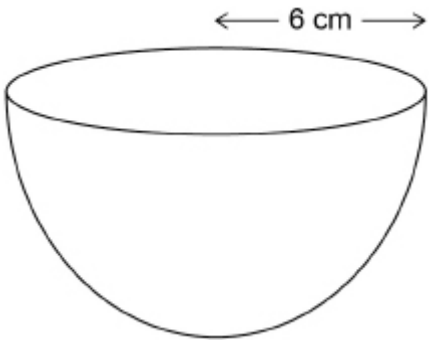
$V = \pi r^2 h$

$= \pi (16)(10)$

$V = 160\pi$

Hemisphere

radius 6 cm



$V = \frac{2}{3} \pi (6)^3$

$V = \frac{2}{3} \pi (216)$

$V = 144\pi$

volume of a hemisphere = $\frac{2}{3}\pi r^3$ where r is the radius

Which solid has the greater volume?

You **must** show your working.

- the cylinder has a greater volume

(Total 4 marks)

Q17

$\mathbf{a} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 1 \\ -5 \end{pmatrix}$

Work out $\mathbf{a} - 3\mathbf{b}$

Circle your answer.

$\begin{pmatrix} -6 \\ 17 \end{pmatrix}$ $\begin{pmatrix} -6 \\ -13 \end{pmatrix}$ $\begin{pmatrix} 0 \\ 17 \end{pmatrix}$ $\begin{pmatrix} 0 \\ -13 \end{pmatrix}$

(Total 1 mark)

$$a - 3b = \begin{pmatrix} -3 \\ 2 \end{pmatrix} - 3\begin{pmatrix} 1 \\ -5 \end{pmatrix}$$

$$= \begin{pmatrix} -3 \\ 2 \end{pmatrix} - \begin{pmatrix} 3 \\ -15 \end{pmatrix}$$

$$= \begin{pmatrix} -6 \\ 17 \end{pmatrix}$$