

# Shape 1

Calculator allowed for all questions

MATHSWATCH

Foundation



Higher



All questions

Time 45 minutes

Name:

SOLUTIONS

	<i>Grade</i>	<i>Title of clip</i>	<i>Marks</i>	<i>Score</i>	<i>Percentage</i>
Clip 118	C	Pythagoras (qu. 1, 2, 3)	9	_____	_____
Clip 119	C	Pythagoras on a graph (qu. 4)	3	_____	_____
Clip 120	C	3-D coordinates (qu. 5)	4	_____	_____
Clip 121	C	Surface area of cuboids (qu. 6)	4	_____	_____
Clip 122	C	Volume of prisms (qu. 7)	3	_____	_____
Clip 123	C	Similar shapes (qu. 8)	4	_____	_____
Clip 124	C	Dimensions (qu. 9)	7	_____	_____
Clip 125	C	Bounds (qu. 10)	4	_____	_____
Clip 126	C	Compound measures (qu. 11)	3	_____	_____
Clip 127	C	Bisecting a line (qu. 12)	3	_____	_____
Clip 128	C	Drawing a perpendicular (qu. 13)	3	_____	_____
Clip 129	C	Bisecting an angle (qu. 14)	3	_____	_____
Clip 130	C	Loci (qu. 15)	3	_____	_____
Clip 131	C	Bearings (qu. 16)	5	_____	_____

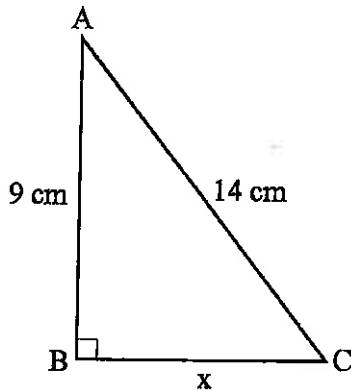
Out of 58

TOTAL  
SCORE \_\_\_\_\_

FINAL  
PERCENTAGE

%

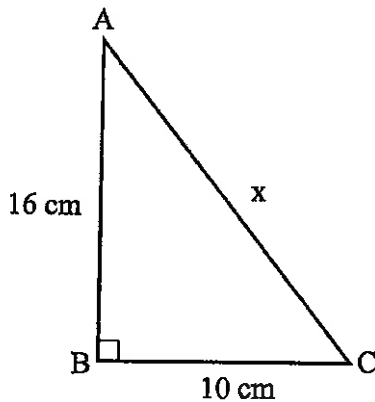
- 1) Find the length of side BC.  
Give your answer correct to one decimal place.



$$\sqrt{14^2 - 9^2} = \sqrt{115} = 10.7238\dots$$

$$BC = \underline{10.7} \text{ cm} \quad 3$$

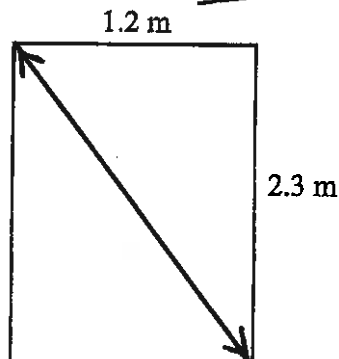
- 2) Find the length of side AC.  
Give your answer correct to one decimal place.



$$\sqrt{16^2 + 10^2} = \sqrt{356} = 18.86796\dots$$

$$BC = \underline{18.9} \text{ cm} \quad 3$$

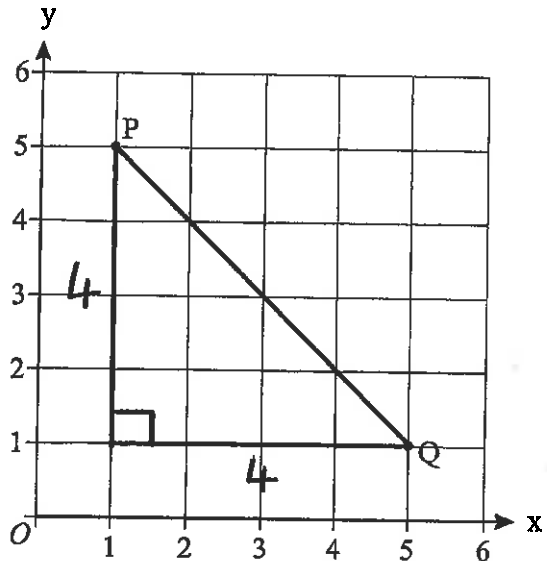
- 3) In the rectangular doorway, find the length of the diagonal.  
Give your answer correct to one decimal place.



$$\text{The diagonal is } \underline{2.6} \text{ m} \quad 3$$

$$\sqrt{1.2^2 + 2.3^2} = \sqrt{6.73} = 2.59422\dots$$

- 4) Points P and Q are on a centimetre grid as shown. Find the distance PQ, giving your answer correct to one decimal place.



Distance PQ = 5.7 3

$$\begin{aligned} \sqrt{4^2 + 4^2} &= \sqrt{32} \\ &= 5.6568\dots \end{aligned}$$

- 5) A cuboid lies on the coordinate axes as shown. Point P has coordinates (6, 3, 4).

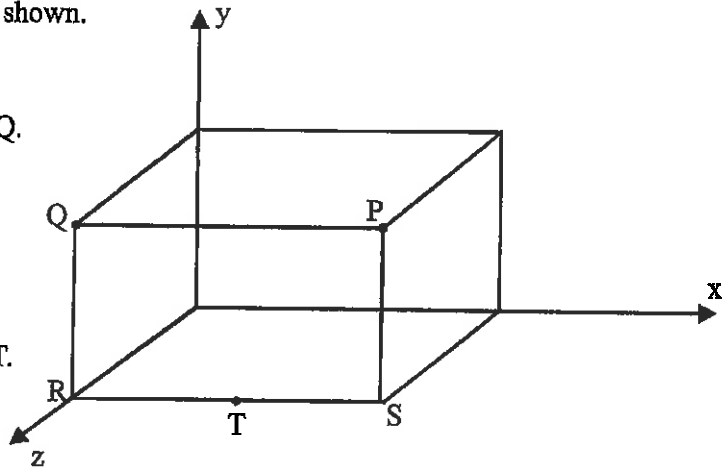
- a) Write down the coordinates of point Q.

(0, 3, 4) 2

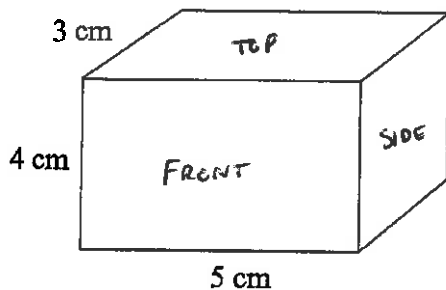
Point T lies half way along RS.

- b) Write down the coordinates of point T.

(3, 0, 4) 2



- 6) A cuboid has sides of length 5 cm, 3 cm and 4 cm. Find the surface area of the cuboid.



$$\begin{aligned} \text{FRONT} &= 4 \times 5 = 20 \\ \text{BACK} &= 4 \times 5 = 20 \\ \text{SIDE} &= 4 \times 3 = 12 \\ \text{SIDE} &= 4 \times 3 = 12 \\ \text{TOP} &= 5 \times 3 = 15 \\ \text{BOTTOM} &= 5 \times 3 = 15 \quad + \\ & \quad \quad \quad \underline{\quad} \\ & \quad \quad \quad \underline{94} \end{aligned}$$

Surface area = 94 cm<sup>2</sup> 4

# Shape 2

Calculator allowed for all questions

Foundation

Higher



All questions

Time for this test, 60 minutes

Use the  $\pi$  button or take  $\pi$  to be 3.142

Name: \_\_\_\_\_

	<i>Grade</i>	<i>Title of clip</i>	<i>Marks</i>	<i>Score</i>	<i>Percentage</i>
Clip 67	D	Alternate angles (qu. 1)	2	_____	_____
Clip 68/69	D	Angle sum of triangle (qu. 2)	3	_____	_____
Clip 70	D	Angles of polygons (qu. 3)	8	_____	_____
Clip 150	B	Circle theorems (qu. 4, 5)	8	_____	_____
Clip 71	D	Area of circle (qu. 6)	7	_____	_____
Clip 72	D	Circumference of circle (qu. 7, 8)	7	_____	_____
Clip 73	D	Area of compound shape (qu. 9)	6	_____	_____
Clip 74	D	Rotations (qu. 10)	5	_____	_____
Clip 75	D	Reflections (qu. 11)	4	_____	_____
Clip 76	D	Enlargements (qu. 12, 13)	5	_____	_____
Clip 171	A*/A	Enlargement with neg. SF (qu. 14)	3	_____	_____
Clip 77	D	Translations (qu. 15)	7	_____	_____
Clip 78	D	Mid-point of line (qu. 16, 17)	4	_____	_____
Clip 79	D	Angles (qu. 18, 19)	6	_____	_____
Clip 80	D	Drawing triangles (qu. 20)	3	_____	_____
Clip 81	D	Plans & elevations (qu. 21)	4	_____	_____
Clip 82	D	Nets (qu. 22)	3	_____	_____
Clip 83	D	Symmetries (qu. 23)	4	_____	_____
Clip 147	B	Trigonometry (qu. 24 to 27)	12	_____	_____
Clip 148	B	Bearings and trig (qu. 28)	3	_____	_____
Clip 149	B	Similar shapes (qu. 29, 30)	8	_____	_____

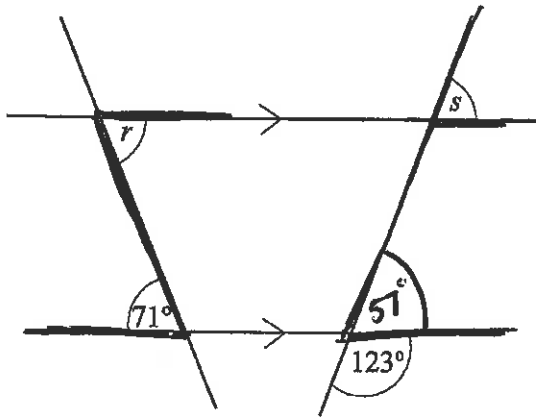
Out of 112

TOTAL  
SCORE \_\_\_\_\_

FINAL  
PERCENTAGE

%

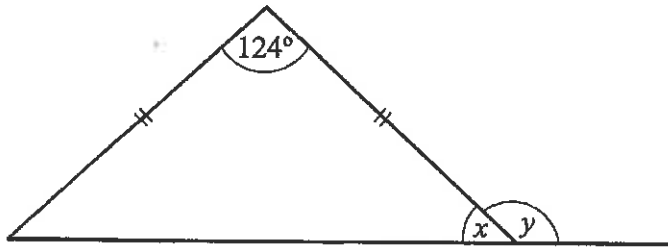
1) Work out the size of angles  $r$  and  $s$ .



$r = 71^\circ$  1 (alternate Z angles are equal)

$s = 57^\circ$  1 (angles straight line =  $180^\circ$ )  
(corresponding F angles are equal)

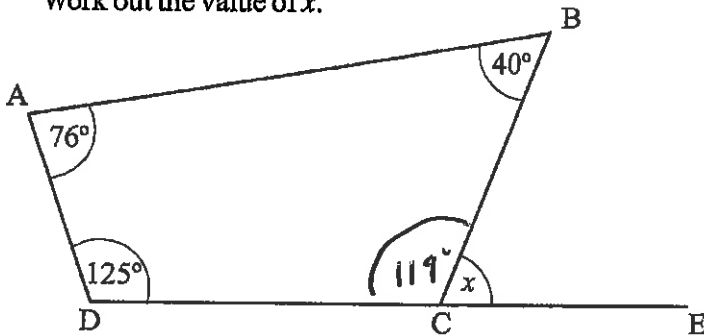
2) Work out the values of  $x$  and  $y$ .



$x = 28^\circ$  2 (Isosceles  $(180 - 124) \div 2$ )

$y = 152^\circ$  1 (straight line  $180 - 28$ )

3) a) ABCD is a quadrilateral. The side DC is extended to E. Work out the value of  $x$ .



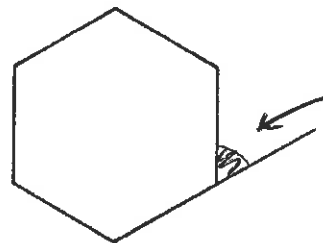
(Quadrilateral =  $360^\circ$ )

$360 - 76 - 40 - 125 = 119^\circ$

$x = 61^\circ$  3 ( $180 - 119 = 61^\circ$ )

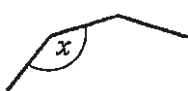
b) Calculate the size of an exterior angle of a regular hexagon.

Size of exterior angle is  $60^\circ$  2



Exterior  $360^\circ \div 6 \text{ sides} = 60^\circ$

c) The diagram shows part of a regular 10-sided polygon. Work out the size of the angle marked  $x$ .



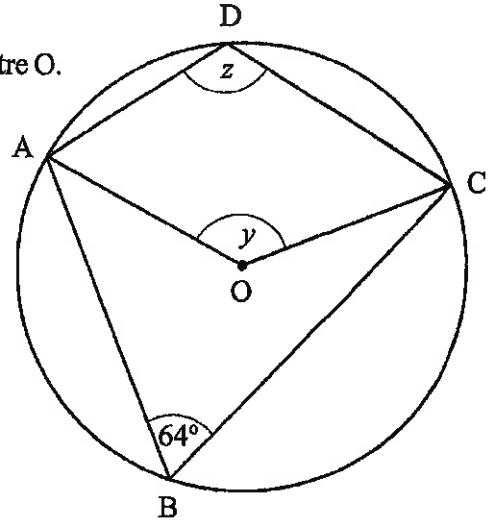
$x = 144^\circ$  3

Exterior  $360^\circ \div 10 = 36^\circ$

Interior  $180 - 36 = 144^\circ$  (straight line)

- 4) A, B, C and D are four points on the circumference of a circle, centre O.  
Angle ABC = 64°

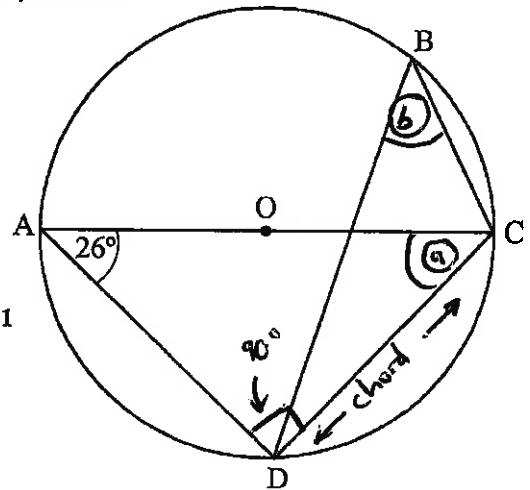
- (a) Work out the size of angle y.  $\frac{128^\circ}{64^\circ \times 2}$  2  
 (b) Work out the size of angle z.  $\frac{116^\circ}{180^\circ - 64^\circ}$  2



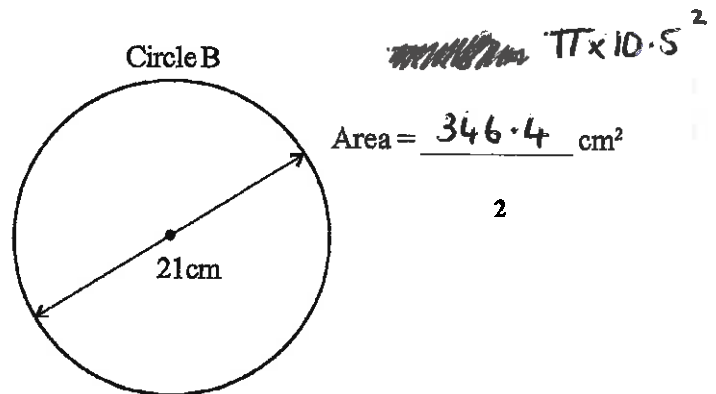
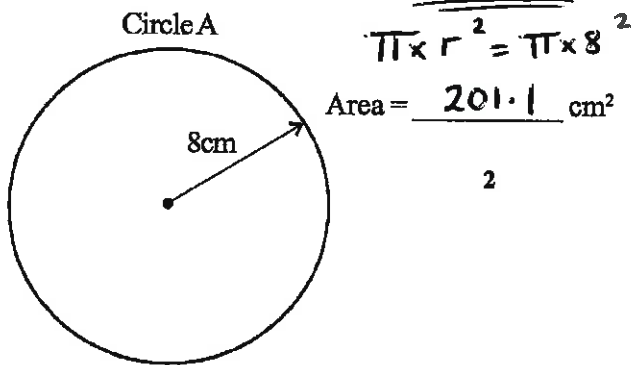
- 5) A, B, C and D are four points on the circumference of a circle, centre O.  
AC is a diameter of the circle.

- (a) Find the size of angle ACD.  $\frac{64^\circ}{180 - 90 - 26 = 64^\circ}$  2  
 (b) Find the size of angle DBC.  $\frac{26^\circ}$  1  
 Give a reason for your answer.

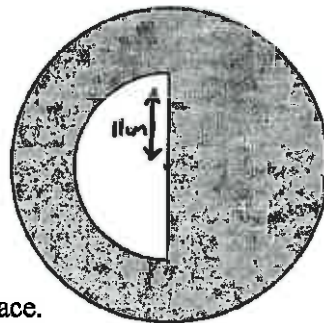
Angles are equal from same chord 1



- 6) a) Find the area of Circle A and Circle B.  
Give your answers correct to 1 decimal place.



- b) A semi-circle is cut from a circle.  
The circle has a diameter of 34cm.  
The semi-circle has a diameter of 22cm.  
Calculate the shaded area.  
Give your answer correct to 1 decimal place.

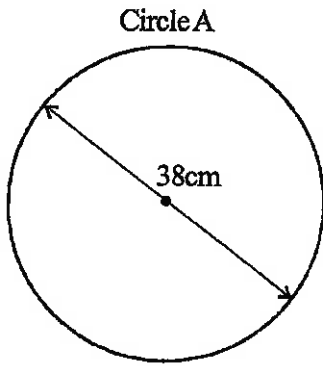


$$\pi \times 17^2 - \left( \frac{\pi \times 11^2}{2} \right)$$

$$= 717.85 \dots$$

Shaded area =  $\frac{717.9}{3}$  cm<sup>2</sup>

- 7) Find the circumference of Circle A and Circle B.  
Give your answers correct to 1 decimal place.

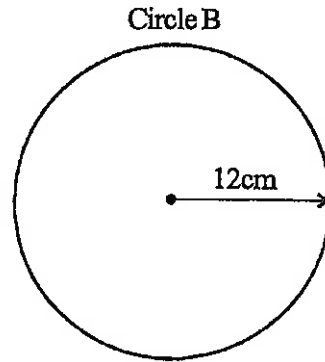


$$C = \pi \times d$$

$$= \pi \times 38$$

$$= 119.38\dots$$

Circumference = 119.4 cm <sup>2</sup>



$$\pi \times d$$

$$= \pi \times 24$$

$$= 75.398\dots$$

Circumference = 75.4 cm <sup>2</sup>

- 8) The wheels of a bicycle each have a diameter of 70cm.  
If the bicycle travels a distance of 100m, how many times does each wheel rotate?  
Give your answer to the nearest whole number.

45 <sup>3</sup>

$$C = \pi \times d = \pi \times 70 = 70\pi \text{ cm}$$

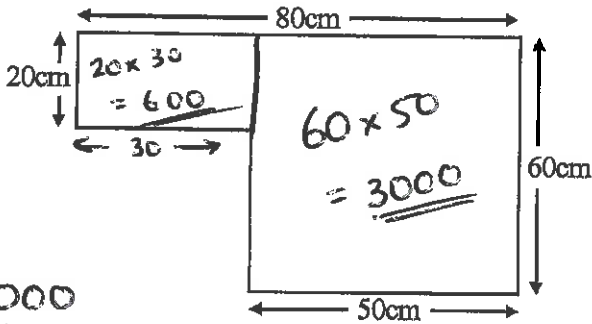
$$\text{Rotations} = 100\text{m} \div 70\pi = 0.454\dots \text{ metres}$$

$$= 45.4\dots \text{ cm} \quad (\times 100)$$

$$= \underline{\underline{45}}$$

- 9) Find the area of Shape A and Shape B.

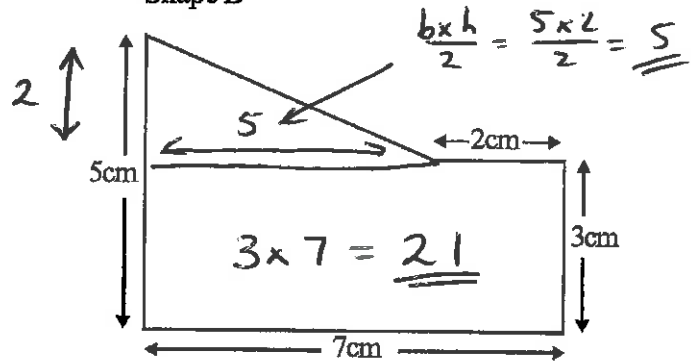
Shape A



$$\begin{array}{r} 3000 \\ 600 + \\ \hline 3600 \end{array}$$

Area = 3600 cm<sup>2</sup> <sup>3</sup>

Shape B



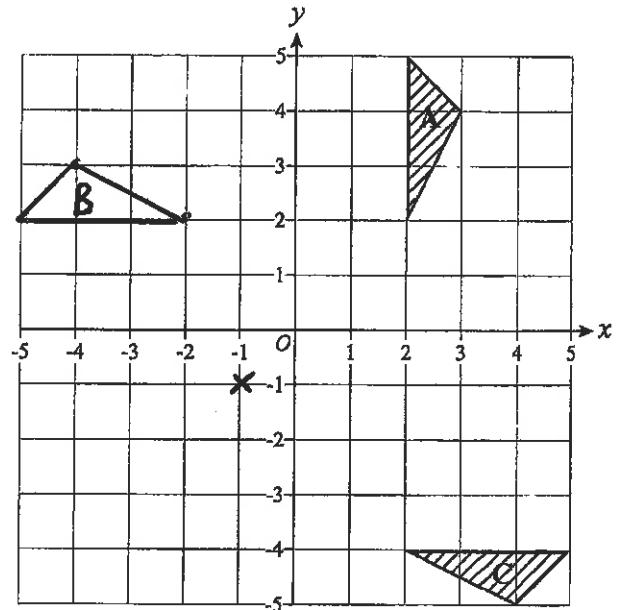
$$\begin{array}{r} 21 \\ 5 + \\ \hline 26 \end{array}$$

Area = 26 cm<sup>2</sup> <sup>3</sup>

- 10) a) Rotate shape A  $90^\circ$  anticlockwise about  $(0, 0)$ .  
Label this new shape with the letter B. 2

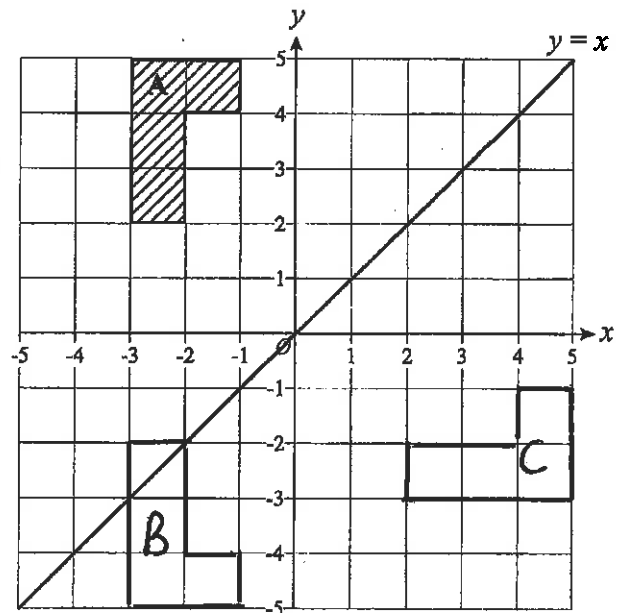
- b) Describe fully the single transformation which takes shape A to shape C. 3

Rotation shape A  
 $90^\circ$  clockwise  
about  $(-1, -1)$

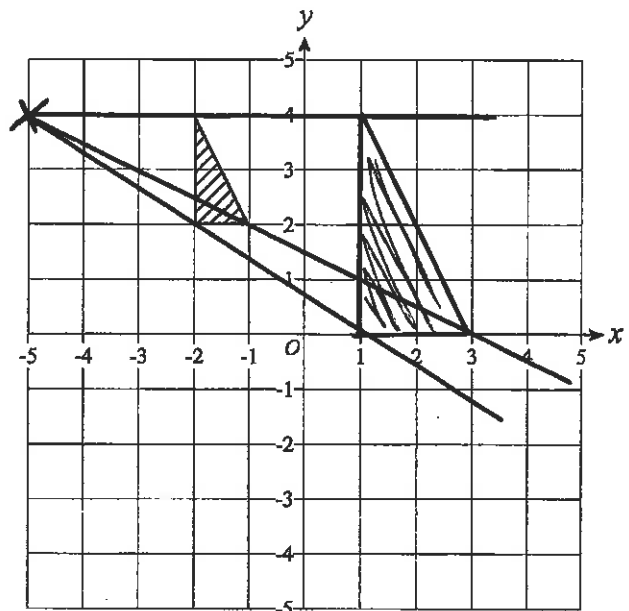


- 11) a) Reflect shape A in the  $x$ -axis and label it B. 2

- b) Reflect shape A in the line  $y = x$  and label it C. 2

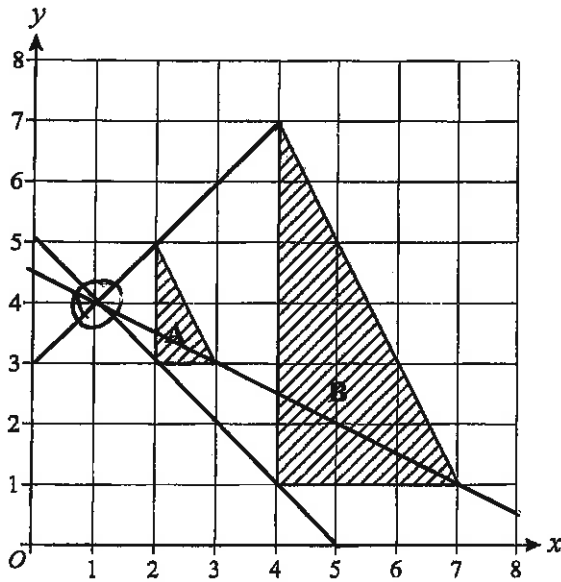


- 12) Enlarge the shaded triangle by scale factor 2 using point  $(-5, 4)$  as the centre of enlargement. 2



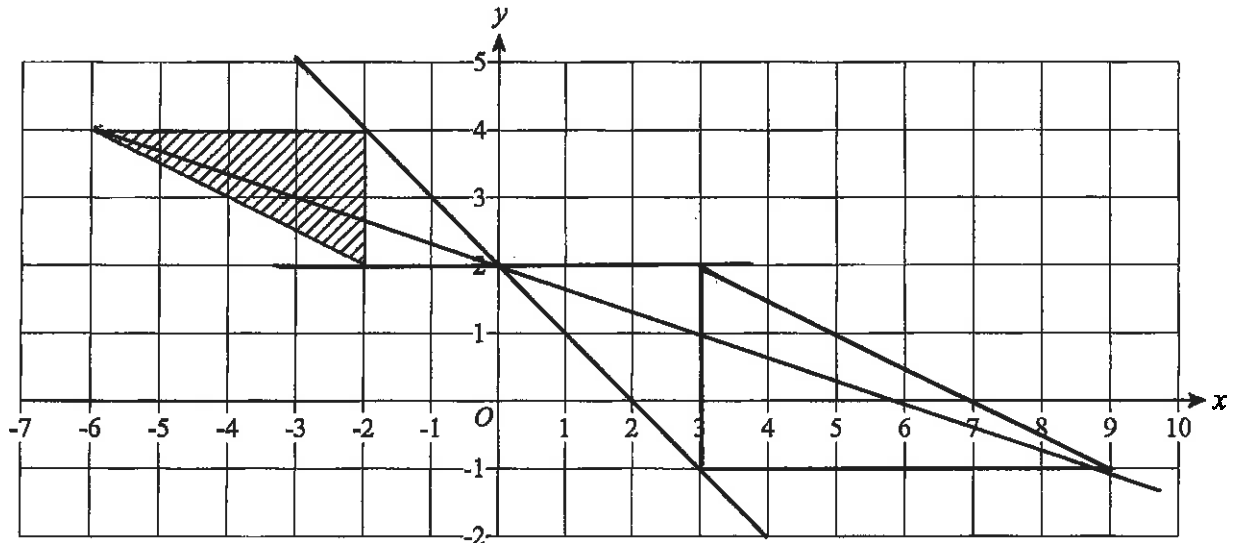


- 13) Describe fully the single transformation which maps shape A onto shape B.



Enlarge shape A  
 scale factor  $\times 3$   
 at point  $(1, 4)$  3

- 14) Enlarge the shaded triangle by scale factor  $-1\frac{1}{2}$  with point  $(0, 2)$  as the centre of enlargement. 3

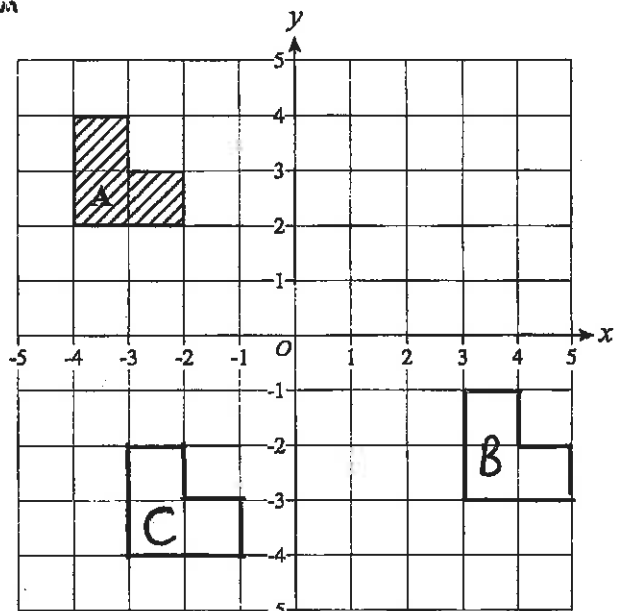


- 15) a) Translate shape A by vector  $\begin{bmatrix} 7 \\ -5 \end{bmatrix}$  and label it B. 2

- b) Translate shape B by vector  $\begin{bmatrix} -6 \\ -1 \end{bmatrix}$  and label this new shape C. 2


- c) Describe fully the single transformation which will take shape A to shape C.

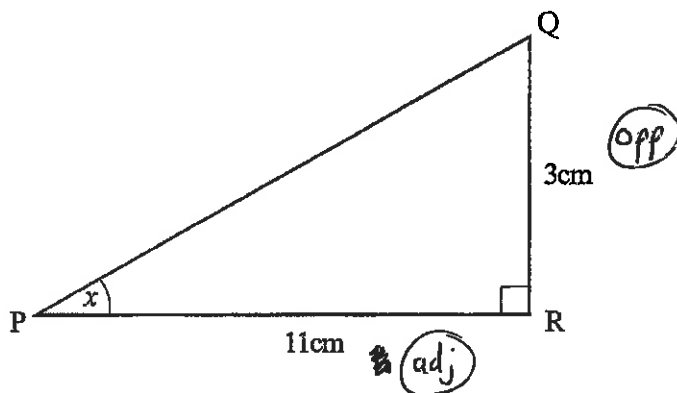
Translation by vector  $\begin{pmatrix} -1 \\ -6 \end{pmatrix}$



- 24) Work out the size of angle RPQ.  
Give your answer to 1 decimal place.


15.3°      3

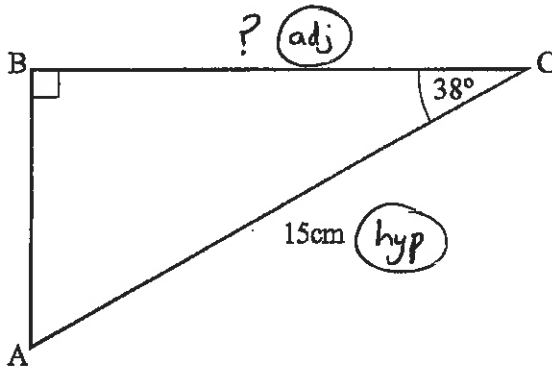
 =  $\tan^{-1}\left(\frac{3}{11}\right)$



- 25) Work out the size of side BC.  
Give your answer to 1 decimal place.


11.8cm      3

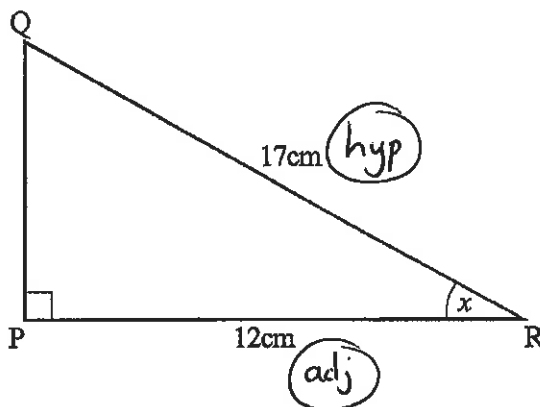
 =  $\cos(38) \times 15$



- 26) Work out the size of angle PRQ.  
Give your answer to 1 decimal place.


45.1°      3

 =  $\cos^{-1}\left(\frac{12}{17}\right)$



- 27) Work out the size of side XZ.  
Give your answer to 1 decimal place.

54.4cm      3

 =  $O \div S = 28 \div \sin(31)$

