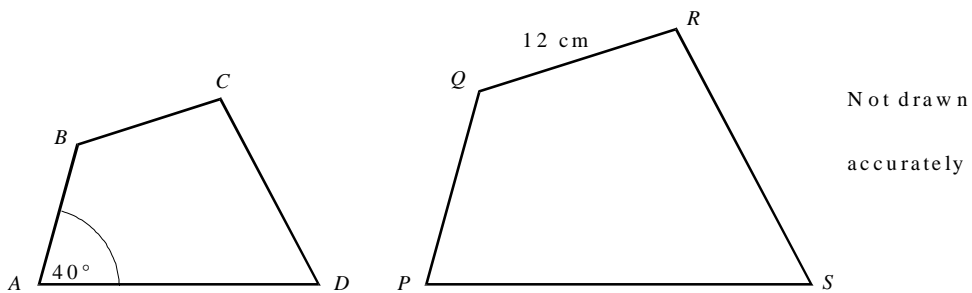


# Mixed SSM 1

55 min  
46 marks

1.  $PQRS$  is an enlargement with scale factor 1.5 of  $ABCD$ .



- (a) Calculate the length of  $BC$ .

.....  
.....  
.....  
.....

Answer  $BC =$  ..... cm

(2)

(b) Write down the size of angle  $QPS$ .

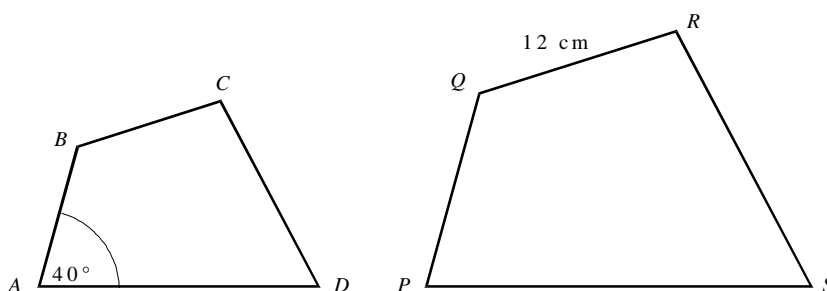
.....

Answer  $QPS =$  ..... degrees

(1)

(Total 3 marks)

2.  $PQRS$  is an enlargement with scale factor 1.5 of  $ABCD$ .



Not drawn  
accurately

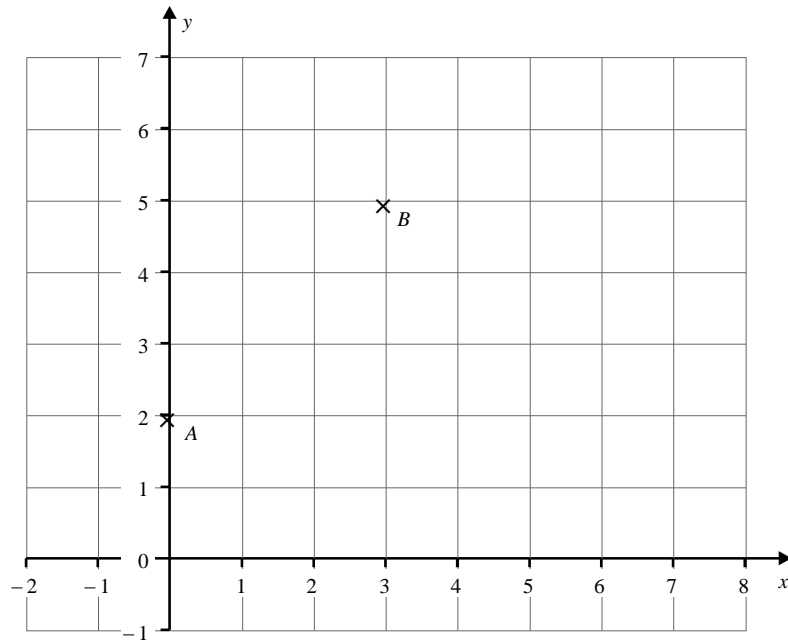
Calculate the length of  $BC$ .

.....  
.....  
.....  
.....

Answer  $BC =$  ..... cm

(Total 2 marks)

3.



$A$  is the point  $(0,2)$  and  $B$  is the point  $(3,5)$ .

(a) Find the **exact** length of  $AB$ .

.....  
.....  
.....

Answer .....

(2)

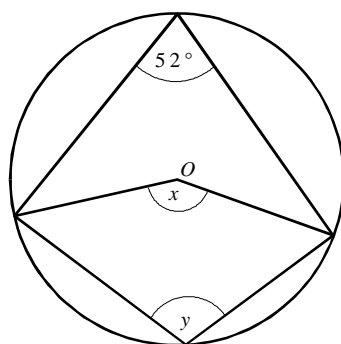
(b) Find the equation of the line joining the points  $A$  and  $B$ .

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Answer .....

(3)  
(Total 5 marks)

4. (a)  $O$  is the centre of the circle.



Not drawn  
accurately

(i) Find the value of  $x$ .

.....

Answer  $x =$  ..... degrees

(1)

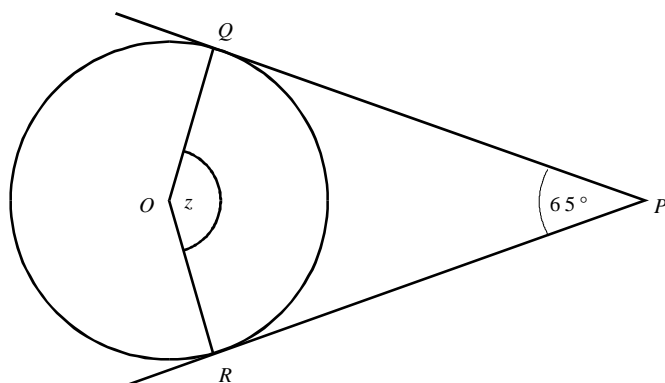
(ii) Find the value of  $y$ .

.....

Answer  $y =$  ..... degrees

(1)

- (b)  $PQ$  and  $PR$  are tangents to the circle centre  $O$ .  
 $\angle QPR$  is  $65^\circ$ .



Not drawn  
accurately

Calculate the size of angle  $QOR$  (marked  $z$  on the diagram).

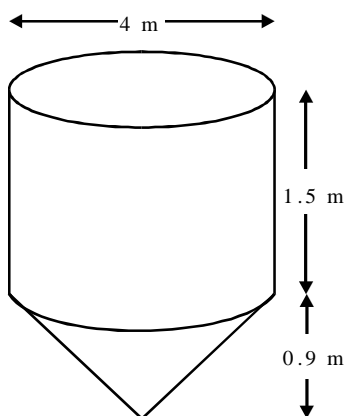
.....  
 .....

Answer ..... degrees

(2)

(Total 4 marks)

5. A container consists of a cylinder on top of a cone.  
 The container is full of oil.



The diameter of both the cylinder and the cone is 4 m.  
 The height of the cone is 0.9 m and the height of the cylinder is 1.5 m.

Calculate the volume of oil in the container.  
Give your answer in terms of  $\pi$ .

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Answer .....  $\text{m}^3$   
**(Total 3 marks)**

6. (a) Multiply out and simplify  $(x + \sqrt{6})^2$ .

.....

.....

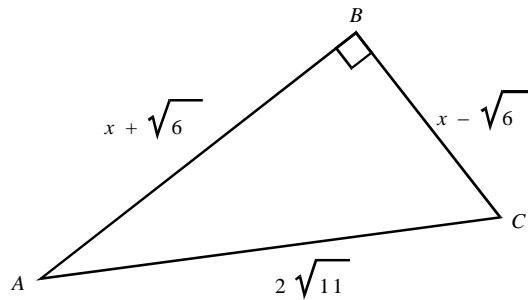
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Answer .....

(2)

(b) Triangle  $ABC$  has a right angle at  $B$ .



Find the value of  $x$ .

You **must** explain clearly how you obtain your answer.

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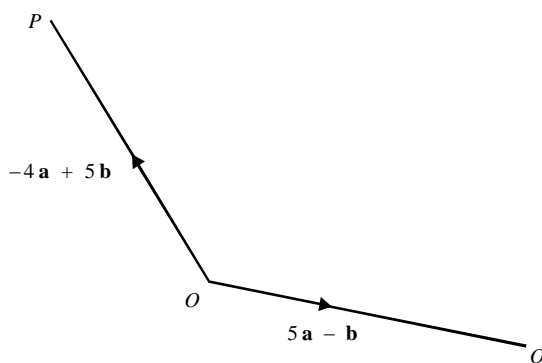
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Answer  $x =$  .....

(5)  
(Total 7 marks)

7.  $\vec{OP} = -4\mathbf{a} + 5\mathbf{b}$  and  $\vec{OQ} = 5\mathbf{a} - \mathbf{b}$ .



$R$  is a point on  $\vec{PQ}$  such that  $PR : RQ = 1 : 2$ .

(a) Express  $\overrightarrow{OR}$  in terms of **a** and **b**.

.....  
.....  
.....  
.....

Answer ..... (3)

(b)  $\overrightarrow{PS} = \mathbf{a} + 4\mathbf{b}$

Express  $\overrightarrow{OS}$  in terms of **a** and **b**.

.....  
.....

Answer ..... (2)

(c) What **two** facts do  $\overrightarrow{OR}$  and  $\overrightarrow{OS}$  indicate about the points *O*, *R* and *S*?

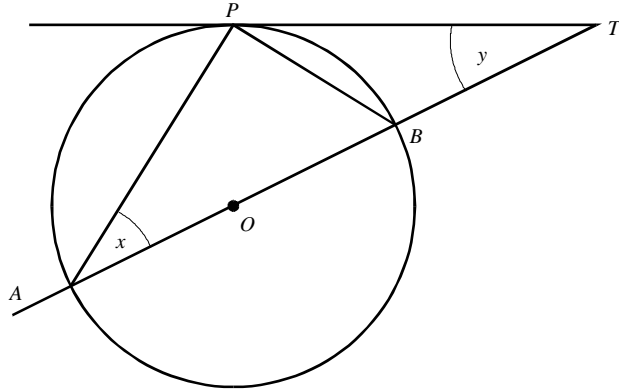
Give a reason for each of your answers.

.....  
.....  
.....  
.....  
.....

(2)  
(Total 7 marks)



8.  $AB$  is the diameter of the circle, centre  $O$ .  
 $TP$  is a tangent to the circle at the point  $P$ .  
 $ABT$  is a straight line.



Angle  $BAP = x^\circ$  and angle  $BTP = y^\circ$ .

Show that  $y = 90 - 2x$ .

You **must** explain clearly how you obtain your answer.

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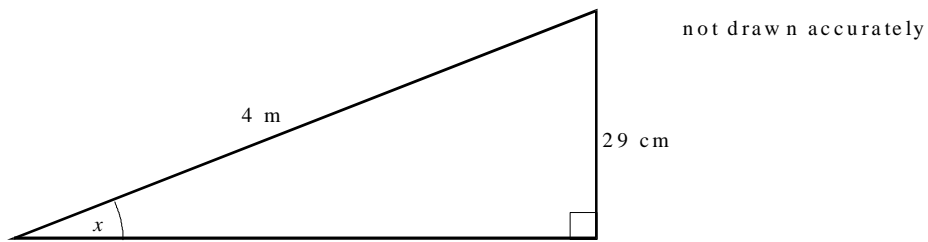
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(Total 4 marks)

9. (a) A ramp is 4 metres long and 29 centimetres high.  
If the ramp is safe for wheelchair users the angle marked  $x$  must be  $4^\circ$  or less.



Is this ramp safe for wheelchair users?  
You **must** show your working

.....

.....

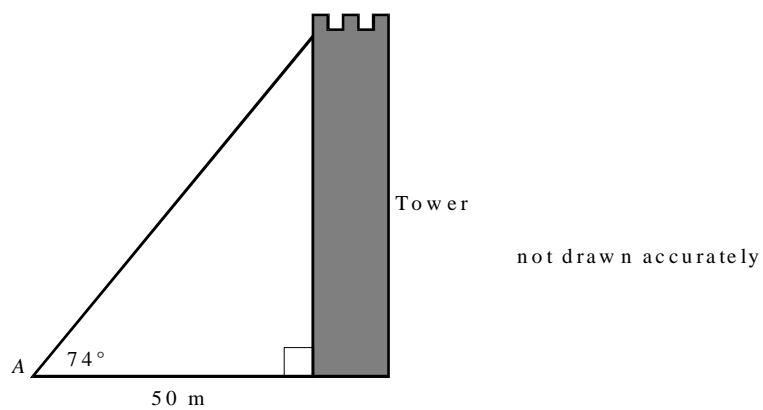
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Answer .....

(4)

- (b) The point  $A$  is 50 metres from the base of a tower.  
The angle of elevation of the top of the tower from  $A$  is  $74^\circ$ .



- (i) Calculate the height of the tower.  
Give your answer to a suitable degree of accuracy.

.....  
.....  
.....  
.....

Answer ..... m

(4)

- (ii) What is the angle of depression of the point A from the top of the tower?

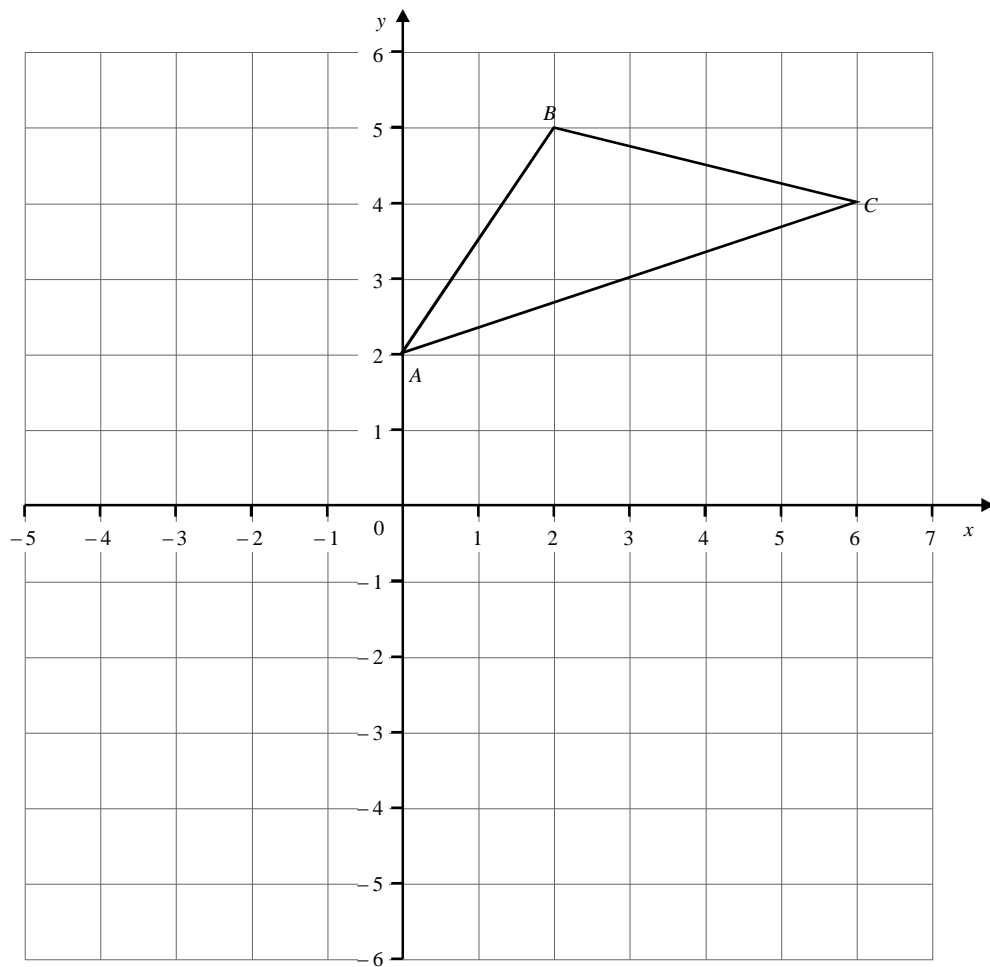
.....  
.....  
.....

Answer ..... degrees

(1)

(Total 9 marks)

10. Triangle  $ABC$  has vertices at  $A(0, 2)$ ,  $B(2, 5)$ ,  $C(6, 4)$ .



Draw the enlargement of triangle  $ABC$  with scale factor  $-\frac{1}{2}$  and centre  $(2, -2)$ .

**(Total 2 marks)**