

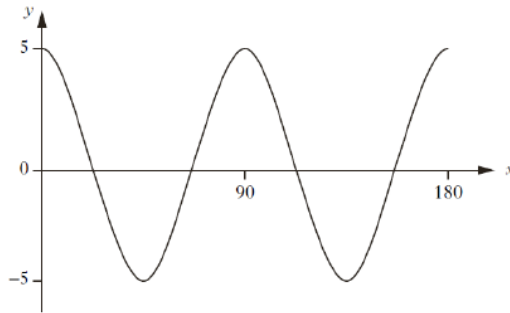


## National 5

### Home Ex 8

1.

Part of the graph of  $y = a \cos bx^\circ$  is shown in the diagram.



Find the values of  $a$  and  $b$ .

2

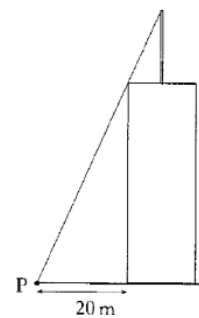
2.

A vertical flagpole 12 metres high stands at the centre of the roof of a tower. The tower is cuboid shaped with a square base of side 10 metres.



At a point P on the ground, 20 metres from the base of the tower, the top of the flagpole is just visible, as shown.

Calculate the height of the tower.



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3.

Sketch the graph of  $y = (x - 3)^2 + 1$ .

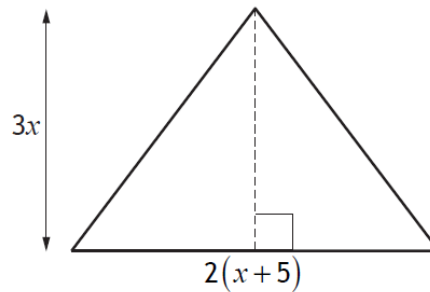
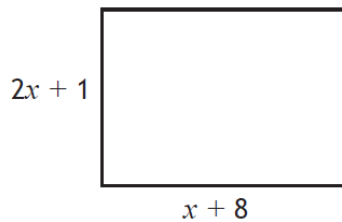
On your sketch, show clearly the coordinates of the turning point and the point of intersection with the  $y$ -axis.

3

4.

The diagrams below show a rectangle and a triangle.

All measurements are in centimetres.



(a) Find an expression for the area of the **rectangle**.

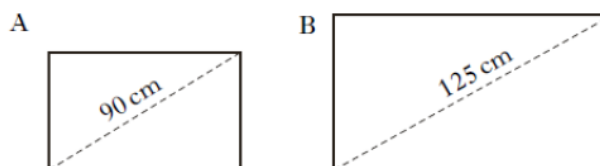
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(b) Given that the area of the rectangle is equal to the area of the triangle, show that  $x^2 - 2x - 8 = 0$ .

(c) Hence find, **algebraically**, the length and breadth of the rectangle.

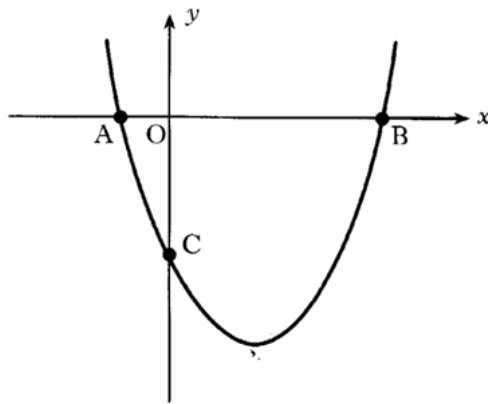
5. Sketch  $y = 4\sin 2x^\circ$ ,  $0 \leq x \leq 360$

6. Two rectangular solar panels, A and B, are mathematically similar. Panel A has a diagonal of 90 centimetres and an area of 4020 square centimetres.



A salesman claims that panel B, with a diagonal of 125 centimetres, will be double the area of panel A. Is this claim justified?

7.



The equation of the parabola in the above diagram is

$$y = (x - 2)^2 - 9.$$

- (a) State the coordinates of the minimum turning point of the parabola. 2
- (b) Find the coordinates of C. 2
- (c) A is the point  $(-1, 0)$ . State the coordinates of B. 1
- 

8. The paper cones shown are similar in shape. The small cone is 8 cm high and uses  $180 \text{ cm}^2$  of paper. What will be the height of the larger cone if it is made from  $290 \text{ cm}^2$  of card? Give your answer to 2 decimal places

9. For what values of  $q$  does the equation  $x^2 + qx = 3q$  have equal roots?