GCSE Grade 8/9

Maths Booklet 6

Paper 2H
Calculator

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1 The number of bees in a beehive at the start of year n is P_n.
The number of bees in the beehive at the start of the following year is given by

$$P_{n+1} = 1.05(P_n - 250)$$

At the start of 2015 there were 9500 bees in the beehive.

How many bees will there be in the beehive at the start of 2018?

....

(Total for Question 1 is 3 marks)

Turn over ▶

2 $D = \dfrac{x}{y}$

$x = 99.7$ correct to 1 decimal place.
$y = 67$ correct to 2 significant figures.

Work out an upper bound for D.

....

(Total for Question 2 is 3 marks)

3 Here is a circle, centre O, and the tangent to the circle at the point $P(4, 3)$ on the circle.
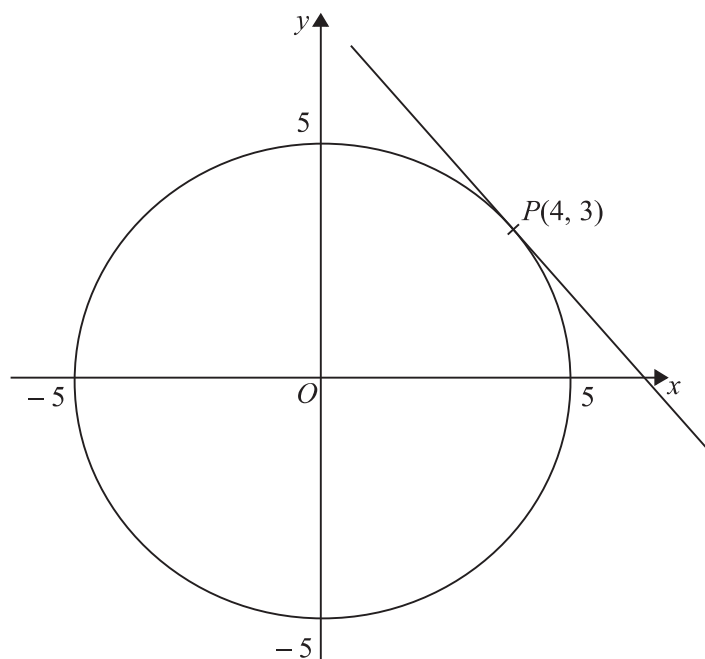
Find an equation of the tangent at the point P.

....

(Total for Question 3 is 3 marks)

4 *A*, *B* and *C* are points on the circumference of a circle centre *O*.
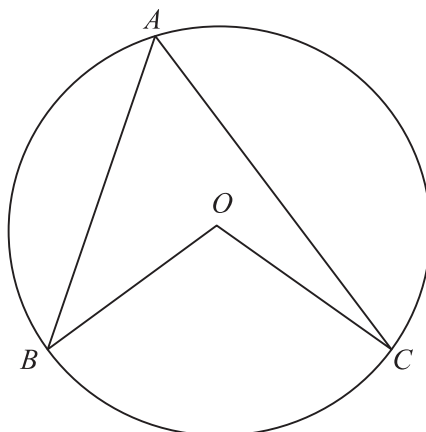
Prove that angle *BOC* is twice the size of angle *BAC*.

5 $m = \dfrac{\sqrt{s}}{t}$ $s = 3.47$ correct to 3 significant figures

$t = 8.132$ correct to 4 significant figures

By considering bounds, work out the value of m to a suitable degree of accuracy.
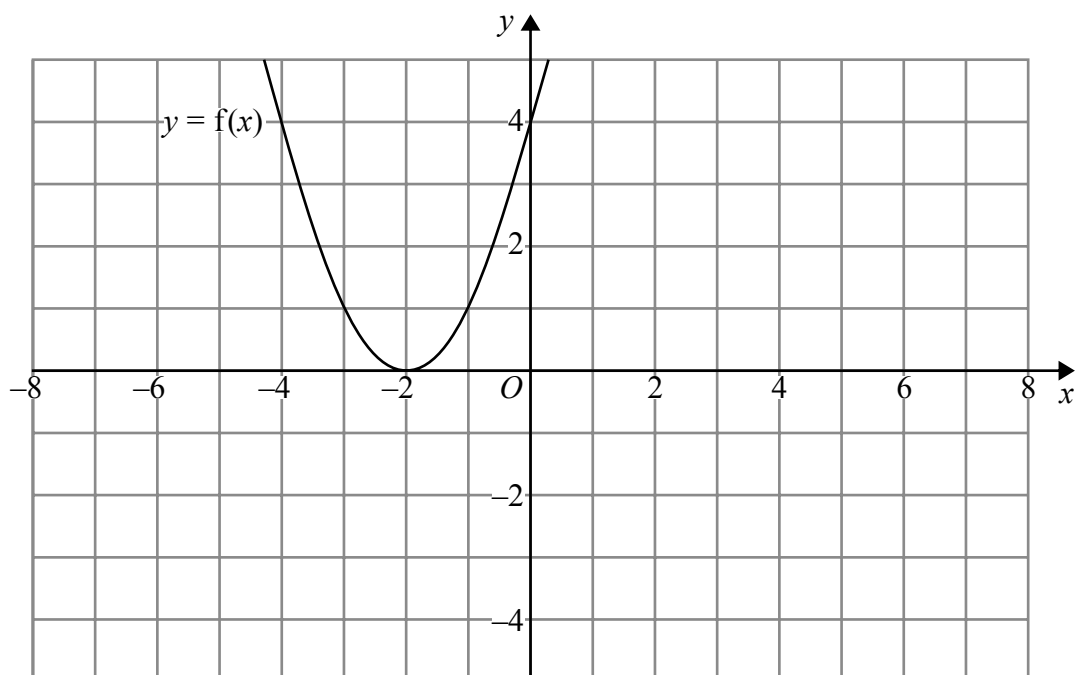Give a reason for your answer.

(Total for Question 5 is 5 marks)

6 The graph of $y = f(x)$ is shown on both grids below.

$y = f(x)$

(a) On the grid above, sketch the graph of $y = f(-x)$

(1)

$y = f(x)$
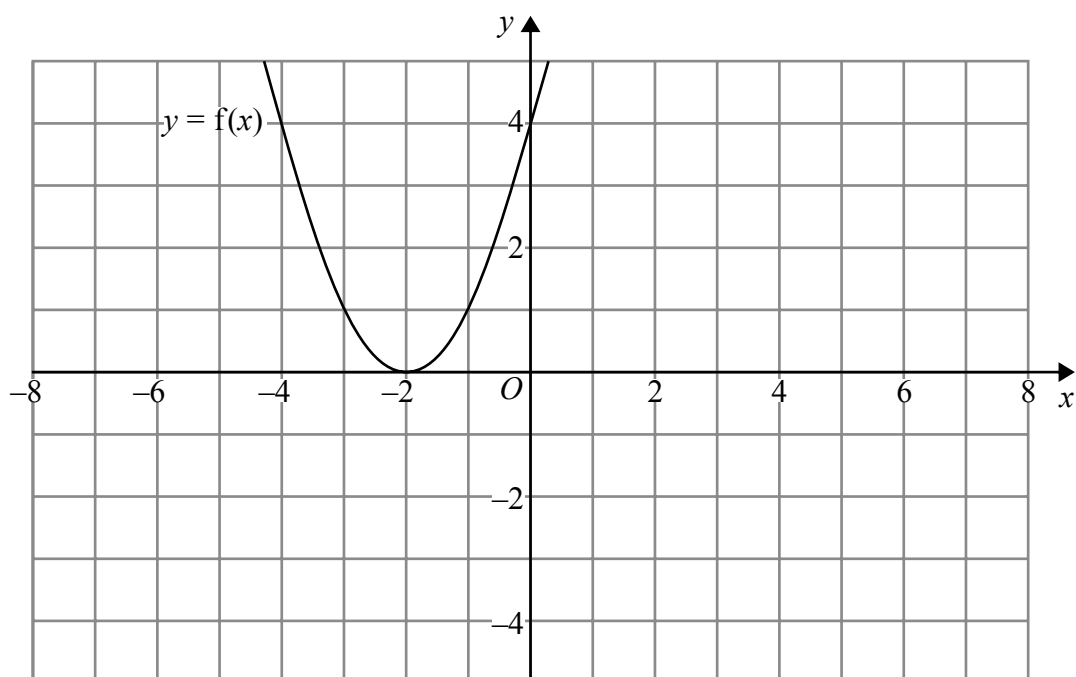
(b) On this grid, sketch the graph of $y = -f(x) + 3$

(1)

(Total for Question 6 is 2 marks)

7 Solve algebraically the simultaneous equations

$$x^2 + y^2 = 25$$
$$y - 2x = 5$$

(Total for Question 7 is 5 marks)

8   In triangle *RPQ*,

   RP = 8.7 cm
   PQ = 5.2 cm
   Angle *PRQ* = 32°

(a)   Assuming that angle *PQR* is an acute angle,
   calculate the area of triangle *RPQ*.
   Give your answer correct to 3 significant figures.
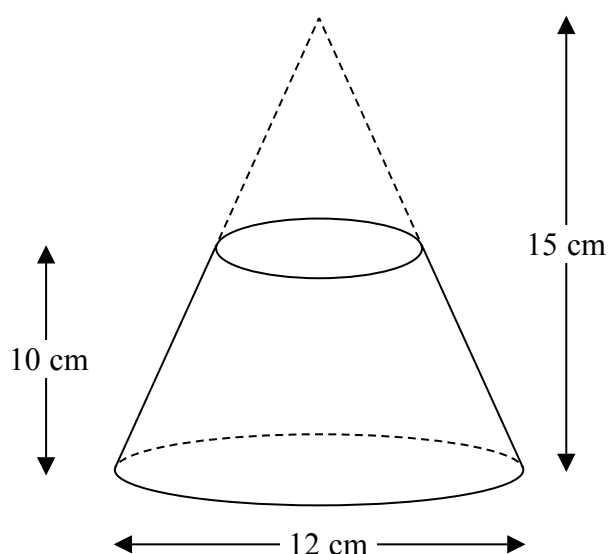
....cm^2

(4)

(b)   If you did not know that angle *PQR* is an acute angle, what effect would this have on
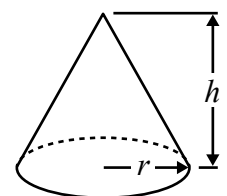   your calculation of the area of triangle *RPQ*?

....

....

....

(1)

(Total for Question 8 is 5 marks)

9 A frustum is made by removing a small cone from a large cone as shown in the diagram.

15 cm

10 cm

12 cm

Volume of cone $= \frac{1}{3}\pi r^2 h$

h

r

The frustum is made from glass.
The glass has a density of 2.5 g / cm³

Work out the mass of the frustum.
Give your answer to an appropriate degree of accuracy.

.... g

(Total for Question 9 is 5 marks)