GCSE Grade 8/9

Maths Booklet 1

Paper 3H
Calculator

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1 A train travelled along a track in 110 minutes, correct to the nearest 5 minutes.

Jake finds out that the track is 270 km long.
He assumes that the track has been measured correct to the nearest 10 km.

(a) Could the average speed of the train have been greater than 160 km/h?
You must show how you get your answer.

(4)

Jake's assumption was wrong.
The track was measured correct to the nearest 5 km.

(b) Explain how this could affect your decision in part (a).

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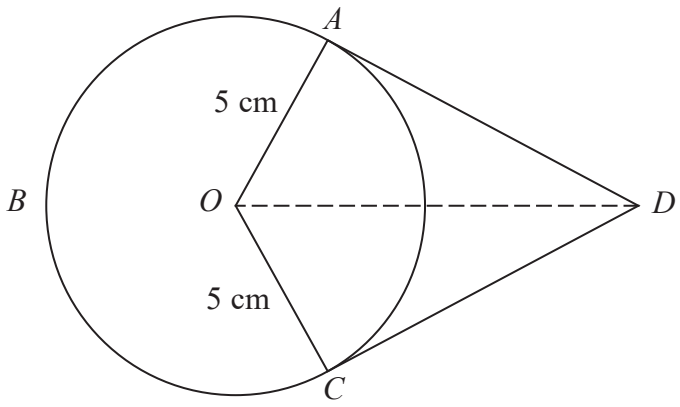
(1)

(Total for Question 1 is 5 marks)

22



A, *B* and *C* are points on a circle of radius 5 cm, centre *O*.
DA and *DC* are tangents to the circle.
DO = 9 cm

Work out the length of arc *ABC*.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 2 is 5 marks)

33 Solve $2x^2 + 3x - 2 > 0$

.....

(Total for Question 3 is 3 marks)

4 The equation of a curve is $y = a^x$

A is the point where the curve intersects the y-axis.

(a) State the coordinates of A.

(..... , ...)

(1)

The equation of circle **C** is $x^2 + y^2 = 16$

The circle **C** is translated by the vector $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$ to give circle **B**.

(b) Draw a sketch of circle **B**.

Label with coordinates
the centre of circle **B**
and any points of intersection with the x-axis.

(3)

(Total for Question 4 is 4 marks)

5 (a) Show that $(2x + 1)(x + 3)(3x + 7)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

(3)

(b) Solve $(1 - x)^2 < \frac{9}{25}$

.....

(3)

(Total for Question 5 is 6 marks)

6 $D = \dfrac{u^2}{2a}$

u = 26.2 correct to 3 significant figures

a = 4.3 correct to 2 significant figures

(a) Calculate the upper bound for the value of D.
Give your answer correct to 6 significant figures.
You must show all your working.

.....

(3)

The lower bound for the value of D is 78.6003 correct to 6 significant figures.

(b) By considering bounds, write down the value of D to a suitable degree of accuracy.
You must give a reason for your answer.

.....

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(2)

(Total for Question 6 is 5 marks)

7 Solve algebraically the simultaneous equations

$$x^2 - 4y^2 = 9$$
$$3x + 4y = 7$$

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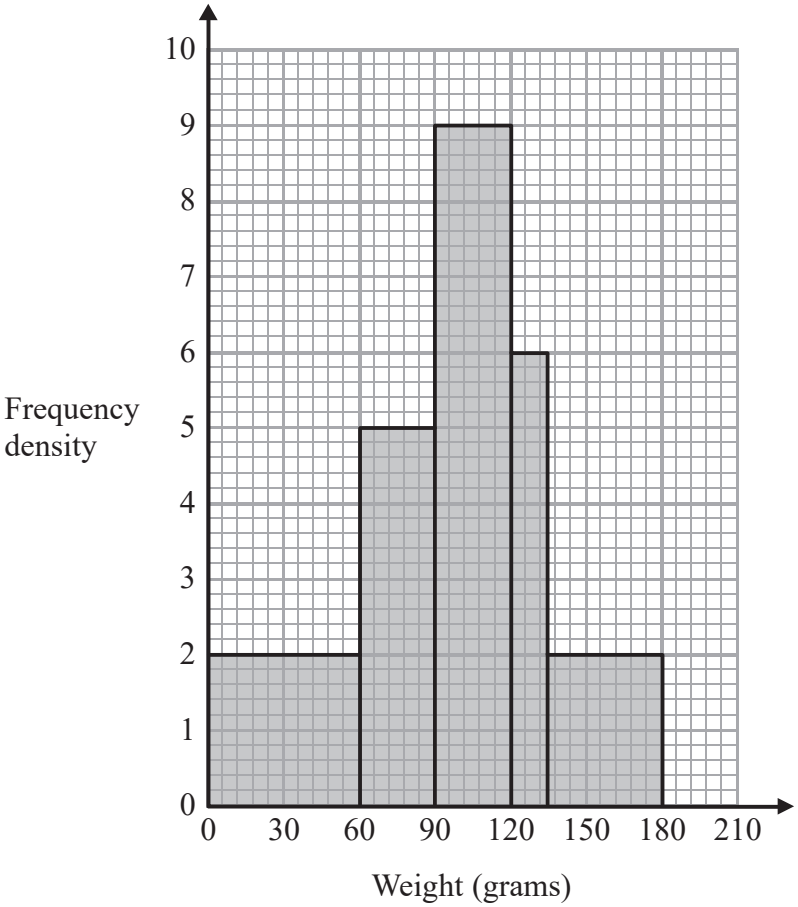
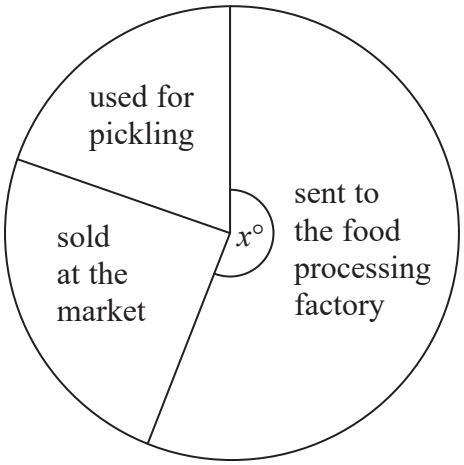
(Total for Question 7 is 5 marks)

8 The histogram gives information about the distribution of the weights of some onions grown by a farmer.



Onions less than 60 grams in weight are used for pickling.
Onions greater than 120 grams in weight are sold at the market.
The rest of the onions are sent to a food processing factory.

A pie chart is drawn using the information opposite to show what the farmer does with the onions he grows.



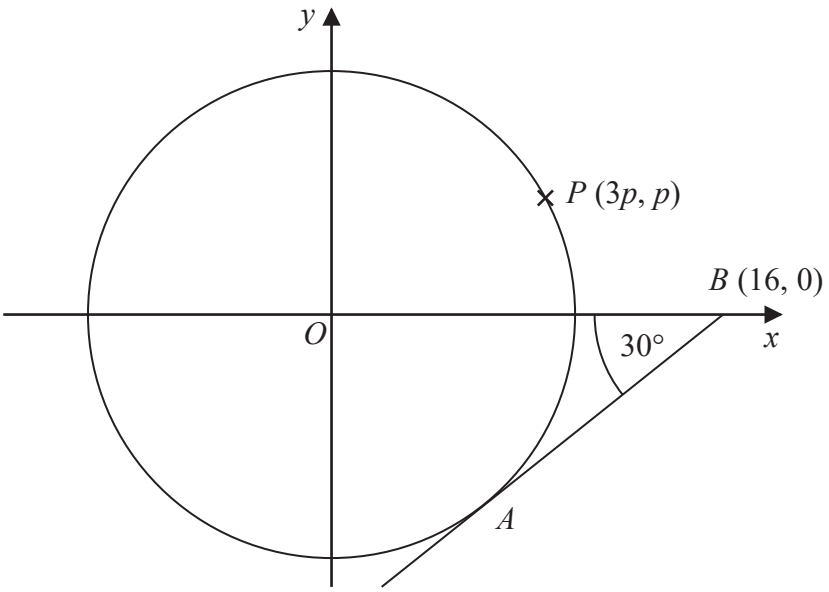
The angle of the sector for the onions sent to the food processing factory is $x°$.

Work out the value of x.

$x =$ .....

(Total for Question 8 is 4 marks)

9 The diagram shows a circle, centre O.



AB is the tangent to the circle at the point A.
Angle $OBA = 30°$

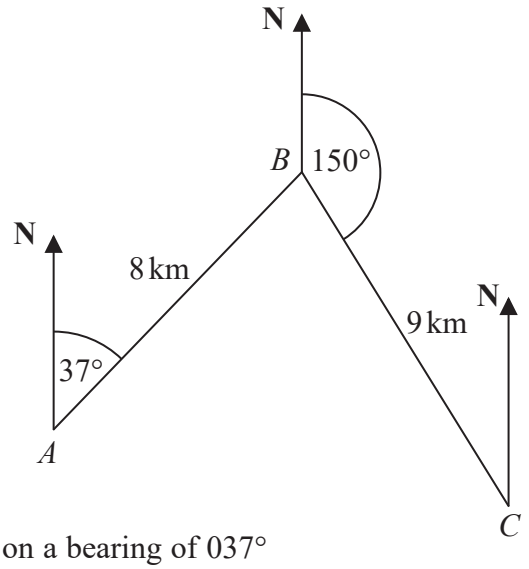
Point B has coordinates (16, 0)
Point P has coordinates $(3p, p)$

Find the value of p.
Give your answer correct to 1 decimal place.
You must show all your working.

$p =$ .....

(Total for Question 9 is 4 marks)

10 The diagram shows the positions of three towns, Acton (A), Barston (B) and Chorlton (C).



Barston is 8 km from Acton on a bearing of 037°
Chorlton is 9 km from Barston on a bearing of 150°

Find the bearing of Chorlton from Acton.
Give your answer correct to 1 decimal place.
You must show all your working.

.....°

(Total for Question 10 is 5 marks)