GCSE Grade 8/9

Maths Booklet 1

Paper 2H
Calculator

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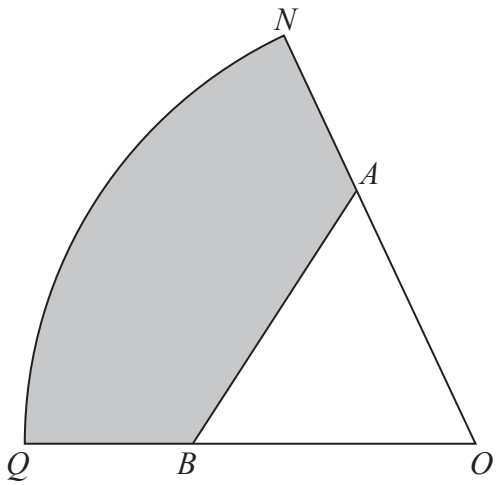
1



ONQ is a sector of a circle with centre *O* and radius 11 cm.

A is the point on *ON* and *B* is the point on *OQ* such that *AOB* is an equilateral triangle of side 7 cm.

Calculate the area of the shaded region as a percentage of the area of the sector *ONQ*.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 1 is 5 marks)

2 $16^{\frac{1}{5}} \times 2^x = 8^{\frac{3}{4}}$

Work out the exact value of x.

.....

(Total for Question 2 is 3 marks)

3 $2 - \frac{x+2}{x-3} - \frac{x-6}{x+3}$ can be written as a single fraction in the form $\frac{ax+b}{x^2-9}$ where a and b are integers.

Work out the value of a and the value of b.

$a =$ .....

$b =$ .....

(Total for Question 3 is 4 marks)

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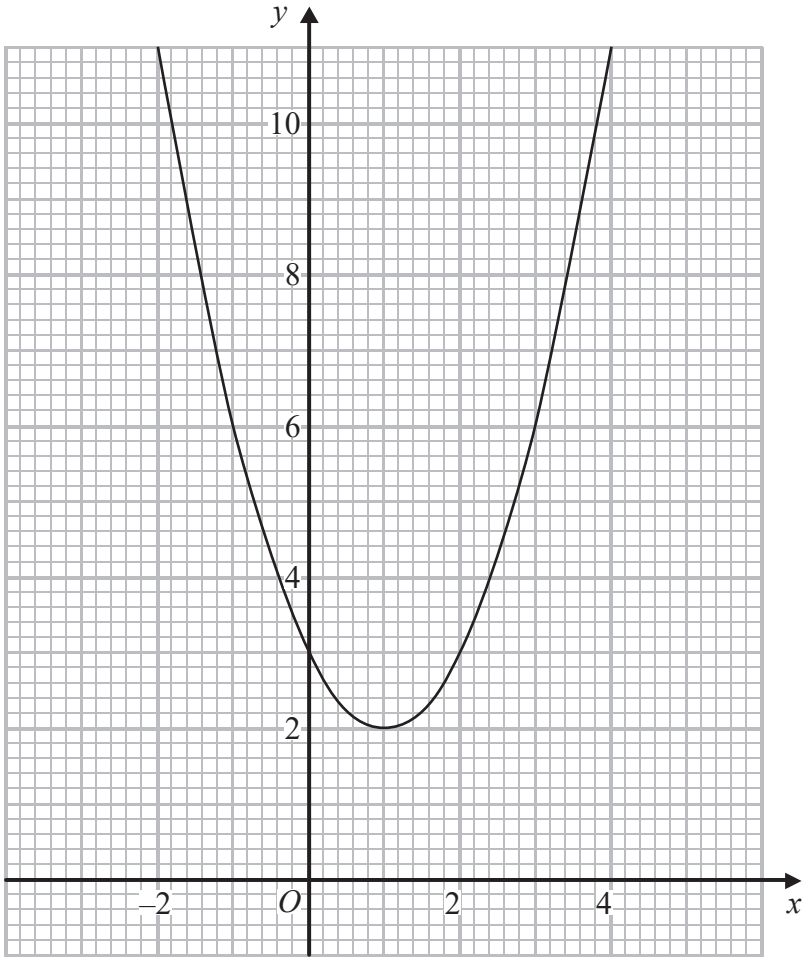
4 The diagram shows part of the graph of $y = x^2 - 2x + 3$



(a) By drawing a suitable straight line, use your graph to find estimates for the solutions of $x^2 - 3x - 1 = 0$

.....

(2)

P is the point on the graph of $y = x^2 - 2x + 3$ where $x = 2$

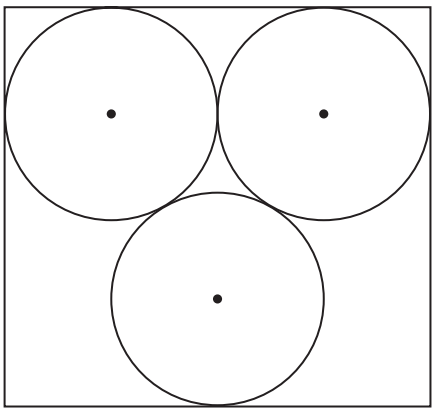
(b) Calculate an estimate for the gradient of the graph at the point P.

.....

(3)

(Total for Question 4 is 5 marks)

5 The diagram shows 3 identical circles inside a rectangle.
Each circle touches the other two circles and the sides of the rectangle, as shown in the diagram.



The radius of each circle is 24 mm.

Work out the area of the rectangle.
Give your answer correct to 3 significant figures.

..... mm^2

(Total for Question 5 is 4 marks)

6 Here are the first five terms of a sequence.

4 11 22 37 56

Find an expression, in terms of n, for the nth term of this sequence.

.....

(Total for Question 6 is 3 marks)

7 **L** is the circle with equation $x^2 + y^2 = 4$

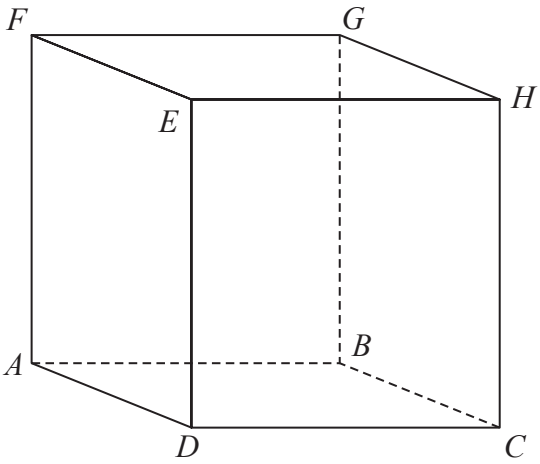
$P\left(\frac{3}{2}, \frac{\sqrt{7}}{2}\right)$ is a point on **L**.

Find an equation of the tangent to **L** at the point P.

.....

(Total for Question 7 is 3 marks)

8 *ABCDEFGH* is a cuboid.



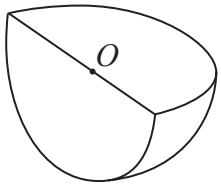
$AB = 7.3\,\text{cm}$
$CH = 8.1\,\text{cm}$
Angle $BCA = 48°$

Find the size of the angle between AH and the plane $ABCD$.
Give your answer correct to 1 decimal place.

.....°

(Total for Question 8 is 4 marks)

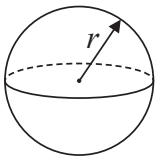
9 Shape **S** is one quarter of a solid sphere, centre O.



Shape **S**

Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$



The volume of **S** is 576π cm^3

Find the surface area of **S**.
Give your answer correct to 3 significant figures.
You must show your working.

..... cm^2

(Total for Question 9 is 5 marks)