



# **GCSE MATHEMATICS**

S21-C300

## **Non-Calculator Assessment Resource K**

Higher Tier

## Formula list

### *Area and volume formulae*

Where  $r$  is the radius of the sphere or cone,  $l$  is the slant height of a cone and  $h$  is the perpendicular height of a cone:

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

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

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

### *Kinematics formulae*

Where  $a$  is constant acceleration,  $u$  is initial velocity,  $v$  is final velocity,  $s$  is displacement from the position when  $t = 0$  and  $t$  is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

1. (a) Solve  $19 - 4x = 11$ . [2]

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(b) Solve  $\frac{2x-3}{4} = 3x$ . [3]

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(c) (i) Solve  $3x + 2 > 5$ . [2]

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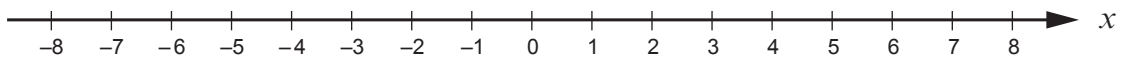
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(ii) Represent your answer to part (c)(i) on the number line below. [1]



2. The table shows some of the values of  $y = x^2 + x - 1$  for  $-2 \leq x \leq 1$ .

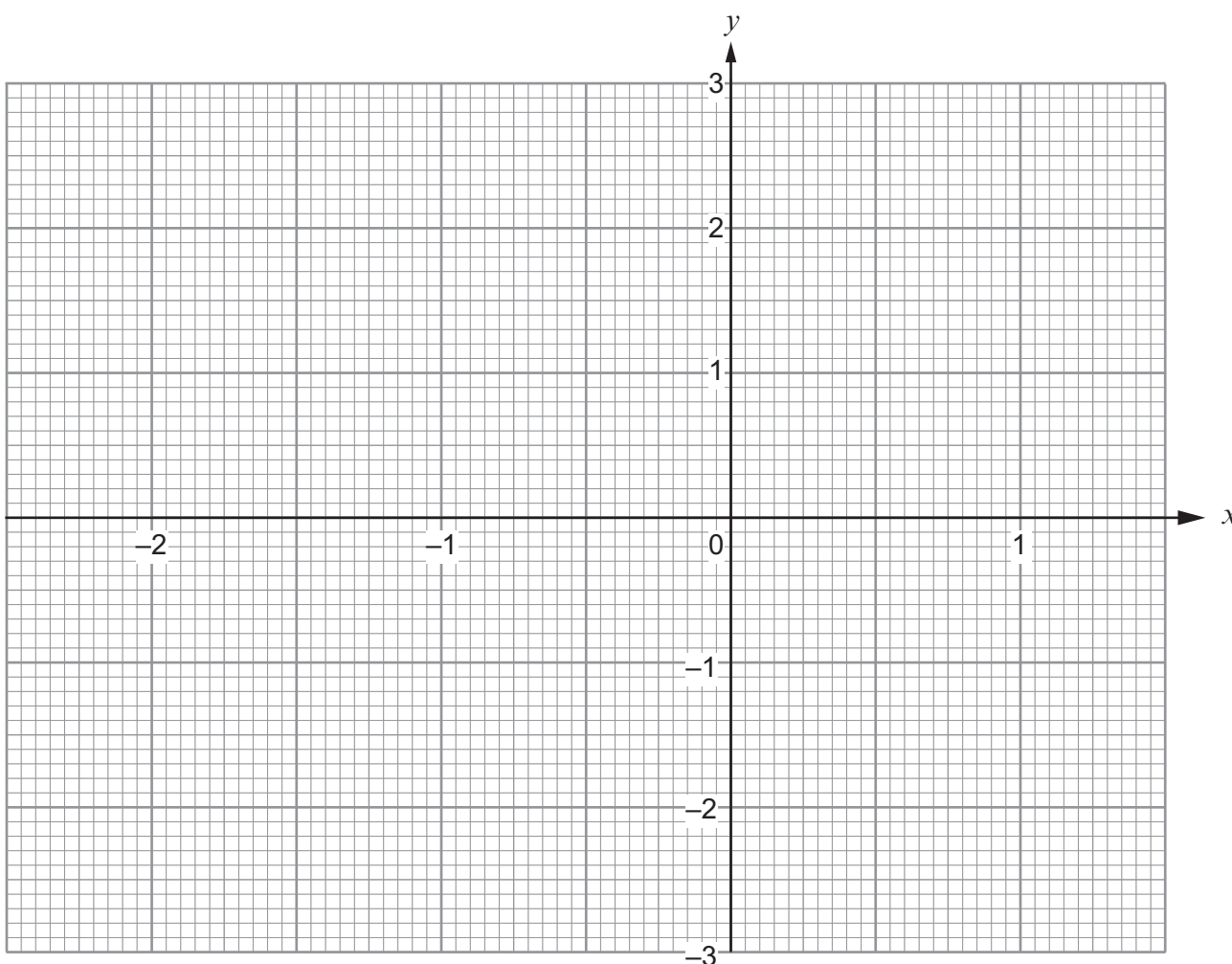
$x$	-2	-1	-0.5	0	1
$y = x^2 + x - 1$		-1	-1.25		

(a) Complete the table above. [2]

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(b) On the graph paper below, draw the graph of  $y = x^2 + x - 1$  for  $-2 \leq x \leq 1$ . [2]



(c) State the equation of the line of symmetry of the curve  $y = x^2 + x - 1$ . [1]

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(d) Use your graph to solve  $x^2 + x - 1 = 0$ . [2]

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4. (a) Find the value of each of the following.

(i)  $0.8^{-1}$  [1]

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(ii)  $625^{\frac{1}{4}}$  [1]

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(iii)  $\left(\frac{1}{64}\right)^{\frac{2}{3}}$  [2]

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(b) Write  $81 \times \frac{3^0}{27^2}$  as a power of 3. [2]

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(c) Simplify  $\frac{(5ab^4)^3}{a^2}$ . [3]

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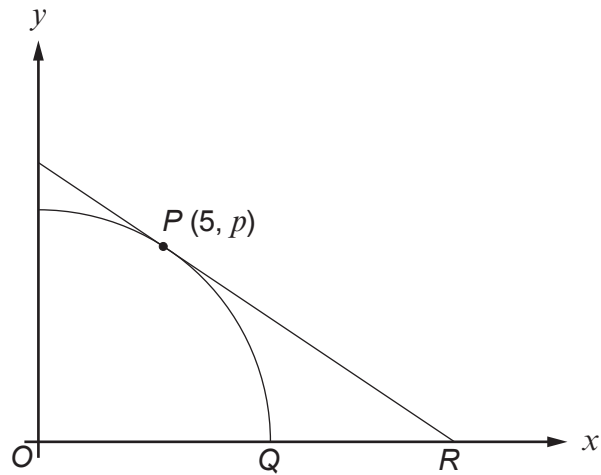


Diagram not drawn to scale

The diagram shows an arc of a circle with centre  $O$  and equation  $x^2 + y^2 = 50$ .  
 $P(5, p)$  lies on the circle.  
The arc meets the  $x$ -axis at  $Q$ .  
The tangent to the circle at  $P$  meets the  $x$ -axis at  $R$ .

- (a) Find the value of  $p$ , the  $y$ -coordinate of  $P$ . [1]

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- (b) Show that the equation of the tangent to the circle at  $P$  is  $y = mx + 10$ , where  $m$  is a constant. [4]

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- (c) Find the exact length of  $QR$ . [2]

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