Quadratic and Other Graphs

GCSE Maths · Practice Questions

20 questions · 62 marks total

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Section A · Foundation

Questions 1–3 are the most straightforward; they get harder as you go on. Question 10 is the most challenging.

1 **[1 mark]**

What is the name of the shape of the graph of $y = x^2$?

2 **[2 marks]**

Complete the table of values for $y = x^2$

x	−2	−1	0	1	2
y					

3 **[2 marks]**

Work out the values of y for $y = x^2 - 3$ when

(a) $x = -2$ (b) $x = 0$ (c) $x = 3$

4 **[2 marks]**

Write down the coordinates of the points where the curve $y = x^2 - 4$ crosses the x-axis.

5 **[3 marks]**

A curve has equation $y = x^2 - 2x - 3$

(a) Factorise $x^2 - 2x - 3$

(b) Write down where the curve crosses the x-axis.

(c) Write down where the curve crosses the y-axis.

6 [3 marks]

The curve $y = x^2 - 6x + 8$ crosses the x-axis at $x = 2$ and $x = 4$.

(a) Write down the equation of the line of symmetry.

(b) Work out the coordinates of the turning point.

7 [3 marks]

Describe the shape of the graph of each equation.

(a) $y = x^3$

(b) $y = \frac{1}{x}$

(c) $y = 2^x$

8 [3 marks]

(a) Complete the table of values for $y = x^2 + 2x$

x	−3	−2	−1	0	1
y					

(b) Write down the coordinates of the minimum point.

9 [4 marks]

Use an algebraic method to find the solutions of $x^2 - 2x - 4 = 0$, correct to 1 decimal place.

These are the values where the curve $y = x^2 - 2x - 4$ crosses the x-axis.

10 [4 marks]

A curve has equation $y = x^3 - 4x$

(a) Factorise $x^3 - 4x$ fully.

(b) Write down the three values of x where the curve meets the x-axis.

(c) Work out y when $x = 3$

Section B · Higher

Higher-tier style. Again, questions 1–3 are the gentlest and question 10 is the hardest.

1 [2 marks]

Write down the coordinates of the turning point of $y = (x - 2)^2 + 5$

2 [2 marks]

How many times does the curve $y = x^3 - 3x$ cross the x-axis? Show your working.

3 [3 marks]

Find the coordinates of the turning point of $y = x^2 + 4x - 1$ by completing the square.

4 [3 marks]

A circle has equation $x^2 + y^2 = 49$

(a) Write down the centre and the radius.

(b) Does the point (5, 5) lie inside, on, or outside the circle? Show your working.

5 [4 marks]

The point P(3, 4) lies on the circle $x^2 + y^2 = 25$

Find the equation of the tangent to the circle at P.

6 [4 marks]

The graph of $y = f(x)$ passes through the point (2, 5).

Write down the coordinates of the corresponding point on each of these graphs.

(a) $y = f(x) - 3$ (b) $y = f(x + 1)$

(c) $y = 2f(x)$ (d) $y = f(-x)$

7 [4 marks]

A curve has equation $y = 3 \times 2^x$

(a) Work out y when $x = 0$

(b) Work out y when $x = 4$

(c) Work out y when $x = -1$

(d) Explain why the curve never touches the x-axis.

8 [4 marks]

A curve has equation $y = \frac{12}{x}$

(a) Complete the table of values.

x	1	2	3	4	6
y					

(b) Explain why $x = 0$ cannot be used.

(c) Describe the symmetry of the full graph.

9 **[4 marks]**

The curve $y = x^2 + 1$ passes through the points (1.9, 4.61) and (2.1, 5.41).

(a) Use these two points to estimate the gradient of the curve at $x = 2$

(b) Explain why this is only an estimate.

10 **[5 marks]**

The graph of $y = x^2 - 3x$ has been drawn.

(a) Explain which straight line should be drawn on the same axes to solve $x^2 - 3x = 2x - 4$

(b) Solve the equation algebraically.

(c) Write down the coordinates of the two points where the curve and the line would cross.