

Foundation GCSE: Quadratic Graphs

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. Complete the table of values for $y = x^2$ when $x = -3$.
2. Find the value of y for the quadratic graph $y = x^2 - 3$ when $x = 4$.
3. State the coordinates of the turning point (vertex) of the graph $y = x^2$.
4. Complete the table for $y = x^2 + 2x$ when $x = -1$.
5. Find the y -intercept of the quadratic graph $y = x^2 - 5x + 6$.
6. Find the x -intercepts (roots) of the graph $y = x^2 - 9$.
7. Complete the table for $y = 2x^2$ when $x = -3$.
8. State whether the parabola $y = -x^2 + 4$ has a maximum or a minimum turning point.
9. Find the y -intercept of the graph $y = 3x^2 + 2x - 4$.
10. Find the x -intercepts of the graph $y = x^2 - 5x + 6$.
11. Determine the coordinates of the turning point of $y = (x - 2)^2 + 3$.
12. Find the value of y on the graph $y = x^2 - 2x - 8$ when $x = -2$.
13. Find the x -intercepts of the graph $y = x^2 + 7x + 10$.
14. A quadratic graph has equation $y = x^2 - 4x + 3$. Find the value of y when $x = 1$.
15. State the line of symmetry for the parabola $y = x^2 - 6x + 5$.
16. Find the minimum value of y for the quadratic function $y = x^2 - 4x + 7$.
17. Find the x -intercepts of the graph $y = 2x^2 - 8$.
18. Determine the coordinates of the turning point of $y = (x + 3)^2 - 4$.
19. If a quadratic graph passes through $(0, 5)$, $(1, 6)$, and $(-1, 6)$ and has form $y = x^2 + c$, find c .
20. Find the coordinates of the intersection points of $y = x^2$ and the line $y = 4$.

Answers & Worked Solutions

1. $9 - (-3)^2 = 9$.
2. $13 - 4^2 - 3 = 16 - 3 = 13$.
3. $(0, 0)$ – The origin is the vertex of $y = x^2$.
4. $-1 - (-1)^2 + 2(-1) = 1 - 2 = -1$.
5. $(0, 6)$ – When $x = 0$, $y = 6$.
6. $x = 3$ and $x = -3$ – Set $x^2 - 9 = 0 \implies x^2 = 9$.
7. $18 - 2(-3)^2 = 2(9) = 18$.
8. Maximum point – Negative coefficient of x^2 makes an inverted U-shape.
9. $(0, -4)$ – Constant term gives the y -intercept.
10. $x = 2$ and $x = 3$ – Factorise $(x - 2)(x - 3) = 0$.
11. $(2, 3)$ – Vertex form $(x - p)^2 + q$ gives turning point (p, q) .
12. $0 - (-2)^2 - 2(-2) - 8 = 4 + 4 - 8 = 0$.
13. $x = -2$ and $x = -5$ – Factorise $(x + 2)(x + 5) = 0$.
14. $0 - 1^2 - 4(1) + 3 = 1 - 4 + 3 = 0$.
15. $x = 3$ – Line of symmetry is $x = -\frac{b}{2a} = -\frac{-6}{2(1)} = 3$.
16. 3 – Complete the square: $(x - 2)^2 + 3$, minimum value is 3 when $x = 2$.
17. $x = 2$ and $x = -2$ – $2x^2 = 8 \implies x^2 = 4$.
18. $(-3, -4)$ – Vertex form gives $(-3, -4)$.
19. 5 – When $x = 0$, $y = 5$, so $c = 5$.
20. $(-2, 4)$ and $(2, 4)$ – $x^2 = 4 \implies x = \pm 2$.