

Foundation GCSE: Harder 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 the cubic graph $y = x^3$ when $x = -2$.
2. Find the value of y on the reciprocal graph $y = \frac{6}{x}$ when $x = 2$.
3. Identify the standard shape of the graph $y = x^3$ (e.g., snake-like, U-shape, L-shape).
4. Find the value of y on the exponential graph $y = 2^x$ when $x = 3$.
5. Complete the table for $y = x^3 - 1$ when $x = 3$.
6. Find the value of y on the reciprocal graph $y = \frac{12}{x}$ when $x = -4$.
7. State whether the graph $y = 3^x$ increases or decreases as x increases.
8. Find the value of y on the exponential graph $y = 5^x$ when $x = 0$.
9. Complete the table for $y = x^3 + 2x$ when $x = 2$.
10. Find the value of y on the reciprocal graph $y = \frac{10}{x}$ when $x = 5$.
11. Identify the asymptotes of the reciprocal graph $y = \frac{1}{x}$.
12. Find the value of y on the exponential graph $y = 3^x$ when $x = 2$.
13. Evaluate $y = x^3 - 2x^2 + x$ when $x = 2$.
14. Find the value of x for which $\frac{8}{x} = 2$.
15. Find the value of y on the graph $y = x^3 - 5$ when $x = 3$.
16. Evaluate $y = 2^x + 3^x$ when $x = 2$.
17. Find the value of x for which $2^x = 32$.
18. Find the value of y on the graph $y = \frac{20}{x} + 2$ when $x = 4$.
19. Evaluate $y = x^3 - 4x$ when $x = -3$.
20. Find the coordinates of the point where $y = x^3$ intersects $y = x$.

Answers & Worked Solutions

1. $-8 - (-2)^3 = -8.$
2. $3 - \frac{6}{2} = 3.$
3. S-shape (or snake-like curve passing through origin).
4. $8 - 2^3 = 8.$
5. $26 - 3^3 - 1 = 27 - 1 = 26.$
6. $-3 - \frac{12}{-4} = -3.$
7. Increases – Exponential growth function.
8. 1 – Any non-zero number to the power of 0 is 1.
9. $12 - 2^3 + 2(2) = 8 + 4 = 12.$
10. $2 - \frac{10}{5} = 2.$
11. $x = 0$ (y -axis) and $y = 0$ (x -axis).
12. $9 - 3^2 = 9.$
13. $2 - 2^3 - 2(2^2) + 2 = 8 - 8 + 2 = 2.$
14. $4 - \frac{8}{2} = 4.$
15. $22 - 3^3 - 5 = 27 - 5 = 22.$
16. $13 - 2^2 + 3^2 = 4 + 9 = 13.$
17. $5 - 2^5 = 32.$
18. $7 - \frac{20}{4} + 2 = 5 + 2 = 7.$
19. $-15 - (-3)^3 - 4(-3) = -27 + 12 = -15.$
20. $(-1, -1), (0, 0),$ and $(1, 1)$ – Solve $x^3 = x \implies x(x^2 - 1) = 0.$