

Graphs of Logarithms

For each function:

- Determine **growth or decay** (based on base)
- Find the x-intercept by setting $y = 0$ and solving for x .
- Find the upward behavior. Consider what happens as $y \rightarrow \infty$. Solve for x .
- Find the downward behavior. Consider what happens as $y \rightarrow -\infty$. Solve for x .
- Sketch the function

Part A — Mild (parent functions & simple reflections)

1. $y = \log_2(x)$
2. $y = \log_3(x)$
3. $y = \log_{0.5}(x)$
4. $y = -\log_2(x)$
5. $y = -\log_{0.25}(x)$

Part B — Vertical shifts + reflections

6. $y = \log_2(x) + 3$
7. $y = -2\log_2(x) + 1$
8. $y = \log_{0.5}(x) - 4$
9. $y = 4\log_5(x) - 5$
10. $y = \log_{0.25}(x) + 2$
11. $y = -\log_{0.5}(x) - 3$
12. $y = -3\log_2(x) - 4$

Part C — Horizontal shifts (key concept jump)

13. $y = \log_2(x - 2)$
14. $y = -\log_2(x + 1)$
15. $y = \log_{0.5}(x - 3)$
16. $y = -\log_{0.5}(x + 2)$
17. $y = 4\log_{0.5}(x - 2) + 6$
18. $y = 3\log_2(x - 1) + 5$

Part D — Spicy (transformations + coefficients inside)

19. $y = \log_2(3 - x) + 4$
20. $y = -\log_2(3 - x) + 1$
21. $y = \log_5(2 - 2x) - 1$
22. $y = -3\log_5(2 - 2x) - 1$
23. $y = -\frac{5}{6}\log_{\frac{2}{5}}(3 - 0.5x) + 2$