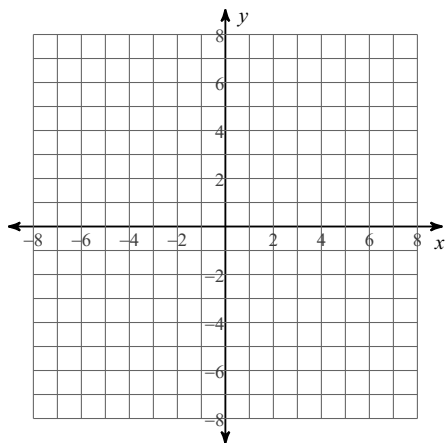


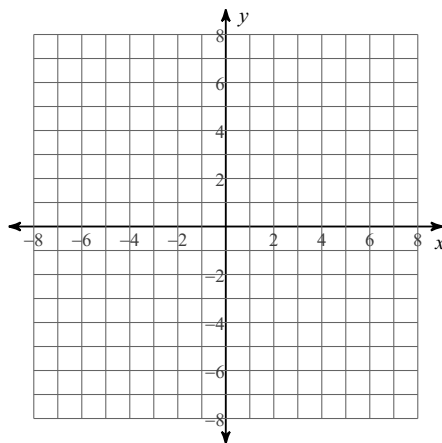
5-4 Graphing Logarithms

State the transformations and asymptote of each logarithmic function. Then, sketch the graph.

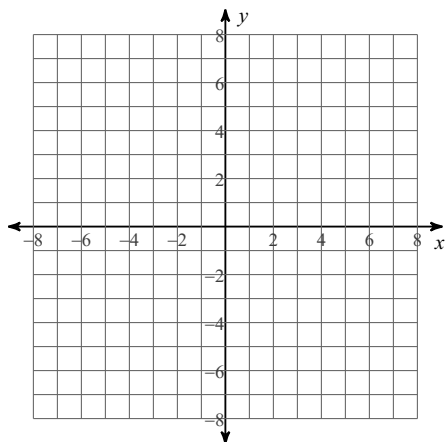
1) $f(x) = \log_6(x + 3) - 1$



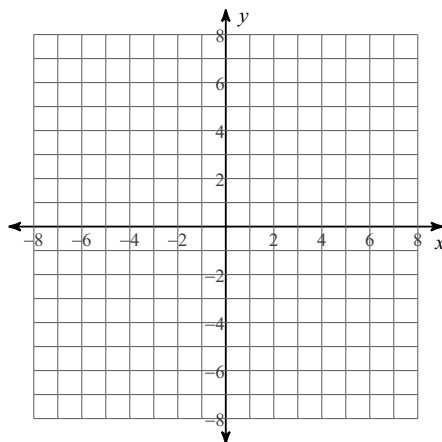
2) $f(x) = \log_3(x - 1) + 2$



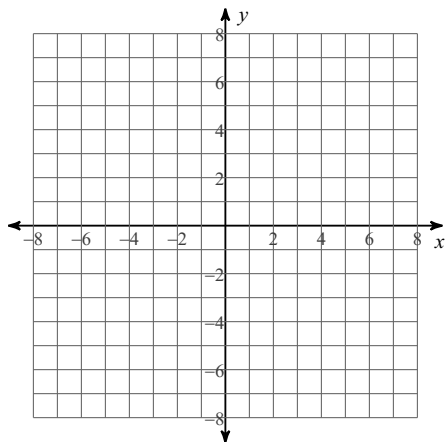
3) $f(x) = \log_2(x + 3) + 3$



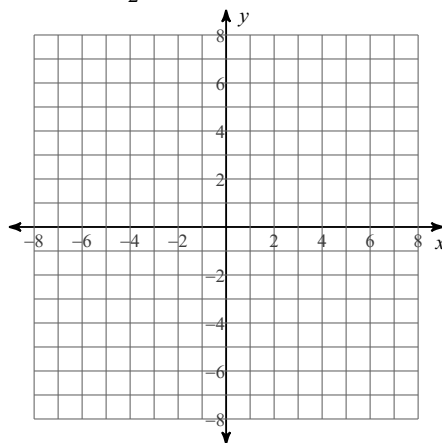
4) $f(x) = \log_4(x + 4) + 1$



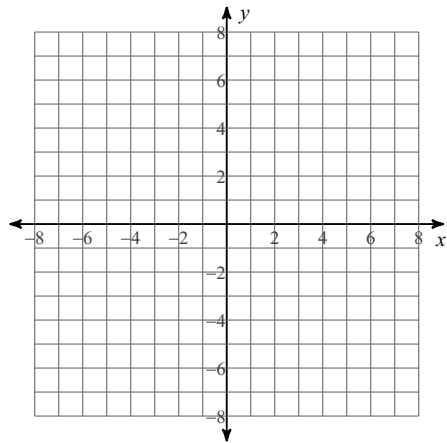
5) $f(x) = \log_6(x - 1) + 1$



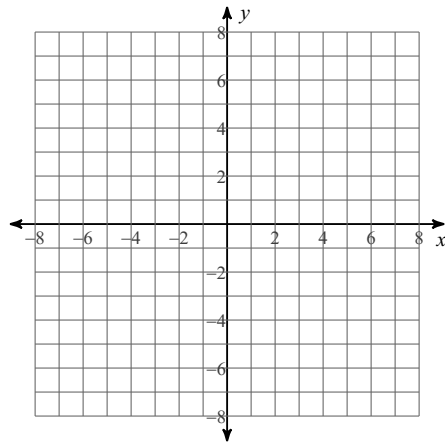
6) $y = -\log_2(x - 2)$



7) $y = 2\log_3 x + 1$



8) $y = -2\log_4 (x - 1)$



Expand each logarithm.

9) $\log_3 \frac{x^6}{y^4}$

10) $\ln (a \cdot b \cdot c^2)$

Condense each expression to a single logarithm.

11) $4\log_7 x + 12\log_7 y$

12) $2\log_3 x - 4\log_3 y$

Solve each equation.

13) $\log_2 (5 - 3v) = \log_2 (3v - 1)$

14) $2\log_6 10x = 4$