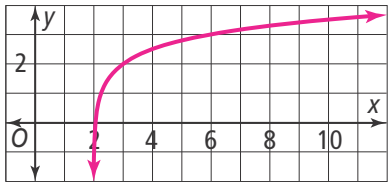
6-4 Additional Practice

Logarithmic Functions

Graph the function below and identify the domain, range, *x*-intercept, *y*-intercept, asymptote, and end behavior. Compare the graph to the parent function.

1. $f(x) = \log_4(x - 2) + 2$



domain: $\{x|x > 2\}$

range: all real numbers

x-intercept: $2\frac{1}{16}$

y-intercept: none

asymptote: $x = 2$

end behavior: As $x \to 2$, $y \to -\infty$

As $x \to \infty$, $y \to \infty$

The graph is shifted right 2 units and up 2 units.

Find the inverse of each function.

2. $f(x) = 6 \log_5(2x - 6)$

$f^{-1}(x) = \frac{1}{2}\left(5^{\frac{x}{6}} + 6\right)$

3. $f(x) = 2 \log_{0.5}(-5x) + 4$

$f^{-1}(x) = -\frac{1}{5}\left(0.5^{\frac{x-4}{2}}\right)$

4. $f(x) = \ln 3^x - 2$

$f^{-1}(x) = \frac{e^{x+2}}{3}$

5. A hurricane center uses the function $s = 95 \log d + 75$ to relate the wind speed in miles per hour s and distance in miles d a hurricane travels. How many miles will the hurricane travel with a wind speed of approximately 320 mph?

$320 = 95 \log d + 75$ $\quad$ $d \approx 10^{2.58} \approx 380$ mi

6. Which company's profit shows a greater average rate of change between 2010 and 2015?
Company A: $1.5 million profit in 2010; after 5 years, grew exponentially to $2.5 million.
Company B: profit, in million of dollars, modeled by $P(B) = 1.3(1.15)^x$, where x is the number of years after the end of 2010.

Company A: 0.2 million per year; Company B: about 0.26 million per year; Company B has greater average rate of change.