

Logarithmic Functions and Their Graphs (3.3)

Changing Between Logarithmic and Exponential Form

If $x > 0$ and $0 < b \neq 1$ then

$$\log_b x = y \text{ if and only if } b^y = x$$

Evaluating Logarithmic and Exponential Expressions

a. $\log_2 16 =$

b. $\log_3 243 =$

c. $\log_7 \sqrt{7} =$

d. $\log_{11} 1 =$

e. $2^{\log_2 8} =$

f. $3^{\log_3 9} =$

Common Logarithms \rightarrow Base 10

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$$y = \log x \text{ if and only if } 10^y = x$$

Evaluating Common Logarithms

a. $\log 1000 =$

b. $\log \sqrt[3]{10} =$

c. $\log 1/100 =$

d. $10^{\log 7} =$

e. $\log 56.4 =$

f. $\log 0.39 =$

Solving Simple Logarithmic Equations

Solve each equation by changing it to exponential form.

a. $\log x = 5$

b. $\log_3 x = 4$

c. $\log_5 x = 2$

Natural Logarithms → Base e

$$y = \log_e x = \ln x \quad \text{if and only if } e^y = x$$

Evaluating Natural Logarithms

a. $\ln \sqrt{e} =$

b. $\ln 1 =$

c. $\ln e =$

d. $\ln e^7 =$

e. $e^{\ln 5} =$

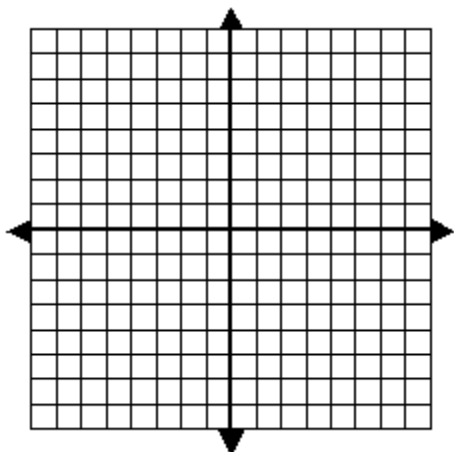
f. $\ln 31.2 =$

g. $\ln 0.93 =$

Graphs of Logarithmic Functions

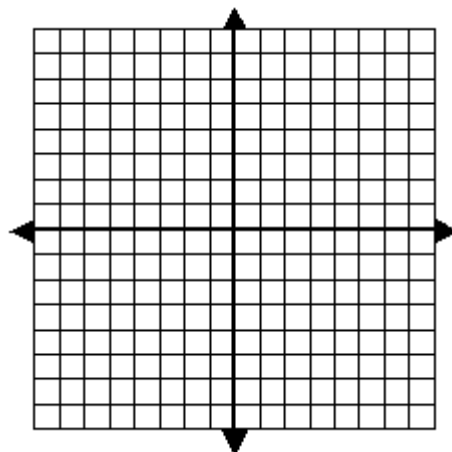
$$f(x) = e^x$$

$$f^{-1}(x) =$$



$$f(x) = 10^x$$

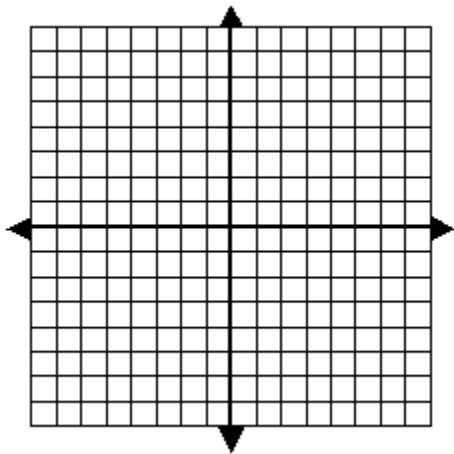
$$f^{-1}(x) =$$



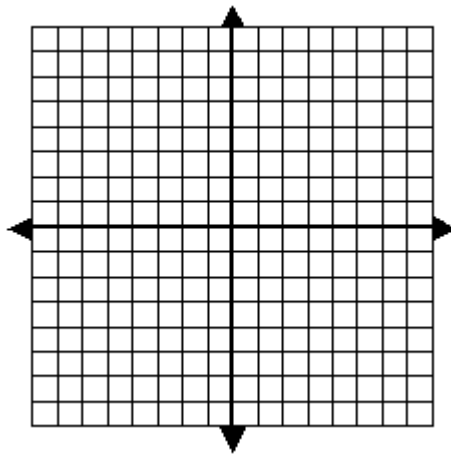
Transforming Logarithmic Graphs

Describe how to transform the graph of $y = \ln x$ or $y = \log x$ into the graph of the given function.

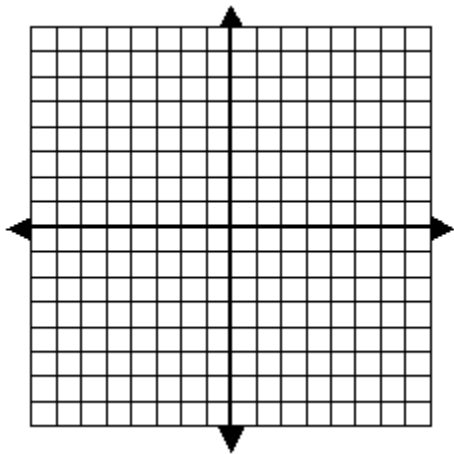
a. $g(x) = \ln(x + 3)$



b. $f(x) = \ln(x - 2)$



c. $h(x) = 2 \log x$



d. $g(x) = -2 + \log x$

