

126

Inverse of Natural Log (\ln and e)Log Form: $y = \ln x$ What is the inverse of $y = \ln x$?

Switch x and y

$$x = \ln y$$

Write as exponent
"Exponentiate"

$$e^x = e^{\ln y}$$

Remember:
 \ln could also be
written as \log_e

Solve for y

$$e^x = y$$

$$y = e^x$$

$$\cancel{e^{\log_e y}}$$

Ex1: Find the inverse of $y = e^{x-2}$

$$x = e^{y-2}$$

$$\ln x = \ln e^{y-2}$$

$$\ln x = y - 2$$

$$\ln x + 2 = y$$

$$\rightarrow y = 2 + \ln x$$

Ex2: Find the inverse of $y = \ln(x-4) + 2$

$$x = \ln(y-4) + 2$$

$$x - 2 = \ln(y-4)$$

$$e^{x-2} = e^{\ln(y-4)}$$

$$e^{x-2} = y - 4$$

$$e^{x-2} + 4 = y$$

Graphs of Exponentials & Logs

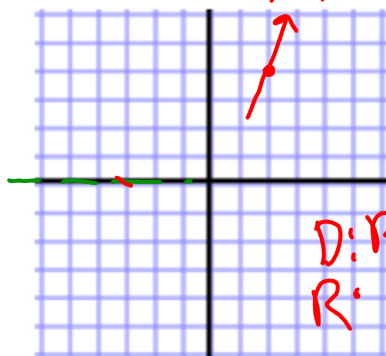
Exponential $y = b^x$

$(0, 1)$

$(1, b)$

Always on the graph.

$y = 2^x$ (0, 1)
(1, 2)



D: Real
R: $y > 0$

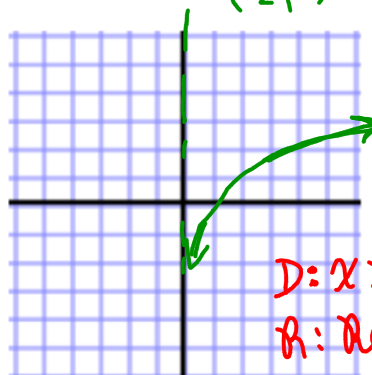
$y = \log_b x$

$(1, 0)$

$(b, 1)$

Always on the graph.

$y = \log_2 x$ (1, 0)
(2, 1)

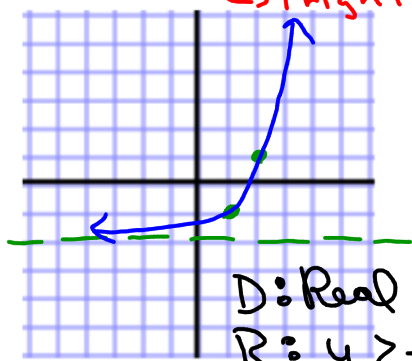


D: $x > 0$
R: Real

Exponential $y = b^{(x-h)} + k$

Log $y = \log_b (x - h) + k$

$y = 3^{(x-1)} - 2$ - 2 down
↳ 1 right



D: Real
R: $y > -2$

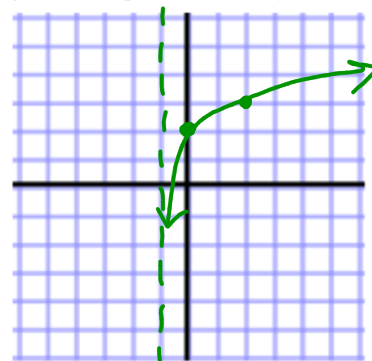
Parent:
 $y = 3^x$

$(0, 1) \rightarrow (1, -1)$

$(1, 3) \rightarrow (2, 1)$

horizontal asymptote at -2

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



Parent: $y = \log_3 x$ D: $y > -1$
R: Real

$(1, 0) \rightarrow (0, 2)$

$(3, 1) \rightarrow (2, 3)$

vertical asymptote at -1