Everything Ln(x) and e^x

Special properties of logarithms
$\ln(1)=0$
$\ln(e)=1$
$e^{\ln x}=x$

One-to-one property of logarithms
If $\ln(A)=\ln(B)$, then $A=B$

A common log has a base of 10.
A natural log has a base of e

Product Rule of Logarithms
$\ln(xy)\leftrightarrow\ln(x)+\ln(y)$
Quotient Rule of Logarithms
$\ln\left(\frac{x}{y}\right)\leftrightarrow\ln(x)-\ln(y)$
Power Rule of Logarithms
$\ln(x^y)\leftrightarrow y\ln(x)$

Definition of ln
$y=\ln(x)\leftrightarrow e^y=x$

You can't take the log of a negative number!

Expand the Following

$\ln(4\sqrt{x})$	$\ln\left(\frac{e^3}{x}\right)$
$\ln\left(\frac{9}{x^4y^7}\right)$	$\ln(x-9)$ vs. $\ln(x^2-9)$

Condense the Following

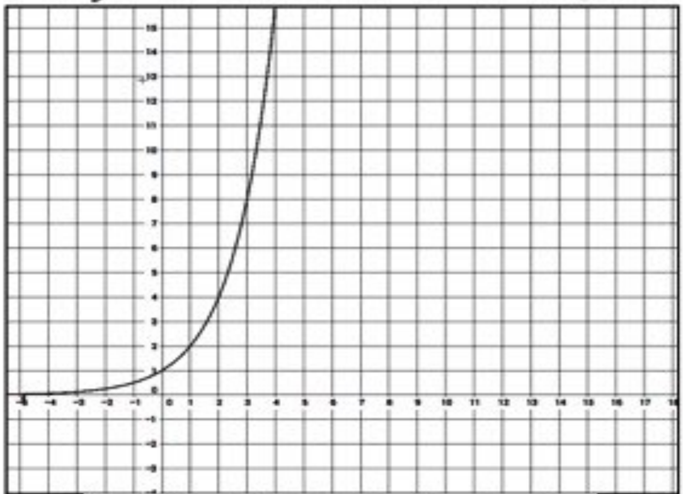
$\ln(x)-\ln(7)+3\ln(y)$	$2\ln(x)-[\ln(7)+\ln(y)]$
$\ln(6x^2+7x-5)-\ln(3x+5)$	$\frac{\ln(9)}{\ln(2)}$ $\ln\left(\frac{9}{2}\right)$

Using *ln* to solve exponential equations

solve WITHOUT using ***ln*** $2^{2x-5}=\frac{1}{16}$	solve using ***ln*** $2^{2x-5}=\frac{1}{16}$
solve using ***ln*** $e^{-x+4}-10=2$	solve using ***ln*** $-2e^{3x+4}+8=6$

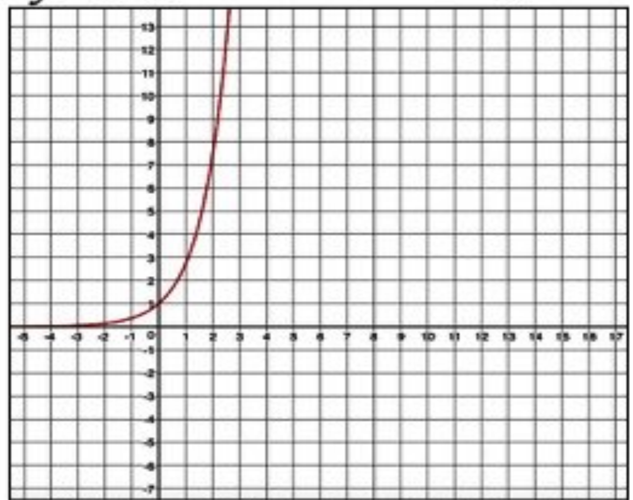
Graphing Logs in relation to their exponential inverses.

$y = 2^x$ given below $\qquad y = \log_2 x$

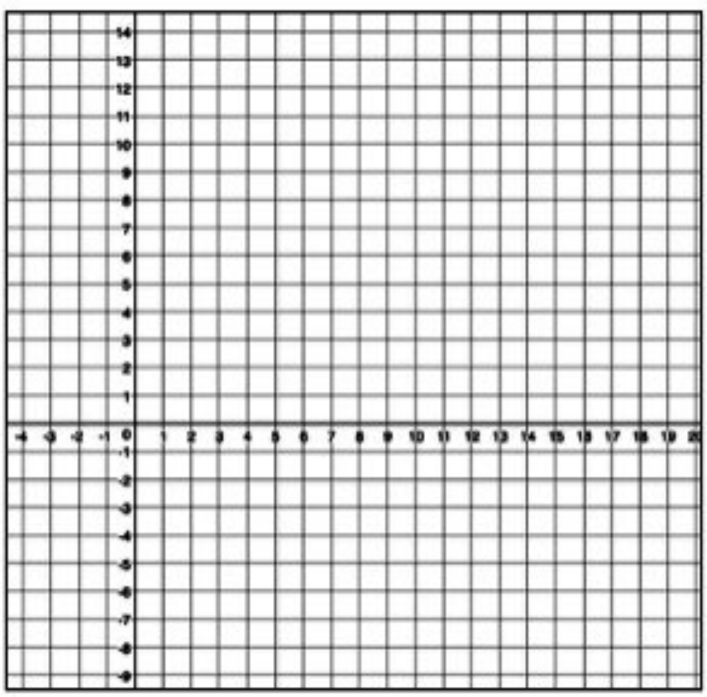


x	$y = 2^x$	$y = \log_2 x$
-2		
-1		
0		
1		
2		
3		
4		

$y = e^x$ given below $\qquad y = \ln x$



x	$y = e^x$	$y = \ln x$
-2		
-1		
0		
1		
2		
3		
4		



Graph the function below and supply all the work asked for.

$$y = 3\ln\left(x+2\right)+1$$

Parent: ____________________

Multiplier: ____________________

Shift: ____________________

X - int: ____________________

Y - int: ____________________

Asymptote: ____________________

Solving using the one-to-one property

$\ln(x)+\ln\left(\frac{x}{2}\right)=\ln(8)$	$3\ln(x)=\ln(8)-\ln(27)$

Various examples of solving ln equations

$4\ln(x)+3=10.25$ check your answers!	$\ln\left(\sqrt{x+2}\right)=2$ check your answers!
$\ln(x-2)+\ln(2x-3)=2\ln(x)$ check your answers!	$e^{\ln(3x-7)}=2$ check your answers!