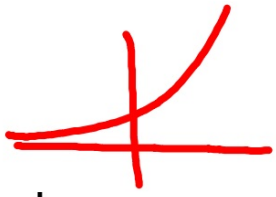
Precalc 11.6

inverse $y = e^x$



Find natural logarithms of numbers
Solve equations and inequalities using natural logs
Solve applications with natural logs

inverse function

natural logarithm

e

ln x

antiln x

$\log_e$

→ ln

$\ln_e$

Ln is exponent, antiln is the number

Evaluate each expression.

5. $\ln 0.0089$ 6. $\ln \frac{1}{0.32}$ 7. $\ln 0.21$ 8. $\text{antiln}(-0.7831)$

$e^{-4.7217}$ = 0.0089

-4.7217

$e^{-4.7217} \approx$ 0.0089

$\ln\left(\frac{1}{0.32}\right)$

$\ln(3.125)$

1.1394

$e^{1.1394}$ 3.125

$e^x = -0.7831$

NS

2 Convert $\log_6 254$ to a natural logarithm and evaluate.

$\log_6 254 = x$

$6^{3.0904} =$

$\ln 6^x = \ln 254$

$x(1.7918) = 5.5373$

$x = 3.0904$

Convert each logarithm to a natural logarithm and evaluate.

9. $\log_5 132 = x$ $5^? = 132$

10. $\log_3 64$

$\ln 5^x = \ln 132$

$x(1.6094) = 4.8828$

$x = 3.0339$

3 Solve $6.5 = -16.25 \ln x$.

$$\frac{6.5}{-16.25} = \frac{-16.25 \ln x}{-16.25}$$

$$-0.4 = \ln_e x$$

$$e^{-0.4} = x$$

$$x = 0.6703$$

4 Solve each equation or inequality by using natural logarithms.

a. $3^{2x} = 7^{(x-1)}$

$2x\,(1.0986) = (x-1)(1.9459)$

$2.1972x = 1.9459x - 1.9459$

$-1.9459x \qquad -1.9459x$

$0.2513x = -1.9459$

$x = -7.7433$

Use natural logarithms to solve each equation or inequality.

11. $18 = e^{3x}$

12. $10 = 5e^{5k}$

13. $25e^{x} < 100$

$\frac{10}{5} = \frac{5}{5}$

$\frac{25}{25} < \frac{25}{25}$

$2.8904 = 3x(1)$

$0.9635 = x$

$\ln 2 = e^{5k}$

$0.6931 = 5k(1)$

0.1386

$\ln e^{x} < \ln 4$

$x(1) < 1.386$