Natural Logarithms … Set 3

Solving Natural Log Equations

Expand each logarithm.

1) $\ln\left(\frac{8^5}{7}\right)^4$

2) $\ln\left(c\sqrt{a \cdot b}\right)$

3) $\ln\left(uv^6\right)^5$

4) $\ln\left(x \cdot y \cdot z^6\right)$

Condense each expression to a single logarithm.

5) $25\ln 5 - 5\ln 11$

6) $5\ln x + 6\ln y$

7) $\frac{\ln 5}{2} + \frac{\ln 6}{2} + \frac{\ln 7}{2}$

8) $20\ln a - 4\ln b$

Use a calculator to approximate each to the nearest thousandth.

9) $\ln 39$

10) $\ln 2.2$

11) $\ln 21$

12) $\ln 3.4$

Solve each equation.Round your final answer to the nearest thousandth.

13) $\ln(7 - p) = \ln(-5p - 1)$

14) $\ln -2x = \ln(3x + 10)$

15) $\ln 8 - \ln(x + 4) = 1$

16) $\ln(x + 1) - \ln x = 5$

Natural Logarithms … Set 3

Answers

Expand each logarithm.

1) $\ln\left(\frac{8^5}{7}\right)^4$

$20\ln 8 - 4\ln 7$

2) $\ln\left(c\sqrt{a \cdot b}\right)$

$\ln c + \frac{\ln a}{2} + \frac{\ln b}{2}$

3) $\ln\left(uv^6\right)^5$

$5\ln u + 30\ln v$

4) $\ln\left(x \cdot y \cdot z^6\right)$

$\ln x + \ln y + 6\ln z$

Condense each expression to a single logarithm.

5) $25\ln 5 - 5\ln 11$

$\ln \frac{5^{25}}{11^5}$

6) $5\ln x + 6\ln y$

$\ln\left(y^6x^5\right)$

7) $\frac{\ln 5}{2} + \frac{\ln 6}{2} + \frac{\ln 7}{2}$

$\ln \sqrt{210}$

8) $20\ln a - 4\ln b$

$\ln \frac{a^{20}}{b^4}$

Use a calculator to approximate each to the nearest thousandth.

9) $\ln 39$

3.664

10) $\ln 2.2$

0.788

11) $\ln 21$

3.045

12) $\ln 3.4$

1.224

Solve each equation.Round your final answer to the nearest thousandth.

13) $\ln(7-p) = \ln(-5p-1)$

$\{-2\}$

14) $\ln -2x = \ln(3x+10)$

$\{-2\}$

15) $\ln 8 - \ln(x+4) = 1$

$\left\{\frac{8-4e}{e}\right\}$

16) $\ln(x+1) - \ln x = 5$ $\left\{-\frac{1}{1-e^5}\right\}$

Natural Logarithms … Set 3

17) $\ln(x+8) - \ln 7 = 3$

18) $\ln 10 + \ln(5x-2) = 3$

19) $\ln(-4x-4) - \ln 3 = 3$

20) $\ln 3 + \ln(2x^2+4) = \ln 12$

21) $\ln(2x^2-2) - \ln 9 = \ln 80$

22) $\ln(-3+3n) = \ln(n^2-n)$

Solve each equation. Round your answers to the nearest thousandth.

23) $-8e^{-p} = -49$

24) $2e^{8x} = 45$

25) $e^{-4x} + 8 = 35$

26) $e^{3r} + 4 = 59$

27) $3e^{-b} = 56$

28) $-9.3e^{10b} = -67$

29) $4e^{r+5} = 29$

30) $6e^{-10r} = 63$

Answers

17) $\ln(x+8) - \ln 7 = 3$

$\{7e^3 - 8\}$

18) $\ln 10 + \ln(5x-2) = 3$

$\left\{\frac{e^3+20}{50}\right\}$

19) $\ln(-4x-4) - \ln 3 = 3$

$\left\{\frac{-3e^3-4}{4}\right\}$

20) $\ln 3 + \ln(2x^2+4) = \ln 12$

$\{0\}$

21) $\ln(2x^2-2) - \ln 9 = \ln 80$

$\{19, -19\}$

22) $\ln(-3+3n) = \ln(n^2-n)$

$\{3\}$

Solve each equation. Round your answers to the nearest thousandth.

23) $-8e^{-p} = -49$

-1.8124

24) $2e^{8x} = 45$

0.3892

25) $e^{-4x} + 8 = 35$

-0.824

26) $e^{3r} + 4 = 59$

1.3358

27) $3e^{-b} = 56$

-2.9267

28) $-9.3e^{10b} = -67$

0.1975

29) $4e^{r+5} = 29$

-3.019

30) $6e^{-10r} = 63$

-0.2351