

Solve each equation.

1) $5^{k+1} = 625$

2) $6^{2p} \cdot 6^{-2p-1} = 6^{-3p}$

3) $81 \cdot 3^{-2x} = 9$

4) $2^n \cdot 2^{2n} = 2^{2n-1}$

5) $\ln 9 + \ln 4x^2 = 4$

6) $\log 2 + \log 2x^2 = 4$

7) $\ln 2 + \ln 2x^2 = 4$

8) $\ln 8 + \ln -3x = 1$

9) $\log 4 + \log (x+5) = 2$

10) $\log -4x - \log 8 = \log 38$

11) $\log 4x - \log 4 = \log 39$

12) $\ln 2x^2 - \ln 2 = 4$

Solve each equation by factoring.

13) $11k^2 = 110 + 99k$

14) $10p^2 - 160p = -480$

15) $n^2 - 8n = 0$

16) $8x^2 = 48x$

17) $6m^2 = 42m + 180$

18) $10r^2 - 90r = -200$

19) $5n^2 - 17n = 12$

20) $3x^2 = -2x + 16$

Expand each logarithm.

21) $\log_5 \sqrt[3]{3 \cdot 7 \cdot 10}$

22) $\log_6 (8 \cdot 3^4)^4$

23) $\log_5 (u^5 v^3)$

24) $\log_4 (xy^3)^5$

Condense each expression to a single logarithm.

25) $24\log_7 11 + 6\log_7 6$

26) $2\log_7 2 - 12\log_7 3$

Rewrite each equation in exponential form.

27) $\log_p m = n$

28) $\log_x y = 12$

29) $\log_x \frac{29}{23} = y$

30) $\log_x y = -2$

Solve each equation. Remember to check for extraneous solutions.

31) $\frac{b+2}{2b^2} = \frac{3b-18}{b^2} - \frac{1}{2b^2}$

32) $\frac{1}{r} + \frac{1}{r^2} = \frac{4}{r}$

33) $\frac{6n-12}{n^2} = \frac{4n-6}{n^2} + \frac{1}{2n}$

34) $\frac{1}{2x^2} + \frac{x-1}{2x^2} = \frac{6}{x^2}$

35) Solve for x : $\frac{12.3-x}{4.5} = -0.83$

36) Solve for r : $\sqrt{45-x} = 5$

37) Solve for n : $1.96\sqrt{\frac{0.5 \cdot 0.5}{n}} < 0.03$

38) If $y = 10.2x^{0.72}$, find y when $x = 32.7$.

39) Sketch the graphs of $y = 2^x$ and $y = 3^x$ on the same set of axes. Mark and label at least three points on each of the graphs. What point(s), if any, do they have in common? Write a description comparing the two graphs.

40) Sketch the graphs of $y = \log_2 x$ and $y = \log_3 x$ on the same set of axes. Mark and label at least three points on each of the graphs. What point(s), if any, do they have in common?

41) Write a description comparing the graphs of $y = \log_2 x$ and $y = 2^x$.

Solve each equation.

1) $5^{k+1} = 625$
(3)

3) $81 \cdot 3^{-2x} = 9$
(1)

5) $\ln 9 + \ln 4x^2 = 4$ $\left\{ \frac{e^2}{6}, -\frac{e^2}{6} \right\}$

7) $\ln 2 + \ln 2x^2 = 4$ $\left\{ \frac{e^2}{2}, -\frac{e^2}{2} \right\}$

9) $\log 4 + \log (x+5) = 2$
(20)

11) $\log 4x - \log 4 = \log 39$
(39)

2) $6^{2p} \cdot 6^{-2p-1} = 6^{-3p}$ $\left\{ \frac{1}{3} \right\}$

4) $2^n \cdot 2^{2n} = 2^{2n-1}$
(-1)

6) $\log 2 + \log 2x^2 = 4$
(50, -50)

8) $\ln 8 + \ln -3x = 1$ $\left\{ -\frac{e}{24} \right\}$

10) $\log -4x - \log 8 = \log 38$
(-76)

12) $\ln 2x^2 - \ln 2 = 4$
($e^2, -e^2$)

Solve each equation by factoring.

13) $11k^2 = 110 + 99k$
(10, -1)

15) $n^2 - 8n = 0$
(8, 0)

17) $6m^2 = 42m + 180$
(10, -3)

19) $5n^2 - 17n = 12$
 $\left\{ -\frac{3}{5}, 4 \right\}$

14) $10p^2 - 160p = -480$
(12, 4)

16) $8x^2 = 48x$
(6, 0)

18) $10r^2 - 90r = -200$
(4, 5)

20) $3x^2 = -2x + 16$
 $\left\{ -\frac{8}{3}, 2 \right\}$

Expand each logarithm.

21) $\log_5 \sqrt[3]{3 \cdot 7 \cdot 10}$
 $\frac{\log_5 3}{3} + \frac{\log_5 7}{3} + \frac{\log_5 10}{3}$

23) $\log_5 (u^5 v^3)$
 $5 \log_5 u + 3 \log_5 v$

22) $\log_6 (8 \cdot 3^4)^4$
 $4 \log_6 8 + 16 \log_6 3$

24) $\log_4 (xy^3)^5$
 $5 \log_4 x + 15 \log_4 y$

Condense each expression to a single logarithm.

25) $24\log_7 11 + 6\log_7 6$

$$\log_7 (6^6 \cdot 11^{24})$$

26) $2\log_7 2 - 12\log_7 3$

$$\log_7 \frac{2^2}{3^{12}}$$

Rewrite each equation in exponential form.

27) $\log_p m = n$

$$p^n = m$$

28) $\log_x y = 12$

$$x^{12} = y$$

29) $\log_x \frac{29}{23} = y$ $x^y = \frac{29}{23}$

30) $\log_x y = -2$

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

Solve each equation. Remember to check for extraneous solutions.

31) $\frac{b+2}{2b^2} = \frac{3b-18}{b^2} - \frac{1}{2b^2}$ $\left\{ \frac{39}{5} \right\}$

32) $\frac{1}{r} + \frac{1}{r^2} = \frac{4}{r}$ $\left\{ \frac{1}{3} \right\}$

33) $\frac{6n-12}{n^2} = \frac{4n-6}{n^2} + \frac{1}{2n}$

$$\{4\}$$

34) $\frac{1}{2x^2} + \frac{x-1}{2x^2} = \frac{6}{x^2}$

$$\{12\}$$

35) Solve for x: $\frac{12.3-x}{4.5} = -0.83$

$$x=16.035$$

36) Solve for r: $\sqrt{45-x} = 5$

$$x=20$$

37) Solve for n: $1.96\sqrt{\frac{0.5 \cdot 0.5}{n}} < 0.03$

$$n > 1067.11$$

38) If $y = 10.2x^{0.72}$, find y when $x = 32.7$.

$$y = 125.62$$

39) Sketch the graphs of $y = 2^x$ and $y = 3^x$ on the same set of axes. Mark and label at least three points on each of the graphs. What point(s), if any, do they have in common? Write a description comparing the two graphs.

40) Sketch the graphs of $y = \log_2 x$ and $y = \log_3 x$ on the same set of axes. Mark and label at least three points on each of the graphs. What point(s), if any, do they have in common?

41) Write a description comparing the graphs of $y = \log_2 x$ and $y = 2^x$. Since the functions are inverses of each other, the graphs are reflections of each other across the line $y = x$.