

Section 3.4 - Exponential and Logarithmic Equations

1. Determine whether the given x -value is a solution (or an approximate solution) of the equation.

$$4^{3x-10} = 16$$

$$x = 4$$

- a. No
- b. Yes

3. Solve for x .

$$6^x = 36$$

- a. 8
- b. 2
- c. -2
- d. -6
- e. 6

4. Solve for x .

$$\left(\frac{1}{4}\right)^x = 64$$

- a. 4
- b. -3
- c. 7
- d. 3
- e. -4

5. Solve for x .

$$\ln x - \ln 5 = 0$$

- a. $-\frac{1}{5}$
- b. -5
- c. $\frac{1}{5}$
- d. 5^{-2}
- e. 5

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7. Solve for x . Approximate the result to three decimal places.

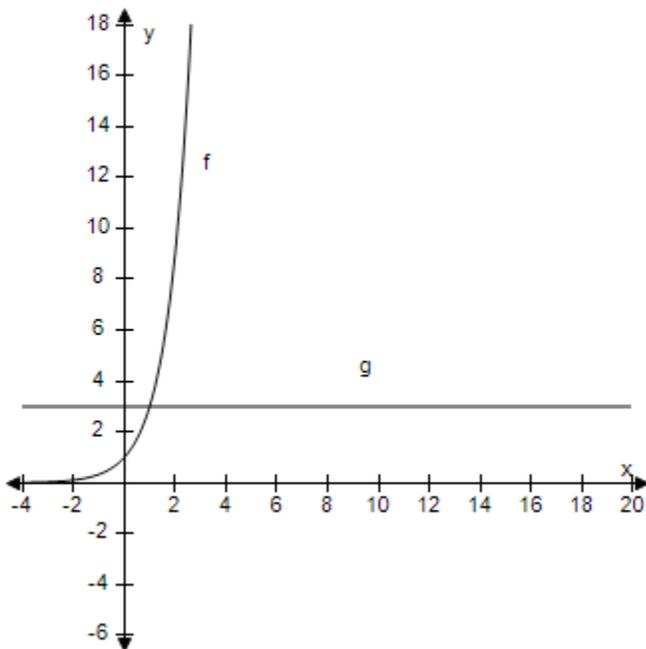
$$\ln x = -5$$

- a. $-5e \approx -13.591$
- b. $-\ln 5 \approx -1.609$
- c. $-5/e \approx -1.839$
- d. $e^{-5} \approx 0.007$
- e. $-5^e \approx -79.432$

10. Approximate the point of intersection of the graphs of f and g . Then solve the equation $f(x) = g(x)$ algebraically to verify your approximation.

$$f(x) = 3^x$$

$$g(x) = 3$$



- a. $(1, -3)$
- b. $(-1, 3)$
- c. $(3, 3)$

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d. (3, 1)

e. (1, 3)

13. Solve the exponential equation algebraically. Approximate the result to three decimal places.

$$e^x = e^{x^2 - 30}$$

a. -6, -5

b. 1, -30

c. 6, 5

d. -6, 5

e. 6, -5

15. Solve the exponential equation algebraically. Approximate the result to three decimal places.

$$e^{-4x^2} = e^{3x^2 - 14x}$$

a. 4, 2

b. 3, 2

c. -4, 2

d. 0, 2

e. 0, -2

26. Solve the exponential equation algebraically. Approximate the result to three decimal places.

$$e^{3x} = 75$$

a. $\frac{3}{\ln 75} \approx 0.695$

b. $3\ln 75 \approx 12.952$

c. $75e^3 \approx 1506.415$

d. $\frac{e^3}{75} \approx 0.268$

e. $\frac{\ln 75}{3} \approx 1.439$

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32. Solve the logarithmic equation algebraically. Approximate the result to three decimal places.

$$\ln x - 6 = 0$$

- a. $\ln 6 \approx 1.792$
- b. $\ln \frac{1}{6} \approx -1.792$
- c. $e^6 \approx 403.429$
- d. $e^{-6} \approx 0.002$
- e. $-e^6 \approx -403.429$

39. Solve the logarithmic equation algebraically. Approximate the result to three decimal places.

$$6 \log_5(0.5x) = 5$$

- a. $\frac{1}{2}(5^{5/6}) \approx 1.912$
- b. $2(5^{6/5}) \approx 13.797$
- c. $2(5^{5/6}) \approx 7.647$
- d. $\frac{5}{6 \ln 5} \approx 0.518$
- e. $\frac{5}{6} \log_5(0.5) \approx -0.359$

42. \$3000 is invested in an account at interest rate r , compounded continuously. Find the time required for the amount to triple. (Approximate the result to two decimal places.)

$$r = 0.03$$

- a. 37.62 yr
- b. 36.62 yr
- c. 35.62 yr
- d. 34.62 yr

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e. 38.62 yr

45. Solve the equation algebraically. Round the result to three decimal places.

$$\frac{6 + \ln x}{9} = 0$$

a. $e^3 \approx 20.086$

b. $-\ln 6 \approx -1.792$

c. $\ln 6 \approx 1.792$

d. $e^{-6} \approx 0.002$

e. $-e^6 \approx -403.429$

47. Solve $\left(\frac{1}{4}\right)^x = 64$ for x.

a. -3

b. -4

c. -1

d. 1

e. no solution

51. Simplify the expression.

$$\log_5 5^9$$

a. 45

b. 5

c. 9

d. 81

e. none of these

53. Use the One-to-One Property to solve the following equation for x.

$$2^{5x} = 128$$

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a. $\frac{128}{5}$

b. $\frac{64}{5}$

c. $\frac{7}{5}$

d. $\frac{5}{7}$

e. 2

54. Solve the equation $\log(1-x) = \log(10)$ for x using the One-to-One Property.

a. 11

b. -9

c. -11

d. 0

e. The equation has no solution.