

Exponential Equations

Solve the equation by expressing each side as a power of the same base and then equating exponents.

1) $4^x = 256$ 1) _____
 A) {4} B) {64} C) {3} D) {5}

2) $2^{(5 - 3x)} = \frac{1}{16}$ 2) _____
 A) {8} B) {3} C) $\left\{\frac{1}{8}\right\}$ D) {-3}

3) $3^{(3x - 6)} = 27$ 3) _____
 A) {9} B) {3} C) $\left\{\frac{1}{9}\right\}$ D) {-3}

4) $9^x + 4 = 27^x - 4$ 4) _____
 A) {20} B) {12} C) {16} D) {8}

5) $e^x + 5 = \frac{1}{e^3}$ 5) _____
 A) {8} B) {-8} C) {-2} D) {2}

Solve the exponential equation. Express the solution set in terms of natural logarithms.

6) $2^{7x} = 4$ 6) _____
 A) $\left\{\frac{\ln 4}{7 \ln 2}\right\}$ B) $\left\{\frac{7 \ln 4}{\ln 2}\right\}$ C) $\left\{\frac{\ln 4}{2 \ln 7}\right\}$ D) $\left\{\frac{4 \ln 7}{\ln 2}\right\}$

7) $e^{5x} = 2$ 7) _____
 A) {5 ln 2} B) $\left\{\frac{2}{5}e\right\}$ C) $\left\{\frac{\ln 2}{5}\right\}$ D) $\left\{\frac{\ln 5}{2}\right\}$

8) $e^{x+8} = 2$ 8) _____
 A) $\{e^{16}\}$ B) {ln 2 - 8} C) {ln 10} D) $\{e^2 + 8\}$

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

9) $10^x = 3.97$ 9) _____
 A) 39.7 B) 1.38 C) 0.6 D) 9,332.54

10) $e^x = 3.1$ 10) _____
 A) 1.13 B) 8.43 C) 22.24 D) 0.49

- 11) $5^X = 12$ 11) _____
 A) 1.54 B) 0.65 C) 0.75 D) 4
- 12) $4e^X = 25$ 12) _____
 A) 0.8 B) 1.83 C) -1.83 D) -0.8
- 13) $10^X = 3.42$ 13) _____
 A) 2630.27 B) 1.23 C) 34.2 D) 0.53
- 14) $e^X = 3.7$ 14) _____
 A) 10.06 B) 40.54 C) 0.57 D) 1.31
- 15) $8^X = 11$ 15) _____
 A) 0.87 B) 1.15 C) 0.94 D) 4.99
- 16) $8e^X = 27$ 16) _____
 A) 1.22 B) -1.22 C) 0.53 D) -0.53

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

- 17) $\log_6 (x - 2) = 3$ 17) _____
 A) {727} B) {214} C) {731} D) {218}
- 18) $\log_4 (x + 3) = -3$ 18) _____
 A) $\left\{ \frac{193}{64} \right\}$ B) $\left\{ -\frac{191}{64} \right\}$ C) $\left\{ -\frac{191}{81} \right\}$ D) $\left\{ \frac{193}{81} \right\}$

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

- 19) $10^X = 4.53$ 19) _____
 A) 33,884.42 B) 1.51 C) 45.3 D) 0.66
- 20) $e^X = 5.8$ 20) _____
 A) 0.76 B) 15.78 C) 331.51 D) 1.76
- 21) $7^X = 19$ 21) _____
 A) 5.73 B) 0.66 C) 1.08 D) 1.51
- 22) $5e^X = 22$ 22) _____
 A) 1.48 B) -1.48 C) 0.64 D) -0.64

Answer Key

Testname: 27_EXPONENTIAL EQUATIONS

- 1) A
- 2) B
- 3) B
- 4) A
- 5) B
- 6) A
- 7) C
- 8) B
- 9) C
- 10) A
- 11) A
- 12) B
- 13) D
- 14) D
- 15) B
- 16) A
- 17) D
- 18) B
- 19) D
- 20) D
- 21) D
- 22) A