

Solving Exponential Equations - Practice

1. Solve.

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|-------------------|-------------------|
| a) $2^x = 16$ | b) $3^x = 27$ |
| c) $2^x = 128$ | d) $5^x = 125$ |
| e) $4^x = 256$ | f) $729 = 9^x$ |
| g) $(-3)^x = -27$ | h) $(-2)^x = -32$ |
| i) $(-5)^x = 25$ | j) $81 = (-3)^x$ |
| k) $-2^x = -16$ | l) $-4^x = -64$ |
| m) $-5^x = -625$ | n) $(-1)^x = 1$ |
| o) $(-1)^m = -1$ | |

2. Solve.

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|--------------------|----------------------|
| a) $7^{w-2} = 49$ | b) $3^{x+4} = 27$ |
| c) $2^{1-x} = 128$ | d) $4^{3k} = 64$ |
| e) $5^{3x-1} = 25$ | f) $-81 = -3^{2x+6}$ |
| g) $4^{x-1} = 1$ | h) $3^{2-2x} = 1$ |
| i) $(-1)^{2x} = 1$ | |

3. Solve and check.

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|-------------------------|--------------------------|
| a) $6^{x+3} = 6^{2x}$ | b) $2^{x+3} = 2^{2x-1}$ |
| c) $3^{2y+3} = 3^{y+5}$ | d) $2^{4x-7} = 2^{2x+1}$ |

7. Solve and check.

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|---------------------------|----------------------------|
| a) $4^x = 8$ | b) $64^x = 16$ |
| c) $(-8)^y = -2$ | d) $9^{-x} = 3$ |
| e) $2^{yx} = \frac{1}{8}$ | f) $9^{6x} = \frac{1}{27}$ |
| g) $2^x = 16^4$ | h) $2^{-2x} = 32$ |
| i) $9^{2x+1} = 27$ | |

8. Solve and check.

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|---------------------------|---------------------------|
| a) $9^{x+1} = 27^{2x}$ | b) $16^y = 64^{2y-1}$ |
| c) $36^{t-2} = 216^{-2t}$ | d) $8^{2x-1} = 16^{x-1}$ |
| e) $25^{1-3x} = 125^{-x}$ | f) $16^{3+t} = 32^{1-2t}$ |

9. Solve and check.

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|------------------------------------|---|
| a) $5 = 25^{\frac{x}{2}}$ | b) $8 = 2^{\frac{x}{3}}$ |
| c) $9^{\frac{z}{5}} = 27$ | d) $\frac{1}{2} = 2^{\frac{a}{3}}$ |
| e) $4^{\frac{x}{4}} = \frac{1}{8}$ | f) $\left(\frac{3}{2}\right)^{\frac{m}{2}} = \frac{4}{9}$ |

e) $7^{5d-1} = 7^{2d+5}$ f) $3^{6-5} = 3^{2h-3}$

4. Solve.

- | | |
|---------------------------|--------------------------------|
| a) $16^{2x} = 8^{3x}$ | b) $4^x = 8^{x+1}$ |
| c) $27^{x-1} = 9^{2x}$ | d) $25^{2-x} = 125^{2x-4}$ |
| e) $16^{2p+1} = 8^{3p+1}$ | f) $(-8)^{1-2x} = (-32)^{1-x}$ |

5. Solve and check.

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|--------------------------|--------------------------|
| a) $2^{x+5} = 4^{x+2}$ | b) $2^x = 4^{x-1}$ |
| c) $9^{2q-6} = 3^{q+6}$ | d) $4^x = 8^{x+1}$ |
| e) $27^{j-1} = 9^{2j-4}$ | f) $8^{x+3} = 16^{2x+1}$ |

6. Solve and check.

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|-------------------------------|-----------------------------------|
| a) $5^{4-x} = \frac{1}{5}$ | b) $10^{j-2} = \frac{1}{10\,000}$ |
| c) $6^{3x-7} = \frac{1}{6}$ | d) $3^{3x-1} = \frac{1}{81}$ |
| e) $5^{2n+1} = \frac{1}{125}$ | f) $\frac{1}{256} = 2^{2-5w}$ |

10. Solve.

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|-----------------------|
| a) $3(5^{x+1}) = 15$ |
| b) $2(3^{y-2}) = 18$ |
| c) $5(4^z) = 10$ |
| d) $2(4^{u+1}) = 1$ |
| e) $2 = 6(3^{4v-2})$ |
| f) $27(3^{3x+1}) = 3$ |

11. Solve and check.

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|----------------------------------|
| a) $2^{x+2} - 2^x = 48$ |
| b) $4^{x+3} + 4^x = 260$ |
| c) $2^{a+5} + 2^a = 1056$ |
| d) $6^{x+1} + 6^{x+2} = 7$ |
| e) $3^{x+3} - 3^{x+1} = 648$ |
| f) $10^{x+4} + 10^{x+3} = 11$ |
| g) $2^{x+2} - 2^{x+5} = -7$ |
| h) $3^{m+1} + 3^{m+2} - 972 = 0$ |
| i) $5^{n+2} - 5^{n+3} = -2500$ |

Section 1.3, pp. 23-25

1. a) 4 b) 3 c) 7 d) 3 e) 4 f) 3 g) 3 h) 5 i) 2 j) 4 k) 4 l) 3 m) 4
 n) x any even integer o) m any odd integer 2. a) 4 b) -1 c) -6
 d) 1 e) 1 f) -2 g) 1 h) 1 i) all values of x 3. a) 3 b) 4 c) 2 d) 4
 e) 2 f) -2 4. a) 0 b) -3 c) -3 d) 2 e) 1 f) -2 5. a) 1 b) 2 c) 6
 d) -3 e) 5 f) 1 6. a) 5 b) -2 c) 2 d) -1 e) -2 f) 2 7. a) $\frac{3}{2}$
 b) $\frac{2}{3}$ c) $\frac{1}{3}$ d) $-\frac{1}{2}$ e) $-\frac{1}{3}$ f) $-\frac{1}{4}$ g) 16 h) $-\frac{5}{2}$ i) $\frac{1}{4}$ 8. a) $\frac{1}{2}$ b) $\frac{3}{4}$
 c) $\frac{1}{2}$ d) $-\frac{1}{2}$ e) $\frac{2}{3}$ f) $-\frac{1}{2}$ 9. a) 1 b) 9 c) $\frac{15}{2}$ d) -3 e) -6 f) -4
 10. a) 0 b) 4 c) $\frac{1}{2}$ d) $-\frac{3}{2}$ e) $\frac{1}{4}$ f) -1 11. a) 4 b) 1 c) 5 d) -1 e) 3
 f) -3 g) -2 h) 4 i) 2 12. The equation is true for all values of