

## Practice

State the base.

1.  $\left(\frac{1}{2}\right)^6$    2.  $(-5)^2$    3.  $-1^4$    4.  $(-9)^3$

State the exponent.

5.  $-2^5$    6.  $4^2$    7.  $(-4)^0$    8.  $-5$

Write in exponential form.

9.  $\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)$    10.  $(-3)(-3)(-3)(-3)(-3)$   
11.  $p \times p \times p \times p \times p$    12.  $(-n)(-n)(-n)(-n)$   
13.  $3 \times 3 \times 3 \times (-2) \times (-2) \times 3 \times (-2)$

Write as a repeated multiplication.

14.  $(-2)^5$    15.  $-2^5$    16.  $\left(\frac{-1}{x}\right)^3$

Write in standard form.

17.  $3^2$    18.  $(-3)^2$    19.  $(-1)^4$   
20.  $-1^5$    21.  $(-5)^3$    22.  $-5^3$   
23.  $(-0.5)^3$    24.  $1.1^4$    25.  $(-2.5)^2$

Simplify.

26.  $5^3 \times 5^6$    27.  $(-8)^2 \times (-8)^3$   
28.  $(-2)^3(-2)^4$    29.  $\left(\frac{1}{2}\right)^3 \times \left(\frac{1}{2}\right)^4$   
30.  $(-2.1)^5(-2.1)^3$    31.  $(-0.2)^3(-0.2)^2$

Simplify.

32.  $5^4 \div 5^3$    33.  $6^8 \div 6^2$    34.  $\frac{(-0.4)^5}{(-0.4)^3}$    35.  $\frac{(-9)^7}{(-9)^2}$

Simplify.

36.  $(2^3)^2$    37.  $((-3)^7)^4$   
38.  $\left(\left(-\frac{1}{5}\right)^2\right)^3$    39.  $((-6)^5)^3$   
40.  $((-4)^6)^7$    41.  $((-2.3)^3)^4$

Simplify.

42.  $x^4 \times x^2$    43.  $\left(\frac{1}{y}\right)^{12} \div \left(\frac{1}{y}\right)^5$   
44.  $z^8 \div z$    45.  $(-m)^6(-m)^4$   
46.  $(s^2)^4$    47.  $((-r)^3)^2$

Simplify, then calculate.

48.  $(-5)^2 \times (-5)^3$    49.  $6^2 \times 6^5$   
50.  $(-2)^3(-2)^5(-2)^2$    51.  $(-1)^5(-1)^7$   
52.  $(-3.1)^5(-3.1)^3$    53.  $(-3)^6 \div (-3)^4$   
54.  $(-10)^5 \div (-10)$    55.  $(-4)^6 \div (-4)^5$

Calculate.

56.  $2^8 \div 2^4$    57.  $(-3)^7 \div (-3)$   
58.  $(-5)^2 \times (-5)^3$    59.  $(3^2)^3$   
60.  $\frac{(-4)^3 \times (-4)^5}{(-4)^5}$    61.  $\frac{4^9}{4^3 \times 4^2}$   
62.  $(-2)^3(-2)^5$    63.  $(-3)^0(-3)^5$   
64.  $((-2)^3)^2$    65.  $(6^2)^3 \div (6^2)^2$

Evaluate.

66.  $(-8)^2$    67.  $6(-4)^3$   
68.  $(-3)^2(6)^2$    69.  $(-1)^5 + 3^3$   
70.  $4^5 - 3^5$    71.  $(-2)^5 \times (-3)^4$   
72.  $9^2 \div (-2)^3$    73.  $(-5)^2(-4)^4$   
74.  $(1.3)^2(-2)^4$    75.  $(1.5)^2 \div (-5)^3$

76. Evaluate for  $n = 3$ .

a)  $\frac{1}{5n^2}$    b)  $-\frac{n^3}{6}$    c)  $1 + 7n^5$    d)  $n^3 - 6n$

77. Evaluate for  $x = -2$  and  $y = 3$ .

a)  $x^3$    b)  $5y^4$    c)  $\frac{x^2}{2} + \frac{y^2}{3}$   
d)  $\frac{x^3y^3}{3}$    e)  $(x - y)^3$    f)  $(y - x)^2$   
g)  $-\frac{x^2y^3}{8}$    h)  $4x^3 - 5y$    i)  $(3x^2)(-2y^2)$

## Problems and Applications

78. Use the guess-and-check strategy to find the value of  $x$ .

a)  $3^x = 81$    b)  $(-2)^x = -512$   
c)  $x^5 = 1024$    d)  $(-x)^3 = -1000$   
e)  $-5^x = -625$    f)  $-x^2 = -1.69$   
g)  $(0.2)^x = 0.0016$    h)  $x^3 = -0.216$

## Practice

Simplify.

1.  $(x)^2$       2.  $(a)^3$       3.  $(p)^5$   
 4.  $(n^2)^2$       5.  $(-t^3)^2$       6.  $(-y^2)^3$

Simplify.

7.  $(x^2)^3$       8.  $(y^3)^2$       9.  $(m^2)^2$   
 10.  $(n^3)^4$       11.  $(x^3)^3$       12.  $(y^2)^3$   
 13.  $(z^4)^3$       14.  $(m^4)^5$       15.  $(p^{18})^2$   
 16.  $(-s^{10})^2$       17.  $(-x)^{31}$       18.  $-(-b^0)^3$

Simplify.

19.  $(xy)^2$       20.  $(ab)^3$       21.  $(-xy)^2$   
 22.  $(mn)^4$       23.  $(pq)^3$       24.  $(-2xt)^2$   
 25.  $(4xy)^2$       26.  $(-2ax)^3$       27.  $-(3rs)^3$

Simplify.

28.  $(x^2y^2)^3$       29.  $(x^2y^3)^2$       30.  $(a^2b)^3$   
 31.  $(ab^3)^2$       32.  $(mn)^3$       33.  $(-ab^2)^2$   
 34.  $(-j^3k^4)^2$       35.  $(x^2y)^2$       36.  $(-s^3t^2)^0$

Simplify.

37.  $(2x^2)^3$       38.  $(3y^3)^2$       39.  $(4x^4)^2$   
 40.  $(5y^2)^2$       41.  $(-m^2)^2$       42.  $(-n^2)^3$   
 43.  $(-2n^2)^3$       44.  $(-3y^2)^2$       45.  $(3pqr)^2$   
 46.  $(-3yz)^3$       47.  $(-4x^2y^3)^3$       48.  $(-3xy^0)^2$

Simplify.

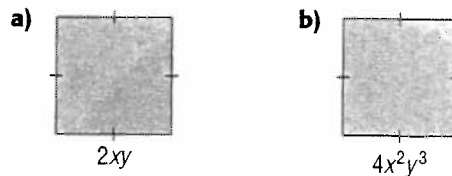
49.  $(\frac{m}{2})^4$       50.  $(\frac{r}{t})^8$       51.  $(\frac{-d}{p})^5$   
 52.  $(\frac{2b}{5c})^3$       53.  $(\frac{-2x}{y^2})^3$       54.  $(\frac{3s^4}{2q^3})^2$

Simplify.

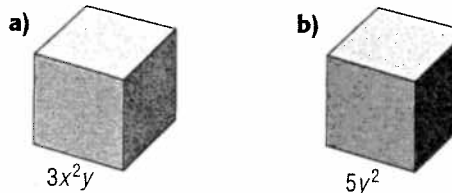
55.  $(2x^2y^3)^2(x^2y)$       56.  $(-3xy)(-2xy)^2$   
 57.  $(2xy^2)^3(3x^2y^2)$       58.  $(10abc)^2(-2a^2bc)$   
 59.  $(2a^4b^3)(-3ab)^3(10a^2b^2)$

## Problems and Applications

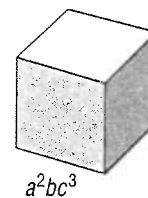
60. Write and simplify an expression for the area of each square.



61. Write and simplify an expression for the volume of each cube.



62. Find the volume of this cube if  $a = 1$ ,  $b = 2$ , and  $c = 3$ .

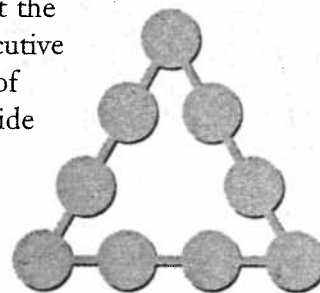


63. Does replacing the variables by their opposites,  $x$  by  $-x$  and  $y$  by  $-y$ , result in the opposite of each monomial? Explain.

- a)  $(3x^2y^3)^2$       b)  $(3x^2y^3)^3$

## NUMBER POWER

Copy the diagram and place the numbers from 1 to 9 in the circles so that the consecutive sums of each side differ by 4.



### Section 1.8 pp. 28-29

Practice 1.  $\frac{1}{2}$  2. -5 3. 1 4. -9 5. 5 6. 2

7. 0 8. 1 9.  $(\frac{1}{4})^3$  10.  $(-3)^5$  11.  $p^5$  12.  $(-n)^4$

13.  $3^4 \times (-2)^3$  14.  $(-2)(-2)(-2)(-2)(-2)$

15.  $-2 \times 2 \times 2 \times 2 \times 2$  16.  $(-\frac{1}{x})(-\frac{1}{x})(-\frac{1}{x})$  17. 9

18. 9 19. 1 20. -1 21. -125 22. -125

23. -0.125 24. 1.4641 25. 6.25 26.  $5^9$  27.  $(-8)^5$

28.  $(-2)^7$  29.  $(\frac{1}{2})^7$  30.  $(-2.1)^8$  31.  $(-0.2)^5$  32.  $5^1$

33.  $6^6$  34.  $(-0.4)^2$  35.  $(-9)^5$  36.  $2^6$  37.  $(-3)^{28}$

38.  $(-\frac{1}{5})^6$  39.  $(-6)^{15}$  40.  $(-4)^{42}$  41.  $(-2.3)^{12}$  42.  $x^6$

43.  $(\frac{1}{y})^7$  44.  $z^7$  45.  $(-m)^{10}$  46.  $s^8$  47.  $(-r)^6$

48.  $(-5)^5$ , -3125 49.  $6^7$ , 279 936 50.  $(-2)^{10}$ , 1024

51.  $(-1)^{12}$ , 1 52.  $(-3.1)^8$ , 8528.9 53.  $(-3)^2$ , 9

54.  $(-10)^4$ , 10 000 55.  $(-4)^1$ , -4 56. 16 57. 729

58. -3125 59. 729 60. -64 61. 256 62. 256

63. -243 64. 64 65. 36 66. 64 67. -384

68. 324 69. 26 70. 781 71. -2592 72. -10.125

73. 6400 74. 27.04 75. -0.018 76. a)  $0.02$  b) -4.5

c) 1702 d) 9 77. a) -8 b) 405 c) 5 d) -72 e) -125

f) 25 g) -13.5 h) -47 i) -216 Problems and

### Section 1.9 p. 34

Practice 1.  $x^2$  2.  $a^3$  3.  $p^5$  4.  $n^4$  5.  $t^6$  6.  $-y^6$

7.  $x^6$  8.  $y^6$  9.  $m^4$  10.  $n^{12}$  11.  $x^9$  12.  $y^6$

13.  $z^{12}$  14.  $m^{20}$  15.  $p^{36}$  16.  $s^{20}$  17.  $-x^{31}$  18. 1

19.  $x^2y^2$  20.  $a^3b^3$  21.  $x^2y^2$  22.  $m^4n^4$  23.  $p^3q^3$

24.  $4x^2t^2$  25.  $16x^2y^2$  26.  $-8a^3x^3$  27.  $-27r^3s^3$

28.  $x^6y^6$  29.  $x^4y^6$  30.  $a^6b^3$  31.  $a^2b^6$  32.  $m^3n^3$

33.  $a^2b^4$  34.  $j^6k^8$  35.  $x^4y^2$  36. -1 37.  $8x^6$  38.  $9y^6$

39.  $16x^8$  40.  $25y^4$  41.  $m^4$  42.  $-n^6$  43.  $-8n^6$

44.  $9y^4$  45.  $9p^2q^2r^2$  46.  $-27y^3z^3$  47.  $-64x^6y^9$

48.  $-9x^2$  49.  $\frac{m^4}{16}$  50.  $\frac{r^8}{t^8}$  51.  $\frac{d^5}{p^5}$  52.  $\frac{8b^3}{125c^3}$

53.  $-\frac{8x^3}{y^6}$  54.  $\frac{9s^8}{4q^6}$  55.  $4x^6y^7$  56.  $-12x^3y^3$  57.  $24x^5y^8$

58.  $-200a^4b^3c^3$  59.  $-540a^9b^8$  Problems and

Applications 60. a)  $4x^2y^2$  b)  $16x^4y^6$  61. a)  $27x^6y^3$

b)  $125y^6$  62. 157 464 63. a) no b) yes