Name _____ Date _____ Class _____

California Standards 2.0*

LESSON 7-1

Practice

Integer Exponents

Simplify.

1. $5^{-3} = \frac{1}{5^3} = \frac{1}{125}$

2. $2^{-6} = \frac{1}{2^6} = \frac{1}{64}$

3. $(-5)^{-2}$ _____

4. $-(4)^{-3}$ _____

5. -6^0 _____

6. $(7)^{-2}$ _____

Evaluate each expression for the given value(s) of the variable(s).

7. d^{-3} for $d = -2$ _____

8. a^5b^{-6} for $a = 3$ and $b = 2$ _____

9. $(b - 4)^{-2}$ for $b = 1$ _____

10. $5z^{-x}$ for $z = -3$ and $x = 2$ _____

11. $(5z)^{-x}$ for $z = -3$ and $x = 2$ _____

12. $c^{-3}\,(16^{-2})$ for $c = 4$ _____

Simplify.

13. t^{-4} _____

14. $3r^{-5}$ _____

15. $\frac{s^{-3}}{t^{-5}}$ _____

16. $\frac{h^0}{3}$ _____

17. $\frac{2x^{-3}y^{-2}}{z^4}$ _____

18. $\frac{4fg^{-5}}{5h^{-3}}$ _____

19. $\frac{14a^{-4}}{20bc^{-1}}$ _____

20. $\frac{a^4c^2e^0}{b^{-1}d^{-3}}$ _____

21. $\frac{-3g^{-2}hk^{-2}}{-6h^0}$ _____

22. A cooking website claims to contain 10^5 recipes. Evaluate this expression. _____

23. A ball bearing has diameter 2^{-3} inches. Evaluate this expression. _____

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LESSON 7-1

Practice

Integer Exponents

Simplify.

1. $5^{-3} = \frac{1}{5^{3}} = \frac{1}{125}$

2. $2^{-6} = \frac{1}{2^{6}} = \frac{1}{64}$

3. $(-5)^{-2}$ $\frac{1}{25}$

4. $-(4)^{-3}$ $-\frac{1}{64}$

5. -6^{0} -1

6. $(7)^{-2}$ $\frac{1}{49}$

Evaluate each expression for the given value(s) of the variable(s).

7. d^{-3} for $d = -2$ $-\frac{1}{8}$

8. $a^{5}b^{-6}$ for $a = 3$ and $b = 2$ $\frac{243}{64}$

9. $(b-4)^{-2}$ for $b = 1$ $\frac{1}{9}$

10. $5z^{-x}$ for $z = -3$ and $x = 2$ $\frac{5}{9}$

11. $(5z)^{-x}$ for $z = -3$ and $x = 2$ $\frac{1}{225}$

12. $c^{-3}(16^{-2})$ for $c = 4$ $\frac{1}{16{,}384}$

Simplify.

13. t^{-4} $\frac{1}{t^{4}}$

14. $3r^{-5}$ $\frac{3}{r^{5}}$

15. $\frac{s^{-3}}{t^{-5}}$ $\frac{t^{5}}{s^{3}}$

16. $\frac{h^{0}}{3}$ $\frac{1}{3}$

17. $\frac{2x^{-3}y^{-2}}{z^{4}}$ $\frac{2}{x^{3}y^{2}z^{4}}$

18. $\frac{4fg^{-5}}{5h^{-3}}$ $\frac{4fh^{3}}{5g^{5}}$

19. $\frac{14a^{-4}}{20bc^{-1}}$ $\frac{7c}{10a^{4}b}$

20. $\frac{a^{4}c^{2}e^{0}}{b^{-1}d^{-3}}$ $a^{4}bc^{2}d^{3}$

21. $\frac{-3g^{-2}hk^{-2}}{-6h^{0}}$ $\frac{h}{2g^{2}k^{2}}$

22. A cooking website claims to contain 10^{5} recipes. Evaluate this expression. 100,000

23. A ball bearing has diameter 2^{-3} inches. Evaluate this expression. $\frac{1}{8}$ inch or 0.125 inch

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LESSON 7-2

Practice

Powers of 10 and Scientific Notation

Find the value of each power of 10.

1. 10^{-3} 0.001
2. 10^{5} 100,000
3. 10^{-4} 0.0001
4. 10^{0} 1
5. 10^{7} 10,000,000
6. 10^{1} 10

Write each number as a power of 10.

7. 1,000,000 10^{6}
8. 0.001 10^{-3}
9. 0.000001 10^{-6}
10. 0.00001 10^{-5}
11. 0.1 10^{-1}
12. 0.00000001 10^{-8}

Find the value of each expression.

13. 5.02×10^{3} 5020
14. 603×10^{-4} 0.0603
15. 52.8×10^{6} 52,800,000
16. 5.41×10^{-3} 0.00541
17. 0.03×10^{-2} 0.0003
18. 22.81×10^{-6} 0.00002281

Write each number in scientific notation.

19. 4500 4.5×10^{3}
20. 6,560,000 6.56×10^{6}
21. 0.00002 2×10^{-5}
22. 0.00203 2.03×10^{-3}

Order the list of numbers from least to greatest.

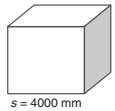
23. 3×10^{2}; 4.54×10^{-3}; 6.75×10^{2}; 8.2×10^{-4}; 9×10^{-1}; 6.18×10^{-4}
6.18×10^{-4}; 8.2×10^{-4}; 4.54×10^{-3}; 9×10^{-1}; 3×10^{2}; 6.75×10^{2}

24. 5.4×10^{-3}; 6.2×10^{-1}; 7.25×10^{3}; 6.87×10^{3}; 2.24×10^{-1}; 6.6×10^{-3}
5.4×10^{-3}; 6.6×10^{-3}; 2.24×10^{-1}; 6.2×10^{-1}; 6.87×10^{3}; 7.25×10^{3}

25. In 1970, the number of televisions sold in the United States was about 1.2×10^{7}. Write this number in standard form. 12,000,000

26. In 1950, about 3,880,000 households in the United States had televisions. Write this number in scientific notation. 3.88×10^{6}

27. Find the volume of the cube shown at right. Write the answer in both standard form and in scientific notation. 64,000,000,000 mm^3; 6.4×10^{10} mm^3



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LESSON 7-3

Practice

Multiplication Properties of Exponents

Simplify.

1. $3^{4} \cdot 3^{2}$ 3^{6} or 729
2. $2^{5} \cdot 2^{4}$ 2^{9} or 512
3. $2^{3} \cdot 2^{5} \cdot 2^{1}$ 2^{9} or 512
4. $q^{-6} \cdot q^{-1}$ $\frac{1}{q^{7}}$
5. $r^{-3} \cdot r^{4} \cdot s^{-4}$ $\frac{r}{s^{4}}$
6. $j^{-2} \cdot j^{-4} \cdot j^{2}$ $\frac{1}{j^{4}}$
7. $c^{5} \cdot b^{-2} \cdot c^{3}$ $\frac{c^{8}}{b^{2}}$
8. $(h^{2})^{5}$ h^{10}
9. $(g^{4})^{-2}$ $\frac{1}{g^{8}}$
10. $(w^{6})^{0}$ 1
11. $(v^{2})^{5} \cdot v^{4}$ v^{14}
12. $(w^{5})^{-2} \cdot w^{-3}$ $\frac{1}{w^{13}}$
13. $(t^{6})^{-4} \cdot (t^{-2})^{-3}$ $\frac{1}{t^{18}}$
14. $(a^{-2})^{-3} \cdot (a^{5})^{2}$ a^{16}
15. $(3b)^{4}$ $81b^{4}$
16. $(-5k)^{2}$ $25k^{2}$
17. $-(4m)^{3}$ $-64m^{3}$
18. $(-3p)^{-2}$ $\frac{1}{9p^{2}}$
19. $(s^{4}t)^{3} \cdot (s^{4}t^{3})^{2}$ $s^{20}t^{9}$
20. $(a^{2}b^{4})^{2} \cdot (a^{-2}b^{3})^{-1} \cdot a^{4}$ $a^{10}b^{5}$
21. $(x^{3}y^{2})^{-4} \cdot (x^{2}y^{-3})^{-2}$ $\frac{1}{x^{16}y^{2}}$

22. The pitch of a sound is determined by the number of vibrations produced per second. The note "middle C" produces 2.62×10^{2} vibrations per second. If a pianist plays middle C for 5×10^{-1} seconds, how many vibrations will occur? 1.31×10^{2} or 131 vibrations

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LESSON 7-4

Practice

Division Properties of Exponents

Simplify.

1. $\frac{6^{7}}{6^{5}} = 6^{7-5} = 6^{2} =$ 36
2. $\frac{t^{12}}{t^{7}} = t^{12-7} =$ t^{5}
3. $\frac{w^{9}}{w^{2}}$ w^{7}
4. $\frac{j^{2}}{j^{8}}$ $\frac{1}{j^{6}}$
5. $\frac{20m^{5}}{4m^{2}}$ $5m^{3}$
6. $\frac{c^{3}d^{2}}{c^{2}d^{5}}$ $\frac{c}{d^{3}}$
7. $\frac{(x^{4})^{2}}{(x^{3})^{5}}$ $\frac{1}{x^{7}}$
8. $\left(\frac{s^{3}t}{st^{4}}\right)^{2}$ $\frac{s^{4}}{t^{6}}$
9. $\left(\frac{2}{3}\right)^{-3}$ $\frac{27}{8}$
10. $\left(\frac{3a}{2b}\right)^{-4}$ $\frac{16b^{4}}{81a^{4}}$
11. $-\left(\frac{-t}{3v}\right)^{-4}$ $-\frac{81v^{4}}{t^{4}}$
12. $\left(\frac{6}{7}\right)^{-2} \cdot \left(\frac{4s}{6t}\right)^{-2}$ $\frac{49t^{2}}{16s^{2}}$
13. $\left(\frac{3c}{-2}\right)^{-1}\left(\frac{d}{4}\right)^{-2}$ $-\frac{32}{3cd^{2}}$
14. $\left(\left(\frac{3mn}{2}\right)^{-1}\right)^{-4}$ $\frac{81m^{4}n^{4}}{16}$

Simplify. Write the answer in scientific notation.

15. $(3.8 \times 10^{5}) \div (1.9 \times 10^{-6})$ 2×10^{11}
16. $(2.5 \times 10^{3}) \div (5 \times 10^{-4})$ 5×10^{6}

17. A textile factory produces 1.08×10^{8} yards of fabric every year. If the factory is in operation 360 days a year, what is the average number of yards of fabric produced each day? Give your answer in standard form. 300,000 yards

18. It takes 5 yards of fabric to manufacture a dress. If the textile factory turned their entire yearly production of 1.08×10^{8} yards of fabric into dresses, how many could they make? Give your answer in scientific notation. 2.16×10^{7} dresses

$2^{5} = 32$