NAME _____ DATE_____ PERIOD ____

7-1 Skills Practice

Multiplying Monomials

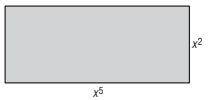
Determine whether each expression is a monomial. Write *yes* or *no*. Explain.

1. 11 Yes; 11 is a real number and an example of a constant.
2. $a - b$ No; This is the difference, not the product, of two variables.
3. $\frac{p^2}{q^2}$ No; This is the quotient, not the product, of two variables.
4. y Yes; Single variables are monomials.
5. j^3k Yes; This is the product of two variables.
6. $2a + 3b$ No; This is the sum of two monomials.

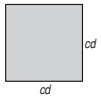
Simplify.

7. $a^2(a^3)(a^6)$ a^{11}
8. $x(x^2)(x^7)$ x^{10}
9. $(y^2z)(yz^2)$ y^3z^3
10. $(\ell^2k^2)(\ell^3k)$ ℓ^5k^3
11. $(e^2f^4)(e^2f^2)$ e^4f^6
12. $(cd^2)(c^3d^2)$ c^4d^4
13. $(2x^2)(3x^5)$ $6x^7$
14. $(5a^7)(4a^2)$ $20a^9$
15. $(4xy^3)(3x^3y^5)$ $12x^4y^8$
16. $(7a^5b^2)(a^2b^3)$ $7a^7b^5$
17. $(-5m^3)(3m^8)$ $-15m^{11}$
18. $(-2c^4d)(-4cd)$ $8c^5d^2$
19. $(10^2)^3$ 10^6 or 1,000,000
20. $(p^3)^{12}$ p^{36}
21. $(-6p)^2$ $36p^2$
22. $(-3y)^3$ $-27y^3$
23. $(3pq^2)^2$ $9p^2q^4$
24. $(2b^3c^4)^2$ $4b^6c^8$

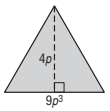
GEOMETRY Express the area of each figure as a monomial.

25. 

x^7

26. 

c^2d^2

27. 

$18p^4$

NAME _____ DATE_____ PERIOD ____

7-1 Practice

Multiplying Monomials

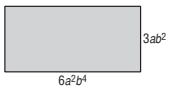
Determine whether each expression is a monomial. Write *yes* or *no*. Explain.

1. $\frac{21a^2}{7b}$ No; this involves the quotient, not the product, of variables.
2. $\frac{b^3c^2}{2}$ Yes; this is the product of a number, $\frac{1}{2}$, and two variables.

Simplify.

3. $(-5x^2y)(3x^4)$ $-15x^6y$
4. $(2ab^2c^2)(4a^3b^2c^2)$ $8a^4b^4c^4$
5. $(3cd^4)(-2c^2)$ $-6c^3d^4$
6. $(4g^3h)(-2g^5)$ $-8g^8h$
7. $(-15xy^4)\left(-\frac{1}{3}xy^3\right)$ $5x^2y^7$
8. $(-xy)^3(xz)$ $-x^4y^3z$
9. $(-18m^2n)^2\left(-\frac{1}{6}mn^2\right)$ $-54m^5n^4$
10. $(0.2a^2b^3)^2$ $0.04a^4b^6$
11. $\left(\frac{2}{3}p\right)^2$ $\frac{4}{9}p^2$
12. $\left(\frac{1}{4}cd^3\right)^2$ $\frac{1}{16}c^2d^6$
13. $(0.4k^3)^3$ $0.064k^9$
14. $[(4^2)^2]^2$ 4^8 or 65,536

GEOMETRY Express the area of each figure as a monomial.

15. 

$18a^3b^6$

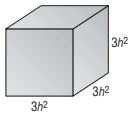
16. 

$(25x^6)\pi$

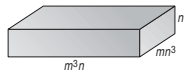
17. 

$12a^3c^4$

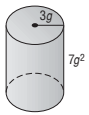
GEOMETRY Express the volume of each solid as a monomial.

18. 

$27h^6$

19. 

m^4n^5

20. 

$(63g^4)\pi$

21. **COUNTING** A panel of four light switches can be set in 2^4 ways. A panel of five light switches can set in twice this many ways. In how many ways can five light switches be set? 2^5 or 32

22. **HOBBIES** Tawa wants to increase her rock collection by a power of three this year and then increase it again by a power of two next year. If she has 2 rocks now, how many rocks will she have after the second year? 2^6 or 64

Answers

NAME _____ DATE_____ PERIOD ____

7-2 Practice

Dividing Monomials

Simplify. Assume that no denominator is equal to zero.

1. $\frac{8^8}{8^4}$ 8^4 or 4096
2. $\frac{a^4b^6}{ab^3}$ a^3b^3
3. $\frac{xy^2}{xy}$ y
4. $\frac{m^5np}{m^4p}$ mn
5. $\frac{5c^2d^3}{-4c^2d}$ $-\frac{5d^2}{4}$
6. $\frac{8y^7z^6}{4y^6z^5}$ $2yz$
7. $\left(\frac{4f^3g}{3h^6}\right)^3$ $\frac{64f^9g^3}{27h^{18}}$
8. $\left(\frac{6w^5}{7p^6s^3}\right)^2$ $\frac{36w^{10}}{49p^{12}s^6}$
9. $\frac{-4c^2}{24c^5}$ $-\frac{1}{6c^3}$
10. $x^3(y^{-5})(x^{-8})$ $\frac{1}{x^5y^5}$
11. $p(q^{-2})(r^{-3})$ $\frac{p}{q^2r^3}$
12. 12^{-2} $\frac{1}{144}$
13. $\left(\frac{3}{7}\right)^{-2}$ $\frac{49}{9}$
14. $\left(\frac{4}{3}\right)^{-4}$ $\frac{81}{256}$
15. $\frac{22r^3s^2}{11r^2s^{-3}}$ $2rs^5$
16. $\frac{-15w^0u^{-1}}{5u^3}$ $-\frac{3}{u^4}$
17. $\frac{8c^3d^2f^4}{4c^{-1}d^2f^{-3}}$ $2c^4f^7$
18. $\left(\frac{x^{-3}y^5}{4^{-3}}\right)^0$ 1
19. $\frac{6f^{-2}g^3h^5}{54f^{-2}g^{-5}h^3}$ $\frac{g^8h^2}{9}$
20. $\frac{-12t^{-1}u^5v^{-4}}{2t^{-3}uv^5}$ $-\frac{6t^2u^4}{v^9}$
21. $\frac{r^4}{(3r)^3}$ $\frac{r}{27}$
22. $\frac{m^{-2}n^{-5}}{(m^4n^3)^{-1}}$ $\frac{m^2}{n^2}$
23. $\frac{(j^{-1}k^3)^{-4}}{j^3k^3}$ $\frac{j}{k^{15}}$
24. $\frac{(2a^{-2}b)^{-3}}{5a^2b^4}$ $\frac{a^4}{40b^7}$
25. $\left(\frac{q^{-1}r^3}{qr^{-2}}\right)^{-5}$ $\frac{q^{10}}{r^{25}}$
26. $\left(\frac{7c^{-3}d^3}{c^5de^{-4}}\right)^{-1}$ $\frac{c^8}{7d^2e^4}$
27. $\left(\frac{2x^3y^2z}{3x^4yz^{-2}}\right)^{-2}$ $\frac{9x^2}{4y^2z^6}$

28. **BIOLOGY** A lab technician draws a sample of blood. A cubic millimeter of the blood contains 22^3 white blood cells and 22^5 red blood cells. What is the ratio of white blood cells to red blood cells? $\frac{1}{484}$

29. **COUNTING** The number of three-letter "words" that can be formed with the English alphabet is 26^3. The number of five-letter "words" that can be formed is 26^5. How many times more five-letter "words" can be formed than three-letter "words"? 676

NAME _____ DATE_____ PERIOD ____

7-2 Word Problem Practice

Dividing Monomials

1. **CHEMISTRY** The nucleus of a certain atom is 10^{-13} centimeters across. If the nucleus of a different atom is 10^{-11} centimeters across, how many times as large is it as the first atom? 100

2. **SPACE** The Moon is approximately 25^4 kilometers away from Earth on average. The Olympus Mons volcano on Mars stands 25 kilometers high. How many Olympus Mons volcanoes, stacked on top of one another, would fit between the surface of the Earth and the Moon? $25^3 = 15{,}625$

3. **E-MAIL** Spam (also known as junk e-mail) consists of identical messages sent to thousands of e-mail users. People often obtain anti-spam software to filter out the junk e-mail messages they receive. Suppose Yvonne's anti-spam software filtered out 10^2 e-mails, and she received 10^4 e-mails last year. What fraction of her e-mails were filtered out? Write your answer as a monomial. 10^{-2}

4. **METRIC MEASUREMENT** Consider a dust mite that measures 10^{-3} millimeters in length and a caterpillar that measures 10 centimeters long. How many times as long as the mite is the caterpillar? $10^5 = 100{,}000$

COMPUTERS For Exercises 5–7, use the following information.

In 1995, standard capacity for a personal computer hard drive was 40 megabytes (MB). In 2006, a standard hard drive capacity was 40 gigabytes (GB or Gig). Refer to the table below.

Memory Capacity Approximate Conversions
8 bits = 1 byte
10^3 bytes = 1 kilobyte
10^3 kilobytes = 1 megabyte (meg)
10^3 megabytes = 1 gigabyte (gig)
10^3 gigabytes = 1 terabyte

5. The newer hard drives have about how many times the capacity of the 1995 drives? 10^3 or 1000

6. Predict the hard drive capacity in the year 2017 if this rate of growth continues. 40 terabytes

7. One kilobyte of memory is what fraction of one terabyte? $\frac{1}{10^9} = 10^{-9}$

Answers