

## Independent Practice

In Exercises 9–41, simplify, if possible.

9.  $4^2 \cdot 4^3$   $4^5$  or 1024

12.  $10^2 \cdot 10^9$   $10^{11}$

15.  $[(2x + 3)^3]^2$   $(2x + 3)^6$

18.  $[(5 + x)^3]^6$   $(5 + x)^{18}$

21.  $(4a)^2 \cdot a$   $16a^3$

24.  $(x \cdot x^2)^3 \cdot 3x$   $3x^{10}$

27.  $2x^3 \cdot (3x)^2$   $18x^5$

30.  $(-rs)(rs^3)^2$   $-r^3s^7$

33.  $(4a^2)^3(\frac{1}{2}a^3)^2$   $16a^{12}$

36.  $(-y)^4(-y)^3(-y)^2$   $-y^9$

39.  $(abc^2)^3(a^2b)^2$   $a^7b^5c^6$

10.  $6^5 \cdot 6^4$   $6^9$  or 10,077,696

13.  $x \cdot x^5$   $x^6$

16.  $(2x)^3$   $8x^3$

19.  $(-5a)^2$   $25a^2$

22.  $6^2 \cdot (6x^3)^2$   $6^4x^6$  or  $1296x^6$

25.  $(3a)^2 \cdot (-4a)^4$

28.  $3y^2 \cdot (2y)^3$   $24y^5$

31.  $(-2xy)^3(-x^2)$   $8x^5y^3$

34.  $(8b^3)^2(\frac{1}{4}b^2)^2$   $4b^{10}$

37.  $(2t)^3(-t^2)$   $-8t^5$

40.  $(r^2st^3)^2(s^4t)^3$   $r^4s^{14}t^9$

25.  $3^2(-4)^4a^6$  or  $2304a^6$

$(-9)^8$  or 43,046,721

11.  $[(-9)^2]^4$

14.  $(5^5)^4$   $5^{20}$

17.  $(3 \cdot 7)^4$   $21^4$  or 194,481

20.  $(16 \cdot 2)^2$   $32^2$  or 1024

23.  $[(-3xy)^2]^3$

26.  $(9a^3)^2 \cdot (2a)^3$

29.  $(-ab)(a^2b)^2$   $-a^5b^3$

32.  $(-3cd)^3(-d^2)$   $27c^3d^5$

35.  $(-x)^5(-x)^2(-x)^3$   $x^{10}$

38.  $(-w^3)(3w^2)^2$   $-9w^7$

41.  $(-3xy^2)^3(-2x^2y)^2$   
 $-108x^7y^8$

26.  $2^{39}9^2a^9$  or  $648a^9$

44.  $(a^2 \cdot b)^3$   $8$

47.  $[(a + 4)^2]^3 \cdot (a + 4)$   
 $78,125$

In Exercises 42–47, evaluate the expression when  $a = 1$  and  $b = 2$ .

42.  $(a^4)^3$   $1$

43.  $b^3 \cdot b^4$   $128$

45.  $(a^2b)^5$   $32$

46.  $(b^2 \cdot b^3) \cdot (b^2)^4$   $8192$

In Exercises 48–50, say which number is larger.

48.  $(5 \cdot 7)^3$  or  $5 \cdot 7^3$   $(5 \cdot 7)^3$

49.  $5^4 \cdot 2^5$  or  $(5 \cdot 2)^5$   $(5 \cdot 2)^5$

50.  $(4^5 \cdot 4^{10})$  or  $4^{50}$   $4^{50}$



Pushed to the max by the algebra test, Tim's brain spontaneously combusted.

## Exercises

Simplify.

1.  $y(y^5)$   
 $y^6$

2.  $n^2 \cdot n^7$   
 $n^9$

3.  $(-7x^2)(x^4)$   
 $-7x^6$

4.  $x(x^2)(x^4)$   
 $x^7$

5.  $m \cdot m^5$   
 $m^6$

6.  $(-x^3)(-x^4)$   
 $x^7$

7.  $(2a^2)(8a)$   
 $16a^3$

8.  $(rs)(rs^3)(s^2)$   
 $r^2s^6$

9.  $(x^2y)(4xy^3)$   
 $4x^3y^4$

10.  $\frac{1}{3}(2a^3b)(6b^3)$   
 $4a^3b^4$

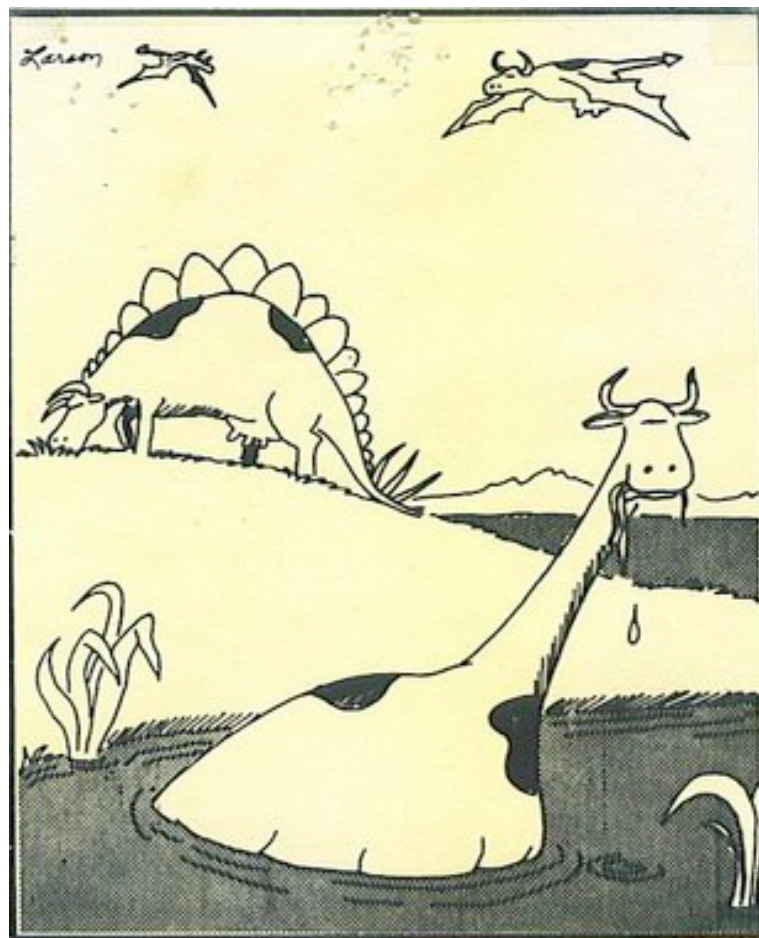
11.  $(-4x^3)(-5x^7)$   
 $20x^{10}$

12.  $(-3j^2k^4)(2jk^6)$   
 $-6j^3k^{10}$

13.  $(5a^2bc^3)\left(\frac{1}{5}abc^4\right)$   
 $a^3b^2c^7$

14.  $(-5xy)(4x^2)(y^4)$   
 $-20x^3y^5$

15.  $(10x^3yz^2)(-2xy^5z)$   
 $-20x^4y^6z^3$



Sixty-five million years ago, when cows ruled the earth

**Exercises****Simplify.**

1.  $(y^5)^2$   
 $y^{10}$

2.  $(n^7)^4$   
 $n^{28}$

3.  $(x^2)^5(x^3)$   
 $x^{13}$

4.  $-3(ab^4)^3$   
 $-3a^3b^{12}$

5.  $(-3ab^4)^3$   
 $-27a^3b^{12}$

6.  $(4x^2b)^3$   
 $64x^6b^3$

7.  $(4a^2)^2(b^3)$   
 $16a^4b^3$

8.  $(4x)^2(b^3)$   
 $16x^2b^3$

9.  $(x^2y^4)^5$   
 $x^{10}y^{20}$

10.  $(2a^3b^2)(b^3)^2$   
 $2a^3b^8$

11.  $(-4xy)^3(-2x^2)^3$   
 $512x^9y^3$

12.  $(-3j^2k^3)^2(2j^2k)^3$   
 $72j^{10}k^9$

13.  $(25a^2b)^3\left(\frac{1}{5}abc\right)^2$   
 $625a^8b^5c^2$

14.  $(2xy)^2(-3x^2)(4y^4)$   
 $-48x^4y^6$

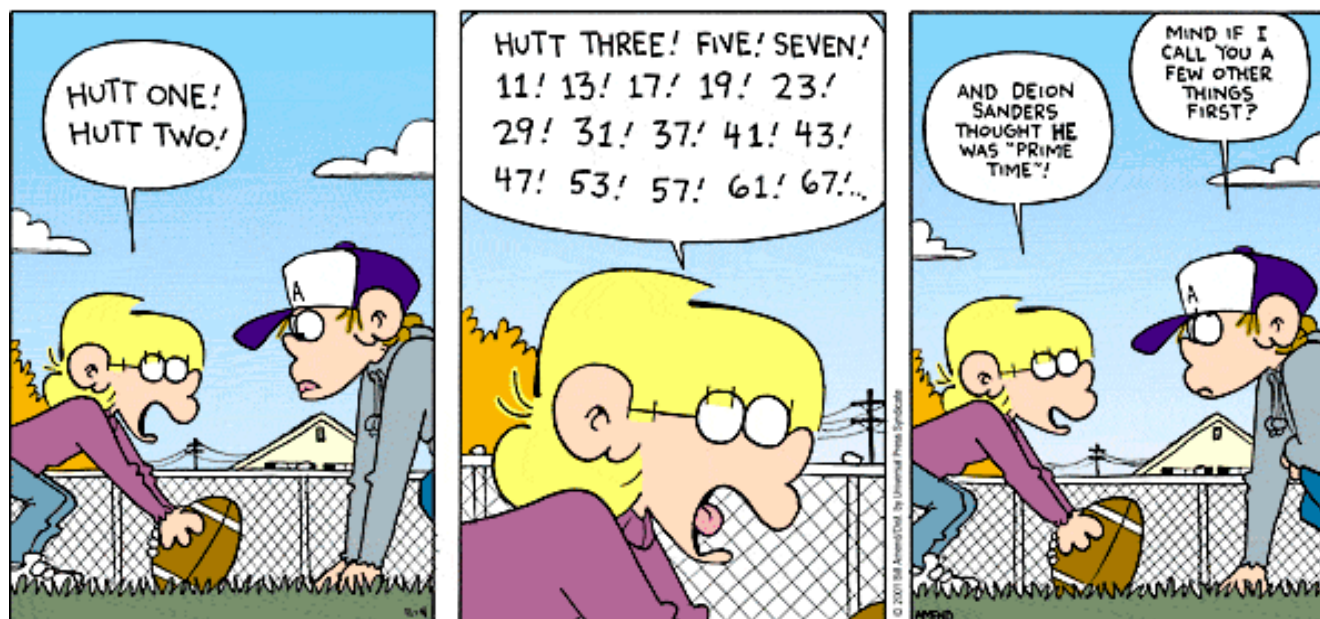
15.  $(2x^3y^2z^2)^3(x^2z)^4$   
 $8x^{17}y^6z^{10}$

16.  $(-2n^6y^5)(-6n^3y^2)(ny)^3$   
 $12n^{12}y^{10}$

17.  $(-3a^3n^4)(-3a^3n)^4$   
 $-243a^{15}n^8$

18.  $-3(2x)^4(4x^5y)^2$   
 $-768x^{14}y^2$





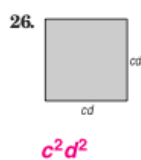
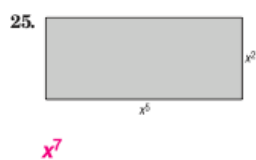
Determine whether each expression is a monomial. Write *yes* or *no*. Explain.

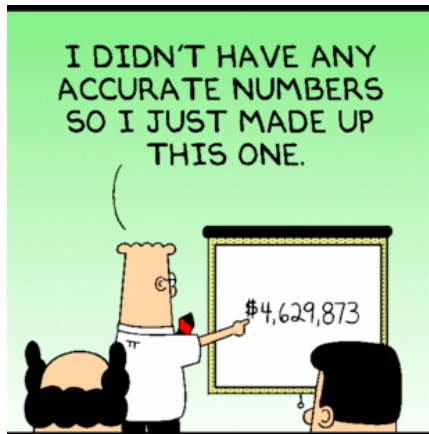
1. 11 **Yes; 11 is a real number and an example of a constant.**
2.  $a - b$  **No; This is the difference, not the product, of two variables.**
3.  $\frac{p^2}{q^2}$  **No; This is the quotient, not the product, of two variables.**
4.  $y$  **Yes; Single variables are monomials.**
5.  $j^3k$  **Yes;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

Simplify.

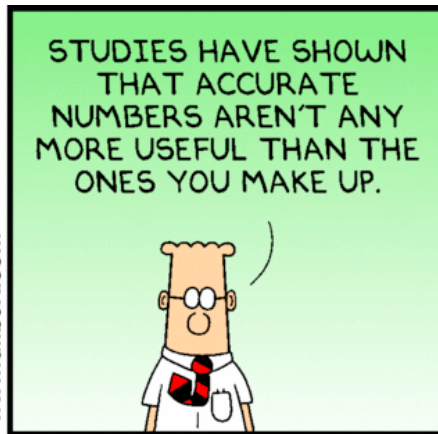
- |  |  |
|--|--|
| 7. $a^2(a^3)(a^6)$ <b><math>a^{11}</math></b>        | 8. $x(x^2)(x^7)$ <b><math>x^{10}</math></b>              |
| 9. $(y^2z)(yz^2)$ <b><math>y^3z^3</math></b>         | 10. $(\ell^2k^2)(\ell^3k)$ <b><math>\ell^5k^3</math></b> |
| 11. $(e^2f^4)(e^2f^2)$ <b><math>e^4f^6</math></b>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

**GEOMETRY** Express the area of each figure as a monomial.

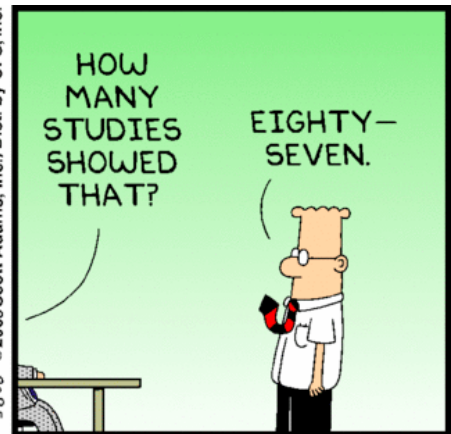




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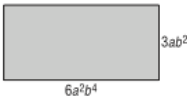


**Determine whether each expression is a monomial. Write yes or no. Explain.**

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

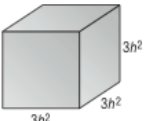
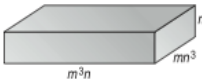
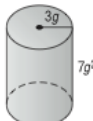
**Simplify.**

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

**GEOMETRY** Express the area of each figure as a monomial.

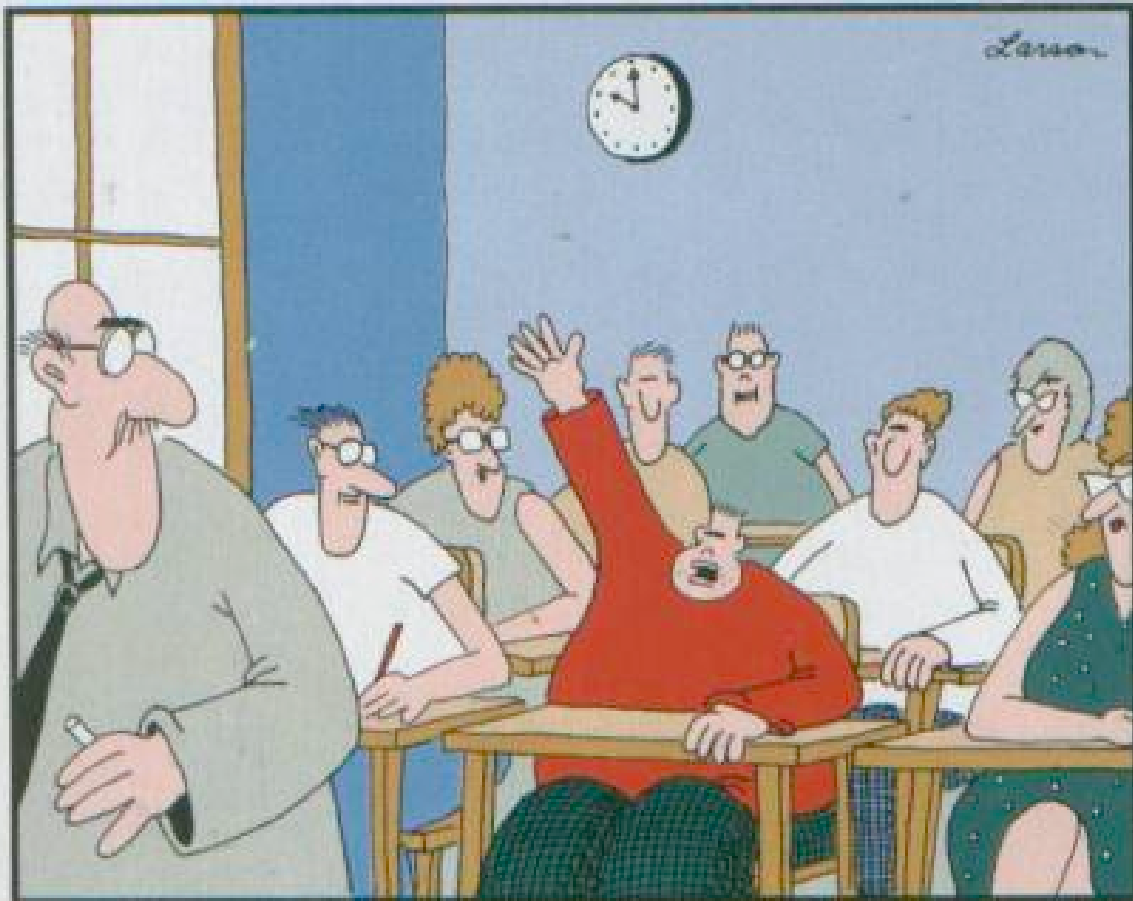
-   **$18a^3b^6$**
-   **$(25x^6)\pi$**
-   **$12a^3c^4$**

**GEOMETRY** Express the volume of each solid as a monomial.

-   **$27h^6$**
-   **$m^4n^5$**
-   **$(63g^4)\pi$**

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

- 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  $64$**



"Mr. Osborne, may I be excused?  
My brain is full."

