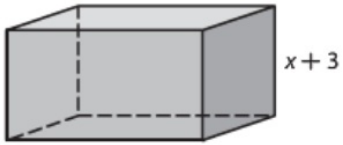
Simplify. Assume that no variable equals 0. (Lesson 5-1)

1. $(3x^2y^{-3})(-2x^3y^5)$ $-6x^5y^2$
2. $4t(3rt - r)$ $12rt^2 - 4rt$
3. $\frac{3a^4b^3c}{6a^2b^5c^3}$ $\frac{a^2}{2b^2c^2}$
4. $\left(\frac{p^2r^3}{pr^4}\right)^2$ $\frac{p^2}{r^2}$
5. $(4m^2 - 6m + 5) - (6m^2 + 3m - 1)$ $-2m^2 - 9m + 6$
6. $(x + y)(x^2 + 2xy - y^2)$ $x^3 + 3x^2y + xy^2 - y^3$

7. **MULTIPLE CHOICE** The volume of the rectangular prism is $6x^3 + 19x^2 + 2x - 3$. Which polynomial expression represents the area of the base? (Lesson 5-1) **C**



A $6x^4 + 37x^3 + 59x^2 + 3x - 9$

B $6x^2 + x + 1$

C $6x^2 + x - 1$

D $6x + 1$

12. **PENDULUMS** The formula $L(t) = \frac{8t^2}{\pi^2}$ can be used to find the length of a pendulum in feet when it swings back and forth in t seconds. Find the length of a pendulum that makes one complete swing in 4 seconds. (Lesson 5-3) **about 12.97 ft**

13. **MULTIPLE CHOICE** Find $3f(a - 4) - 2h(a)$ if $f(x) = x^2 + 3x$ and $h(x) = 2x^2 - 3x + 5$. (Lesson 5-3) **D**

A $-a^2 + 15a - 74$

B $-a^2 - 2a - 1$

C $a^2 + 9a - 2$

D $-a^2 - 9a + 2$

14. **ENERGY** The power generated by a windmill is a function of the speed of the wind. The approximate power is given by the function $P(s) = \frac{s^3}{1000}$, where s represents the speed of the wind in kilometers per hour. Find the units of power $P(s)$ generated by a windmill when the wind speed is 18 kilometers per hour. (Lesson 5-3) **5.832 units**

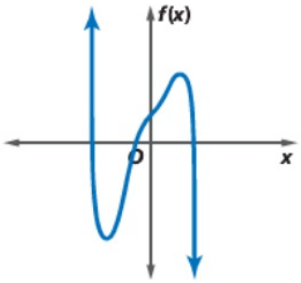
Simplify. (Lesson 5-2)

8. $(4r^3 - 8r^2 - 13r + 20) \div (2r - 5)$ $2r^2 + r - 4$

9. $\frac{3x^3 - 16x^2 + 9x - 24}{x - 5}$ $3x^2 - x + 4 - \frac{4}{x - 5}$

10. Describe the end behavior of the graph. Then determine whether it represents an odd-degree or an even-degree polynomial function and state the number of real zeros. (Lesson 5-3)

end behavior: $f(x) \to \infty$ as $x \to -\infty$ and $f(x) \to -\infty$ as $x \to \infty$; odd-degree function; 3 real zeros



11. **MULTIPLE CHOICE** Find $p(-3)$ if $p(x) = \frac{2}{3}x^3 + \frac{1}{3}x^2 - 5x$. (Lesson 5-3) **F**

F 0 **H** 30

G 11 **J** 36

Use $f(x) = x^3 - 2x^2 - 3x$ for Exercises 15–17. (Lesson 5-4)

15. Graph the function. **See margin.**

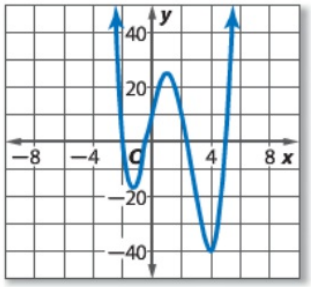
16. Estimate the x-coordinates at which the relative maxima and relative minima occur. **$x = -0.5$ and 2**

17. State the domain and range of the function.

18. Determine the consecutive integer values of x between which each real zero is located for $f(x) = 3x^2 - 3x - 1$. (Lesson 5-4)
between −1 and 0 and between 1 and 2

Refer to the graph. (Lesson 5-4)

17. D = {all real numbers}, R = {all real numbers}



maximum at $x \approx 1$; minima at $x \approx -1.5$ and $x \approx 4$

19. Estimate the x-coordinate of every turning point, and determine if those coordinates are relative maxima or relative minima.

20. Estimate the x-coordinate of every zero. **−2, −0.5, 2.5, 5**

21. What is the least possible degree of the function? **4**

Additional Answer

15.