

GUIDED PRACTICE

Vocabulary Check ✓

Concept Check ✓

- When you add or subtract polynomials, you add or subtract the coefficients of ?.
- ERROR ANALYSIS** Describe the error in the subtraction shown below:

$$\begin{array}{r} \cancel{(x^2 - 3x + 4) - (x^2 + 7x - 2)} \\ \hline = x^2 - 3x + 4 - x^2 + 7x - 2 \\ = 4x + 2 \end{array}$$

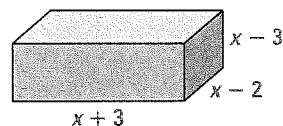
- When you multiply a polynomial of degree 2 by a polynomial of degree 4, what is the degree of the product?

Skill Check ✓

Perform the indicated operation.

- $(4x^2 + 3) + (3x^2 + 8)$
- $(x^2 + 7x - 5) - (3x^2 + 1)$
- $(x + 2)(2x^2 + 3)$
- $(x - 1)(2x + 1)(x + 5)$
- $(2x^3 - 4x^2 + 5) + (-x^2 - 3x + 1)$
- $(x^2 + 1) - (3x^2 - 4x + 3)$
- $(x^2 + 3x + 10)(4x^2 - 2x - 7)$
- $(-3x + 1)^3$

- GEOMETRY CONNECTION** Write a polynomial model in standard form for the volume of the rectangular prism shown at the right.



PRACTICE AND APPLICATIONS

STUDENT HELP

Extra Practice
to help you master
skills is on p. 948.

ADDING AND SUBTRACTING POLYNOMIALS Find the sum or difference.

- $(8x^2 + 1) + (3x^2 - 2)$
- $(x^2 - 6x + 5) - (x^2 + x - 2)$
- $(7x^3 - 1) - (15x^3 + 4x^2 - x + 3)$
- $(4x^2 - 11x + 10) + (5x - 31)$
- $(-3x^3 + x - 11) - (4x^3 + x^2 - x)$
- $(10x^3 - 4x^2 + 3x) - (x^3 - x^2 + 1)$
- $(10x - 3 + 7x^2) + (x^3 - 2x + 17)$
- $(3x^3 + 10x + 5) - (x^3 - 4x + 6)$
- $(16 - 13x) + (10x - 11)$
- $8x + (14x + 3 - 41x^2 + x^3)$
- $(9x^3 - 4 + x^2 + 8x) - (7x^3 - 3x + 7)$
- $(6x^2 - 19x + 5) - (19x^2 - 4x + 9)$
- $(50x - 3) + (8x^3 + 7x^2 + x + 4)$
- $(3x^3 - 5x^4 - 10x + 1) + (17x^4 - x^3)$

MULTIPLYING POLYNOMIALS Find the product of the polynomials.

- $x(x^2 + 6x - 7)$
- $10x^2(x - 5)$
- $-4x(x^2 - 8x + 3)$
- $5x(3x^2 - x + 3)$
- $(x - 4)(x - 7)$
- $(x + 9)(x - 2)$
- $(x + 3)(x^2 - 4x + 9)$
- $(x + 8)(x^2 - 7x - 3)$
- $(2x + 5)(3x^3 - x^2 + x)$
- $(6x + 2)(2x^2 - 6x + 1)$
- $(x + 11)(x^2 - 5x + 9)$
- $(4x^2 - 1)(x^2 - 6x + 9)$
- $(x - 1)(x^3 + 2x^2 + 2)$
- $(x + 1)(5x^3 - x^2 + x - 4)$
- $(3x^2 - 2)(x^2 + 4x + 3)$
- $(-x^3 - 2)(x^2 + 3x - 3)$
- $(x^2 + x + 4)(2x^2 - x + 1)$
- $(x^2 - x - 3)(x^2 + 4x + 2)$

STUDENT HELP

HOMEWORK HELP

Examples 1, 2: Exs. 13–26
Examples 3, 4: Exs. 27–44
Example 5: Exs. 45–52
Example 6: Exs. 53–61
Example 7: Exs. 64, 65, 69
Example 8: Exs. 66–68

MULTIPLYING THREE BINOMIALS Find the product of the binomials.

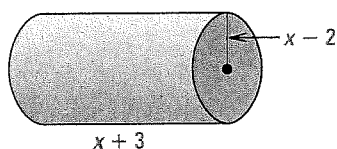
45. $(x + 9)(x - 2)(x - 7)$ 46. $(x + 3)(x - 4)(x - 5)$
 47. $(x + 5)(x + 7)(-x + 1)$ 48. $(2x - 3)(x + 7)(x + 6)$
 49. $(x - 9)(x - 2)(3x + 2)$ 50. $(x - 1)(-2x - 5)(x - 8)$
 51. $(2x + 1)(3x + 1)(x + 4)$ 52. $(4x - 1)(2x - 1)(3x - 2)$

SPECIAL PRODUCTS Find the product.

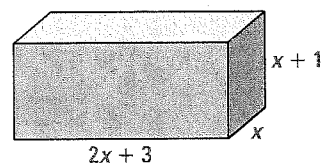
53. $(x + 7)(x - 7)$ 54. $(x + 4)^2$ 55. $(4x - 3)^3$
 56. $(10x + 3)(10x - 3)$ 57. $(6 - x^2)^2$ 58. $(2y + 5x)^2$
 59. $(3x + 7)^3$ 60. $(7y - x)^2$ 61. $(2x + 3y)^3$

GEOMETRY CONNECTION Write the volume of the figure as a polynomial in standard form.

62. $V = \pi r^2 h$



63. $V = lwh$



64. **MOTOR VEHICLE SALES** For 1983 through 1996, the number of cars C (in thousands) and the number of trucks and buses T (in thousands) sold that were manufactured in the United States can be modeled by

$$C = -1.63t^4 + 49.5t^3 - 476t^2 + 1370t + 6705$$

$$T = -1.052t^4 + 31.6t^3 - 296t^2 + 1097t + 2290$$


where t is the number of years since 1983. Find a model that represents the total number of vehicles sold that were manufactured in the United States. How many vehicles were sold in 1990?

65. **SOCIAL STUDIES CONNECTION** For 1980 through 1996, the population P (in thousands) of the United States and the number of people S (in thousands) age 85 and over can be modeled by

$$P = -0.804t^4 + 26.9t^3 - 262t^2 + 3010t + 227,000$$

$$S = 0.0206t^4 - 0.670t^3 + 6.42t^2 + 213t + 7740$$

where t is the number of years since 1980. Find a model that represents the number of people in the United States under the age of 85. How many people were under the age of 85 in 1995?

 **DATA UPDATE** of U.S. Bureau of the Census data at www.mcdougallittell.com


66. **BICYCLING** The equation $P = 0.00267sF$ gives the power P (in horsepower) needed to keep a certain bicycle moving at speed s (in miles per hour), where F is the force of road and air resistance (in pounds). On level ground this force is given by $F = 0.0116s^2 + 0.789$. Write a polynomial function (in terms of s only) for the power needed to keep the bicycle moving at speed s on level ground. How much power does a cyclist need to exert to keep the bicycle moving at 10 miles per hour?

FOCUS ON CAREERS



REAL LIFE GERONTOLOGIST

A gerontologist studies the biological, psychological, and sociological phenomena associated with old age. As people's life expectancies have increased, demand for gerontologists has grown.

 **CAREER LINK**
www.mcdougallittell.com