Check Your Understanding

= Step-by-Step Solutions begin on page R13.

Go Online! for a Self-Check Quiz

Example 1 **Determine whether each expression is a polynomial. If it is a polynomial, find the degree and determine whether it is a *monomial, binomial,* or *trinomial.***

1. $7ab + 6b^2 - 2a^3$
2. $2y - 5 + 3y^2$
3. $3x^2$
4. $\frac{4m}{3p}$
5. $5m^2p^3 + 6$
6. $5q^{-4} + 6q$

Example 2 **Write each polynomial in standard form. Identify the leading coefficient.**

7. $2x^5 - 12 + 3x$
8. $-4d^4 + 1 - d^2$
9. $4z - 2z^2 - 5z^4$
10. $2a + 4a^3 - 5a^2 - 1$

Examples 3–4 TEKS A.10(A) **Find each sum or difference.**

11. $(6x^3 - 4) + (-2x^3 + 9)$
12. $(g^3 - 2g^2 + 5g + 6) - (g^2 + 2g)$
13. $(4 + 2a^2 - 2a) - (3a^2 - 8a + 7)$
14. $(8y - 4y^2) + (3y - 9y^2)$
15. $(-4z^3 - 2z + 8) - (4z^3 + 3z^2 - 5)$
16. $(-3d^2 - 8 + 2d) + (4d - 12 + d^2)$
17. $(y + 5) + (2y + 4y^2 - 2)$
18. $(3n^3 - 5n + n^2) - (-8n^2 + 3n^3)$

Example 5 TEKS A.10(A)

19. MP **ORGANIZE IDEAS** The total number of students T who traveled for spring break consists of two groups: students who flew to their destinations F and students who drove to their destination D. The number (in thousands) of students who flew and the total number of students who flew or drove can be modeled by the following equations, where n is the number of years since 2010.

$$T = 14n + 21 \qquad F = 8n + 7$$

a. Write an equation that models the number of students who drove to their destination for this time period.

b. Predict the number of students who will drive to their destination in 2027.

c. How many students will drive or fly to their destination in 2030?

Practice and Problem Solving

Extra Practice is on page R8.

Example 1 **Determine whether each expression is a polynomial. If it is a polynomial, find the degree and determine whether it is a *monomial, binomial,* or *trinomial.***

20. $\frac{5y^3}{x^2} + 4x$
21. 21
22. $c^4 - 2c^2 + 1$
23. $d + 3d^c$
24. $a - a^2$
25. $5n^3 + nq^3$

Example 2 **Write each polynomial in standard form. Identify the leading coefficient.**

26. $5x^2 - 2 + 3x$
27. $8y + 7y^3$
28. $4 - 3c - 5c^2$
29. $-y^3 + 3y - 3y^2 + 2$
30. $11t + 2t^2 - 3 + t^5$
31. $2 + r - r^3$
32. $\frac{1}{2}x - 3x^4 + 7$
33. $-9b^2 + 10b - b^6$

Examples 3–4 TEKS A.10(A)

Find each sum or difference.

34. $(2c^2 + 6c + 4) + (5c^2 - 7)$

35. $(2x + 3x^2) - (7 - 8x^2)$

36. $(3c^3 - c + 11) - (c^2 + 2c + 8)$

37. $(z^2 + z) + (z^2 - 11)$

38. $(2x - 2y + 1) - (3y + 4x)$

39. $(4a - 5b^2 + 3) + (6 - 2a + 3b^2)$

40. $(x^2y - 3x^2 + y) + (3y - 2x^2y)$

41. $(-8xy + 3x^2 - 5y) + (4x^2 - 2y + 6xy)$

42. $(5n - 2p^2 + 2np) - (4p^2 + 4n)$

43. $(4rxt - 8r^2x + x^2) - (6rx^2 + 5rxt - 2x^2)$

Example 5 TEKS A.10(A)

44. PETS From 2006 through 2016, suppose the number of dogs D and the number of cats C (in hundreds) adopted from animal shelters in a region of the United States are modeled by the equations $D = 2n + 3$ and $C = n + 4$, where n is the number of years since 2006.

a. Write a function that models the total number T of dogs and cats adopted in hundreds for this time period.

b. If this trend continues, how many dogs and cats will be adopted in 2020?

Classify each polynomial according to its degree and number of terms.

45. $4x - 3x^2 + 5$

46. $11z^3$

47. $9 + y^4$

48. $3x^3 - 7$

49. $-2x^5 - x^2 + 5x - 8$

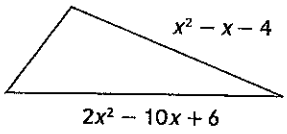
50. $10t - 4t^2 + 6t^3$

51. ENROLLMENT In a rapidly growing school system, the number (in hundreds) of total students is represented by N and the number of students in Kindergarten through 5th grade is represented by P. The equations $N = 1.25t^2 - t + 7.5$ and $P = 0.7t^2 - 0.95t + 3.8$ model the number of students enrolled from 2006 to 2015, where t is the number of years since 2006.

a. Write an equation modeling the number of students S in grades 6 through 12 enrolled for this time period.

b. How many students were enrolled in grades 6 through 12 in the school system in 2013?

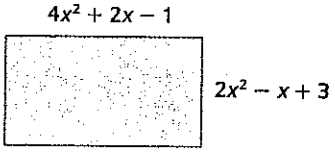
52. MP ANALYZE RELATIONSHIPS The perimeter of the triangle can be represented by the expression $3x^2 - 7x + 2$. Write a polynomial that represents the measure of the third side.



53. GEOMETRY Consider the rectangle.

a. What does $(4x^2 + 2x - 1)(2x^2 - x + 3)$ represent?

b. What does $2(4x^2 + 2x - 1) + 2(2x^2 - x + 3)$ represent?



Find each sum or difference.

54. $(4x + 2y - 6z) + (5y - 2z + 7x) + (-9z - 2x - 3y)$

55. $(5a^2 - 4) + (a^2 - 2a + 12) + (4a^2 - 6a + 8)$

56. $(3c^2 - 7) + (4c + 7) - (c^2 + 5c - 8)$

57. $(3n^3 + 3n - 10) - (4n^2 - 5n) + (4n^3 - 3n^2 - 9n + 4)$

58. FOOTBALL A school district has two high schools, North and South. From 2010 through 2015, the total attendance T at games for both schools and at games for North High School N can be modeled by the following equations, where x is the number of years since 2010.

$T = -0.69x^3 + 55.38x^2 + 643.31x + 10{,}538$ $N = -3.78x^3 + 58.96x^2 + 265.96x + 5257$

Estimate how many people attended South High School football games in 2015.