**5-1**

## Practice

Form G

Polynomial Functions

**Write each polynomial in standard form. Then classify it by degree and by number of terms.**

**1.** $4x + x + 2$

**2.** $-3 + 3x - 3x$

**3.** $6x^4 - 1$

**4.** $1 - 2s + 5s^4$

**5.** $5m^2 - 3m^2$

**6.** $x^2 + 3x - 4x^3$

**7.** $-1 + 2x^2$

**8.** $5m^2 - 3m^3$

**9.** $5x - 7x^2$

**10.** $2 + 3x^3 - 2$

**11.** $6 - 2x^3 - 4 + x^3$

**12.** $6x - 7x$

**13.** $a^3(a^2 + a + 1)$

**14.** $x(x + 5) - 5(x + 5)$

**15.** $p(p - 5) + 6$

**16.** $(3c^2)^2$

**17.** $-(3 - b)$

**18.** $6(2x - 1)$

**19.** $\dfrac{2}{3} + s^2$

**20.** $\dfrac{2x^4 + 4x - 5}{4}$

**21.** $\dfrac{3 - z^5}{3}$

**Determine the end behavior of the graph of each polynomial function.**

**22.** $y = 3x^4 + 6x^3 - x^2 + 12$

**23.** $y = 50 - 3x^3 + 5x^2$

**24.** $y = -x + x^2 + 2$

**25.** $y = 4x^2 + 9 - 5x^4 - x^3$

**26.** $y = 12x^4 - x + 3x^7 - 1$

**27.** $y = 2x^5 + x^2 - 4$

**28.** $y = 5 + 2x + 7x^2 - 5x^3$

**29.** $y = 20 - 5x^6 + 3x - 11x^3$

**30.** $y = 6x + 25 + 4x^4 - x^2$

**Describe the shape of the graph of each cubic function by determining the end behavior and number of turning points.**

**31.** $y = x^3 + 4x$

**32.** $y = -2x^3 + 3x - 1$

**33.** $y = 5x^3 + 6x^2$

**Determine the degree of the polynomial function with the given data.**

**34.**

| x | y |
|---|---|
| -2 | -16 |
| -1 | 1 |
| 0 | 4 |
| 1 | 5 |
| 2 | 16 |

**35.**

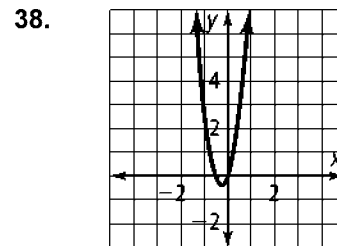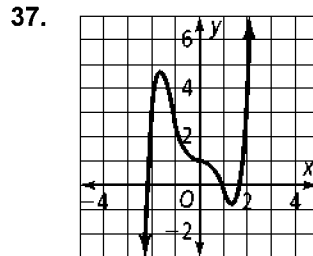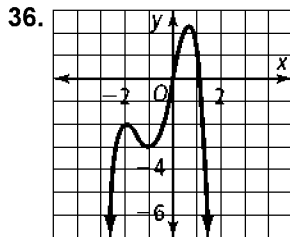| x | y |
|---|---|
| -2 | 52 |
| -1 | 6 |
| 0 | 2 |
| 1 | 4 |
| 2 | 48 |

## 5-1    **Practice** (continued)             *Form G*

### Polynomial Functions

**Determine the sign of the leading coefficient and the degree of the polynomial function for each graph.**

**36.** 

**37.** 

**38.** 

**39. Error Analysis** A student claims the function $y = 3x^4 - x^3 + 7$ is a fourth-degree polynomial with end behavior of down and down. Describe the error the student made. What is wrong with this statement?

**40.** The table at the right shows data representing a polynomial function.
  **a.** What is the degree of the polynomial function?
  **b.** What are the second differences of the $y$-values?
  **c.** What are the differences when they are constant?

| x | y |
|---|---|
| −3 | −999 |
| −2 | −140 |
| −1 | −7 |
| 0 | 0 |
| 1 | 1 |
| 2 | 116 |
| 3 | 945 |

**Classify each polynomial by degree and by number of terms. Simplify first if necessary.**

**41.** $4x^5 - 5x^2 + 3 - 2x^2$

**42.** $b(b - 3)^2$

**43.** $(7x^2 + 9x - 5) + (9x^2 - 9x)$

**44.** $(x + 2)^3$

**45.** $(4s^4 - s^2 - 3) - (3s - s^2 - 5)$

**46.** 13

**47. Open-Ended** Write a third-degree polynomial function. Make a table of values and a graph.

**48. Writing** Explain why finding the degree of a polynomial is easier when the polynomial is written in standard form.