5.5 EXERCISES

HOMEWORK KEY

- = **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 17, 25, and 43
- = **TAKS PRACTICE AND REASONING** Exs. 35, 39, 44, 45, 47, and 48
- = **MULTIPLE REPRESENTATIONS** Ex. 38

SKILL PRACTICE

1. VOCABULARY State the remainder theorem.

2. WRITING Synthetic division has been used to divide $f(x) = x^4 - 5x^2 + 8x - 2$ by $x + 3$. *Explain* what the colored numbers represent in the division problem.

$$\begin{array}{r|rrrrr} -3 & 1 & 0 & -5 & 8 & -2 \\ & & -3 & 9 & -12 & 12 \\ \hline & \mathbf{1} & \mathbf{-3} & \mathbf{4} & \mathbf{-4} & \mathbf{10} \end{array}$$

EXAMPLES 1 and 2 on pp. 362–363 for Exs. 3–10

USING LONG DIVISION **Divide using polynomial long division.**

3. $(x^2 + x - 17) \div (x - 4)$

4. $(3x^2 - 11x - 26) \div (x - 5)$

5. $(x^3 + 3x^2 + 3x + 2) \div (x - 1)$

6. $(8x^2 + 34x - 1) \div (4x - 1)$

7. $(3x^3 + 11x^2 + 4x + 1) \div (x^2 + x)$

8. $(7x^3 + 11x^2 + 7x + 5) \div (x^2 + 1)$

9. $(5x^4 - 2x^3 - 7x^2 - 39) \div (x^2 + 2x - 4)$

10. $(4x^4 + 5x - 4) \div (x^2 - 3x - 2)$

EXAMPLE 3 on p. 363 for Exs. 11–20

USING SYNTHETIC DIVISION **Divide using synthetic division.**

11. $(2x^2 - 7x + 10) \div (x - 5)$

12. $(4x^2 - 13x - 5) \div (x - 2)$

13. $(x^2 + 8x + 1) \div (x + 4)$

14. $(x^2 + 9) \div (x - 3)$

15. $(x^3 - 5x^2 - 2) \div (x - 4)$

16. $(x^3 - 4x + 6) \div (x + 3)$

17. $(x^4 - 5x^3 - 8x^2 + 13x - 12) \div (x - 6)$

18. $(x^4 + 4x^3 + 16x - 35) \div (x + 5)$

ERROR ANALYSIS ***Describe*** **and correct the error in using synthetic division to divide $x^3 - 5x + 3$ by $x - 2$.**

19.

$$\begin{array}{r|rrrr} 2 & 1 & 0 & -5 & 3 \\ & & 2 & 4 & -2 \\ \hline & 1 & 2 & -1 & 1 \end{array}$$

$$\frac{x^3 - 5x + 3}{x - 2} = x^3 + 2x^2 - x + 1$$

20.

$$\begin{array}{r|rrr} 2 & 1 & -5 & 3 \\ & & 2 & -6 \\ \hline & 1 & -3 & -3 \end{array}$$

$$\frac{x^3 - 5x + 3}{x - 2} = x^2 - 3x - \frac{3}{x - 2}$$

EXAMPLE 4 on p. 364 for Exs. 21–28

FACTOR **Given polynomial $f(x)$ and a factor of $f(x)$, factor $f(x)$ completely.**

21. $f(x) = x^3 - 10x^2 + 19x + 30;\ x - 6$

22. $f(x) = x^3 + 6x^2 + 5x - 12;\ x + 4$

23. $f(x) = x^3 - 2x^2 - 40x - 64;\ x - 8$

24. $f(x) = x^3 + 18x^2 + 95x + 150;\ x + 10$

25. $f(x) = x^3 + 2x^2 - 51x + 108;\ x + 9$

26. $f(x) = x^3 - 9x^2 + 8x + 60;\ x + 2$

27. $f(x) = 2x^3 - 15x^2 + 34x - 21;\ x - 1$

28. $f(x) = 3x^3 - 2x^2 - 61x - 20;\ x - 5$

EXAMPLE 5 on p. 365 for Exs. 29–35

FIND ZEROS **Given polynomial function f and a zero of f, find the other zeros.**

29. $f(x) = x^3 - 2x^2 - 21x - 18;\ -3$

30. $f(x) = 4x^3 - 25x^2 - 154x + 40;\ 10$

31. $f(x) = 10x^3 - 81x^2 + 71x + 42;\ 7$

32. $f(x) = 3x^3 + 34x^2 + 72x - 64;\ -4$

33. $f(x) = 2x^3 - 10x^2 - 71x - 9;\ 9$

34. $f(x) = 5x^3 - x^2 - 18x + 8;\ -2$