NAME _____ DATE _____

12-4

Dividing Polynomials (Pages 675–680)

To divide a polynomial by a *monomial*, divide each term of the polynomial by the monomial. To divide a polynomial by a *binomial*, first try factoring the dividend. If you cannot factor the dividend, use long division.

EXAMPLES

A Find $(5x^2 - 3xy + 2y^2) \div 2xy$.

$\frac{5x^2 - 3xy + 2y^2}{2xy}$ *Rewrite as a fraction.*

$= \frac{5x^2}{2xy} - \frac{3xy}{2xy} + \frac{2y^2}{2xy}$ *Divide each term by 2xy.*

$= \frac{5x}{2y} - \frac{3}{2} + \frac{y}{x}$ *Simplify each term.*

The quotient is $\frac{5x}{2y} - \frac{3}{2} + \frac{y}{x}$.

B Find $(t^2 - 5t + 10) \div (t + 3)$.

Since the dividend, $t^2 - 5t + 10$, cannot be factored, use long division.

$t + 3\overline{)t^2 - 5t + 10}$ $\quad t$ *$t^2 \div t = t$*

$(-)\ t^2 + 3t$ *Multiply t and t + 3.*

$-8t$ *Subtract.*

$t + 3\overline{)t^2 - 5t + 10}$ $\quad t - 8$

$(-)\ t^2 + 3t$

$-8t + 10$ *Multiply −8 and t + 3.*

$(-)\ -8t - 24$ *Subtract.*

34

The quotient is $t - 8$ with remainder 34 or $t - 8 + \frac{34}{t + 3}$.

Try These Together

1. Find $(x^3 + 4x - 8) \div 2x$.
HINT: Divide each term of the dividend by 2x.

2. Find $(y^2 + 7y + 10) \div (y + 2)$.
HINT: Factor the dividend, $y^2 + 7y + 10$.

PRACTICE

Find each quotient.

3. $(k^2 - 12k + 6) \div 3k$

4. $(x^2 + 7x + 10) \div (x + 2)$

5. $(x^2 - 5x + 6) \div (x - 3)$

6. $(a^2 - 3a - 4) \div (a + 1)$

7. $(2y^2 + 10y + 8) \div (y + 4)$

8. $(x^2 + 8x + 14) \div (x + 1)$

9. $(2b^2 - 5b + 8) \div (b - 2)$

10. $(2x^2 + 9x + 3) \div (x + 3)$

11. $\frac{t^2 - 6t + 16}{8t}$

12. $\frac{2n^2 + 6n + 3}{n + 3}$

13. $\frac{x^2 + 5x + 6}{x + 1}$

14. $\frac{6x^2 + x - 10}{2x - 3}$

15. $\frac{y^3 - 4y^2 + 2y + 8}{y + 1}$

16. $\frac{x^3 + x - 2}{x - 1}$

17. **Standardized Test Practice** Find $(3x^2 + 6x + 9) \div 3x$.

A $3x + 3$ **B** $3x + 2$ **C** $x + 3 + \frac{3}{x}$ **D** $x + 2 + \frac{3}{x}$

Answers: **1.** $\frac{x^2}{2} + 2 - \frac{4}{x}$ **2.** $y + 5$ **3.** $\frac{k}{3} - 4 + \frac{2}{k}$ **4.** $x + 5$ **5.** $x - 2$ **6.** $a - 4$ **7.** $2y + 2$ **8.** $x + 7 + \frac{7}{x+1}$ **9.** $2b - 1 + \frac{6}{b-2}$ **10.** $2x + 3 - \frac{6}{x+3}$ **11.** $\frac{t}{8} - \frac{3}{4} + \frac{2}{t}$ **12.** $2n + \frac{3}{n+3}$ **13.** $x + 4 + \frac{2}{x+1}$ **14.** $3x + 5 + \frac{5}{2x-3}$ **15.** $y^2 - 5y + 7 + \frac{1}{y+1}$ **16.** $x^2 + x + 2$ **17.** D