

Combined Operations Some fractional expressions involve more than one operation. When simplifying such expressions, we follow the order of operations on page 5.

EXAMPLE 8
$$\left(\frac{1}{x} - \frac{1}{x+1}\right) \cdot \frac{x^3 - x}{x^2 + 1} = \left[\frac{(x+1) - x}{x(x+1)}\right] \cdot \frac{x^3 - x}{x^2 + 1}$$

$$= \frac{1}{\cancel{x}(x+1)} \cdot \frac{\cancel{x}(x+1)(x-1)}{x^2 + 1}$$

$$= \frac{x-1}{x^2 + 1} \quad (x \neq -1, 0)$$

EXERCISE 2.3

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■ Write each sum or difference as a single fraction in lowest terms. See Example 1.

1. $\frac{x}{2} - \frac{3}{2}$

2. $\frac{y}{7} - \frac{5}{7}$

3. $\frac{1}{6}a + \frac{1}{6}b - \frac{5}{6}c$

4. $\frac{1}{3}x - \frac{2}{3}y + \frac{1}{3}z$

5. $\frac{x-1}{2y} + \frac{x}{2y}$

6. $\frac{y+1}{b} + \frac{y-1}{b}$

7. $\frac{3}{x+2y} - \frac{x+3}{x+2y} - \frac{x-1}{x+2y}$

8. $\frac{2}{a-3b} - \frac{b-2}{a-3b} + \frac{b}{a-3b}$

9. $\frac{a+1}{a^2-2a+1} - \frac{5-3a}{a^2-2a+1}$

10. $\frac{x+4}{x^2-x+2} - \frac{2x-3}{x^2-x+2}$

■ Express each fraction as an equivalent fraction with the given denominator. See Example 2.

11. $\frac{2}{6x} = \frac{?}{18x}$

12. $\frac{5}{3y} = \frac{?}{21y}$

13. $\frac{-a^2}{b} = \frac{?}{b^3}$

14. $\frac{-a}{b} = \frac{?}{ab^2}$

15. $y = \frac{?}{xy}$

16. $x = \frac{?}{xy^3}$

17. $\frac{3y}{y+2} = \frac{?}{y^2-y-6}$

18. $\frac{5y}{y+3} = \frac{?}{y^2+y-6}$

19. $\frac{3}{a-b} = \frac{?}{b^2-a^2}$

20. $\frac{5}{2a+b} = \frac{?}{b^2-4a^2}$