

Answers**5-6 Sums and Differences of Rational Expressions (continued)**

Simplify.

1. $\frac{7}{8} - \frac{3}{8} + \frac{1}{8}$ $\frac{5}{8}$

2. $\frac{1}{2} + \frac{1}{3} + \frac{3}{5}$ $\frac{43}{30}$

3. $\frac{5}{6} + \frac{2}{5} - \frac{8}{15}$ $\frac{7}{10}$

4. $\frac{3}{4} + \frac{5}{18} - \frac{7}{9}$ $\frac{1}{4}$

5. $\frac{5}{2x} - \frac{3}{2x}$ $\frac{1}{x}$

6. $\frac{3}{5x^3y} - \frac{2}{xy^2}$ $\frac{3y - 10x^2}{5x^3y^2}$

7. $\frac{x}{x+1} + \frac{1}{x+1}$ 1

8. $\frac{8t+4}{t-2} - \frac{6t-1}{t-2}$ $\frac{2t+5}{t-2}$

9. $\frac{2}{3z} + \frac{7}{12z}$ $\frac{5}{4z}$

10. $\frac{3}{rs} - \frac{4}{rs^2}$ $\frac{3s-4}{rs^2}$

11. $\frac{3m-2}{6} - \frac{m-3}{9}$ $\frac{7m}{18}$

12. $\frac{2n+1}{3n} + \frac{2-3n}{4n}$ $\frac{10-n}{12n}$

Example 3 Simplify $\frac{3}{x^2+x-2} - \frac{5}{x^2-x-6}$.

Solution

$x^2 + x - 2 = (x + 2)(x - 1)$

$x^2 - x - 6 = (x - 3)(x + 2)$

Factor the denominators
to find the LCD.

So the LCD is $(x + 2)(x - 1)(x - 3)$.

$$\begin{aligned} \frac{3}{x^2+x-2} - \frac{5}{x^2-x-6} &= \frac{3}{(x+2)(x-1)} - \frac{5}{(x-3)(x+2)} \\ &= \frac{3(x-3)}{(x+2)(x-1)(x-3)} - \frac{5(x-1)}{(x-3)(x+2)(x-1)} \\ &= \frac{3(x-3) - 5(x-1)}{(x+2)(x-1)(x-3)} \\ &= \frac{3x-9-5x+5}{(x+2)(x-1)(x-3)} \\ &= \frac{-2x-4}{(x+2)(x-1)(x-3)} \\ &= \frac{-2(x+2)}{(x+2)(x-1)(x-3)} \\ &= \frac{-2}{(x-1)(x-3)}, \text{ or } -\frac{2}{(x-1)(x-3)} \end{aligned}$$

Simplify.

13. $\frac{2}{k-3} + \frac{4}{k+3}$

$\frac{6(k-1)}{(k+3)(k-3)}$

15. $\frac{y}{y-1} + \frac{4}{y+1}$

$\frac{y^2+5y-4}{(y+1)(y-1)}$

17. $\frac{1}{x^2-3x} - \frac{1}{x^2-9}$

$\frac{3}{x(x+3)(x-3)}$

19. $\frac{3}{p^2-3p+2} - \frac{2}{p^2-1}$

$\frac{p+7}{(p-2)(p-1)(p+1)}$

14. $\frac{c+1}{c} - \frac{c}{c+1}$

$\frac{2c+1}{c(c+1)}$

16. $\frac{5m+1}{2m^2-2m} - \frac{3}{2m-2}$

$\frac{2m+1}{2m(m-1)}$

18. $\frac{1}{z^2-4} + \frac{1}{(z-2)^2}$

$\frac{2z}{(z+2)(z-2)^2}$

20. $\frac{1}{x^2+x-2} + \frac{1}{x^2-5x+4}$

$\frac{2}{(x+2)(x-4)}$