

5. Simplify.

(a) $\frac{x}{3x-6} + \frac{3}{2x-4}$ (b) $\frac{3x-1}{x^2+3x} + \frac{2}{5x}$ (c) $\frac{6}{y} + \frac{3}{y^2-2y}$
 (d) $\frac{4p}{p^2+3p} - \frac{2}{p+3}$ (e) $\frac{2x+1}{x^2-x-2} + \frac{3}{x-2}$ (f) $\frac{4a}{a^2-9} - \frac{2}{a+3}$
 (g) $\frac{1}{y+4} - \frac{y-3}{y^2+3y-4}$ (h) $\frac{3m+1}{2m-3} + \frac{m}{m^2-9}$

B

6. Simplify and state each result in lowest terms.

(a) $\frac{x}{x^2-1} - \frac{1}{x^2-1}$ (b) $\frac{x-3}{x^2-7x+10} - \frac{x+2}{x^2-25}$
 (c) $\frac{3a}{6a^2-a-2} + \frac{2a}{10a^2-a-3}$ (d) $\frac{1}{h} \left(\frac{1}{3x+h} - \frac{1}{3x} \right)$
 (e) $\frac{k+1}{2k^2-7k+6} - \frac{k-3}{2k^2-k-3}$ (f) $\frac{1}{a-3} + \frac{1}{a^2-9} - \frac{1}{a^2-2a-3}$

7. Communication: Explain why it is better to find the LCD instead of multiplying the denominators when adding or subtracting rational expressions. Use an example to illustrate your points.

8. Knowledge and Understanding: Simplify.

(a) $\frac{5x-7y}{12x} + \frac{2x-9y}{8y}$ (b) $\frac{1}{2x+8} - \frac{3x}{(x+4)^2} + \frac{1}{2}$

9. Simplify.

(a) $\frac{x-2}{x^2-7x+10} + \frac{x+2}{x^2-4x-5}$
 (b) $\frac{x-3}{x^2+x-12} - \frac{x-2}{x^2+3x-4}$
 (c) $\frac{3k}{6k^2+13k-5} + \frac{2k+1}{6k^2+7k-3}$
 (d) $\frac{4-5q}{24q^2+2q-12} - \frac{5-4q}{12q^2-15q-18}$
 (e) $\left(\frac{3x-2}{2x^2-5x-3} - \frac{x+2}{x^2-9} \right) \div \frac{2x-3}{2x^2+7x+3}$
 (f) $\frac{a-2}{6a^2-7a-5} \div \frac{2a}{3a^2-5a} - \frac{3a+2}{2a^2+11a+5}$

10. Find the zeros of each function. (Hint: Rewrite $f(x)$ by putting all terms over a common denominator.)

(a) $f(x) = 3x + 1 + \frac{1}{x+1}$ (b) $f(x) = 6x - 17 + \frac{28}{x+2}$

11. Solve for x .

(a) $\frac{x-2}{x} + \frac{4}{5x} = -\frac{1}{5}$ (b) $\frac{2x+3}{x-1} - \frac{3}{x} = 2$
 (c) $\frac{1}{x} = \frac{2}{x+1} + \frac{1}{1-x}$ (d) $\frac{3x}{x^2-1} = \frac{x}{x+1} - 4$

Answers:

5. (a) $\frac{2x+9}{6(x-2)}, x \neq 2$ (b) $\frac{17x+1}{5x(x+3)}, x \neq 0, -3$
 (c) $\frac{3(2y-3)}{y(y-2)}, y \neq 0, 2$ (d) $\frac{2}{p+3}, p \neq 0, -3$
 (e) $\frac{5x+4}{(x-2)(x+1)}, x \neq 2, -1$ (f) $\frac{2}{a-3}, a \neq \pm 3$
 (g) $\frac{2}{(y+4)(y-1)}, y \neq -4, 1$
 (h) $\frac{3(m^3+m^2-10m-3)}{(2m-3)(m+3)(m-3)}, m \neq \pm 3, \frac{3}{2}$
6. (a) $\frac{1}{x+1}, x \neq \pm 1$
 (b) $\frac{2x-11}{(x-5)(x-2)(x+5)}, x \neq \pm 5, 2$
 (c) $\frac{a(21a-13)}{(2a+1)(3a-2)(5a-3)}, a \neq \frac{1}{2}, \frac{2}{3}, \frac{3}{5}$
 (d) $-\frac{1}{3x(3x+h)}, x \neq 0, -\frac{h}{3}, h \neq 0$
 (e) $\frac{7k-5}{(2k-3)(k-2)(k+1)}, k \neq \frac{3}{2}, 2, -1$
 (f) $\frac{a^2+4a+1}{(a-3)(a+3)(a+1)}, a \neq \pm 3, -1$
7. If you find the LCD, then it is easier to put the final answer in lowest terms. Examples may vary.
8. (a) $\frac{6x^2-17xy-14y^2}{24xy}, x, y \neq 0$ (b) $\frac{x^2+3x+20}{2(x+4)^2}, x \neq -4$
9. (a) $\frac{2x+3}{(x-5)(x+1)}, x \neq -1, 2, 5$ (b) $\frac{1}{(x-1)(x+4)}, x \neq -4, 1, 3$
 (c) $\frac{10k^2+21k+5}{(3k-1)(2k+5)(2k+3)}, k \neq \frac{1}{3}, -\frac{5}{2}, -\frac{3}{2}$
 (d) $\frac{9q^2-4q-4}{6(4q+3)(3q-2)(q-2)}, q \neq -\frac{3}{4}, -\frac{2}{3}, 2$
 (e) $\frac{(x+4)(x-2)}{(x-3)(2x-3)}, x \neq \frac{3}{2}, \pm 3, -\frac{1}{2}$
 (f) $\frac{a^2-3a-14}{2(2a+1)(a+5)}, a \neq 0, \frac{5}{3}, -\frac{1}{2}, -5$
10. (a) $\left(-\frac{2}{3} \pm \frac{\sqrt{2}}{3}i \right)$ (b) $x = \frac{3}{2}$ or $x = -\frac{2}{3}$
11. (a) 1 (b) $-\frac{3}{2}$ (c) $\frac{1}{3}$
 (d) -2 or $\frac{2}{3}$ (e) 8 (f) 3 or $\frac{3}{2}$