

EXERCISE 14.05

Simplify the following (that is, write as one fraction).

1 $\frac{4}{p} + \frac{2}{p}$

11 $x + \frac{x}{2}$

21 $\frac{2}{xy} - \frac{4}{y}$

31 $\frac{x}{3a} + \frac{2}{5x}$

2 $\frac{13}{q} - \frac{9}{q}$

12 $x - \frac{x}{3}$

22 $\frac{a}{x^2} + \frac{b}{xy}$

32 $\frac{2a}{3x} - \frac{4a}{5xy} + \frac{5a}{2xyz}$

3 $\frac{2c}{7} + \frac{3c}{7}$

13 $\frac{2x}{5} - x$

23 $\frac{3}{xy} + \frac{2}{5}$

33 $\frac{x+1}{4} + \frac{x}{3}$

4 $\frac{4c}{5} + \frac{c}{5}$

14 $\frac{3x^2}{5} - \frac{x}{2}$

24 $\frac{1}{x} - \frac{3x}{y}$

34 $\frac{x}{3} - \frac{x+2}{5}$

5 $\frac{x}{2} + \frac{x}{2}$

15 $\frac{7x}{2} - x$

25 $\frac{3}{2x} + \frac{2y}{3x}$

35 $\frac{2x}{3} + \frac{x+1}{6}$

6 $\frac{4x}{5} + \frac{8}{5}$

16 $\frac{x^2}{10} + \frac{3x}{5} + 2$

26 $\frac{x}{ay} + \frac{y}{bx} - \frac{a}{by}$

36 $\frac{x-2}{2} + \frac{2x+3}{6}$

7 $\frac{x}{3} + \frac{x}{2}$

17 $\frac{2x}{7} + \frac{7}{3}$

27 $\frac{2}{5y} - \frac{3}{2y} + \frac{4}{3xy}$

37 $\frac{2x-3}{5} - \frac{x+9}{6}$

8 $\frac{4x}{7} - \frac{x}{2}$

18 $\frac{1}{x} + \frac{1}{y}$

28 $\frac{2}{xy} + \frac{3}{xy^2} + \frac{4}{x^2y}$

38 $\frac{x+2y}{6y} - \frac{3x-2y}{9x}$

9 $\frac{2x}{5} + 3$

19 $\frac{2}{x} - \frac{1}{y}$

29 $\frac{x}{y} + \frac{y}{z} + \frac{z}{x}$

39 $\frac{x+7}{x} + \frac{1-x}{x^2}$

10 $\frac{4x^2}{5} + 10$

20 $\frac{2}{x} + \frac{3}{y}$

30 $\frac{x}{2y} - \frac{y}{3}$

40 $\frac{3-5x}{2x} - \frac{6}{x^2}$

Other examples have linear factors that, when multiplied, give a quadratic expression for the common denominator.

Example

Simplify $\frac{4}{x-3} - \frac{3}{x+1}$.

Answer

The common denominator is

$$(x-3)(x+1) = x^2 - 2x - 3.$$

4 times $(x+1)$ gives $4x+4$ as the first

numerator and 3 times $(x-3)$ gives $3x-9$ as the second numerator.

$$\begin{aligned}\frac{4}{x-3} - \frac{3}{x+1} &= \frac{4x+4-(3x-9)}{x^2-2x-3} \\ &= \frac{4x+4-3x+9}{x^2-2x-3} \\ &= \frac{x+13}{x^2-2x-3}\end{aligned}$$

EXERCISE 14.06

Simplify these sums and differences by writing as one fraction.

1 $\frac{1}{x+2} + \frac{1}{x+3}$

4 $\frac{2}{x} - \frac{5}{x+2}$

7 $\frac{x}{x+1} + \frac{x}{x+4}$

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

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

8 $\frac{a}{x+2a} + \frac{b}{x-2b}$

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

6 $\frac{4x}{x+2} + \frac{5}{x}$

9 $\frac{4}{2x+3} + \frac{1}{x+3}$