

Lesson 12-6

Example 1 Numbers in Denominator

Find $\frac{2m-1}{3} + \frac{m}{3}$.

$$\begin{aligned}\frac{2m-1}{3} + \frac{m}{3} &= \frac{2m-1+m}{3} \\ &= \frac{3m-1}{3}\end{aligned}$$

The common denominator is 3.

Add the numerators.

Example 2 Binomials in Denominator

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

$$\begin{aligned}\frac{x+1}{2-x} + \frac{2x-7}{2-x} &= \frac{3x-6}{2-x} \\ &= \frac{3(x-2)}{-1(x-2)} \\ &= \frac{3(x-2)}{-1(x-2)} \\ &= \frac{3}{-1} \text{ or } -3\end{aligned}$$

The common denominator is $2-x$.

Factor the numerator, $2-x = -1(x-2)$.

Divide by the common factor, $x-2$.

Simplify.

Example 3 Find a Perimeter.

GEOMETRY Find an expression for the perimeter of triangle ABC .

$$P = a + b + c$$

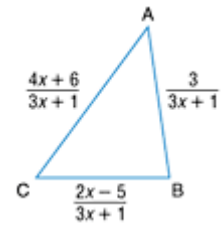
Perimeter formula

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

The common denominator is $3x+1$.

Combine like terms.

Factor.



The perimeter can be represented by the expression $\frac{2(3x+2)}{3x+1}$.

Example 4 Subtract Rational Expressions

Find $\frac{3p+2}{p+1} - \frac{7p+6}{p+1}$.

$$\begin{aligned}\frac{3p+2}{p+1} - \frac{7p+6}{p+1} &= \frac{(3p+2) - (7p+6)}{p+1} \\ &= \frac{(3p+2) + [-(7p+6)]}{p+1} \\ &= \frac{3p+2-7p-6}{p+1} \\ &= \frac{-4p-4}{p+1} \\ &= \frac{-4(p+1)}{p+1} \\ &= -4\end{aligned}$$

The common denominator is $p + 1$.

The additive inverse of $(7p + 6)$ is $-(7p + 6)$.

Distributive Property

Simplify.

Factor.

Divide by the GCF, $p + 1$.

Example 5 Inverse Denominators

Find $\frac{3k-1}{2k-5} - \frac{1}{5-2k}$.

The denominator $5 - 2k$ is the same as $-(-5 + 2k)$. Rewrite the second expression so that it has the same denominator as the first.

$$\begin{aligned}\frac{3k-1}{2k-5} - \frac{1}{5-2k} &= \frac{3k-1}{2k-5} - \frac{1}{-(2k-5)} \\ &= \frac{3k-1}{2k-5} + \frac{1}{2k-5} \\ &= \frac{3k-1+1}{2k-5} \\ &= \frac{3k}{2k-5}\end{aligned}$$

Rewrite using like denominators.

The common denominator is $2k - 5$.

Simplify.