

**Warm Up**

Simplify the following:

$x \neq -4, 3, 1$

$$\frac{(x-3)}{x^2+x-12} - \frac{x-2}{x^2+3x-4}$$

$$= \frac{\cancel{(x-3)}}{(x+4)\cancel{(x-3)}} - \frac{(x-2)}{(x+4)(x-1)}$$

$$= \frac{(x-1)}{(x+4)(x-1)} - \frac{(x-2)}{(x+4)(x-1)}$$

$$= \frac{x-1-x+2}{(x+4)(x-1)}$$

$$= \frac{1}{(x+4)(x-1)}$$



# Solving Rational Equations

## Lesson objectives

- I know how to combine rational terms by cross multiplying
- I know how to solve a rational equation

1.1

Lesson objectives

Teachers' notes

Lesson notes

Handout 3.80 # 11

## Solving Rational Equations

1. Factor the numerator and denominator.
2. State restrictions.
3. Find a common denominator.
4. Write the sum/difference as a single rational expression.
5. Cross Multiply
6. Isolate/Factor to determine the solutions

### Example:

Determine the solution(s).

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

$$x \neq -1, -2$$

$$\frac{3(x+2)}{(x+1)(x+2)} = \frac{-2(x+1)}{(x+1)(x+2)}$$

$$\Rightarrow 3(x+2) = -2(x+1)$$

$$3x + 6 = -2x - 2$$

$$\frac{5x}{5} = \frac{-8}{5}$$

$$x = -1.6$$

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

$$x \neq 0, 1$$

$$\frac{1(x-1)}{x(x-1)} + \frac{2(x)}{x(x-1)} = 5$$

$$\frac{x-1}{x(x-1)} + \frac{2x}{x(x-1)} = 5$$

$$\frac{3x-1}{x(x-1)} = 5$$

$$3x-1 = 5(x)(x-1)$$

$$3x-1 = 5x(x-1)$$

$$3x-1 = 5x^2 - 5x$$

$$0 = 5x^2 - 8x + 1$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(5)(1)}}{2(5)}$$

$$x = \frac{8 \pm \sqrt{44}}{10}$$

$$x = 1.463 \text{ or } 0.137$$