

## Quiz 5

Solutions given without showing work may earn a zero. This quiz is closed-book, but you may use a calculator.

Solve the following rational equations.

**Problem 1. [5 points]**  $\frac{8}{x^2 - 9} = \frac{2}{x - 3} - \frac{4}{x + 3}$

**Problem 2. [5 points]**  $\frac{3x}{x + 1} + \frac{4}{x - 2} = 3$

①  $\frac{8}{(x+3)(x-3)} = \frac{2}{x-3} - \frac{4}{x+3}$

$x \neq 3, x \neq -3$   
LCD =  $(x+3)(x-3)$

$\frac{8}{\cancel{(x+3)(x-3)}} \cdot \frac{\cancel{(x+3)(x-3)}}{1} = \left( \frac{2}{x-3} - \frac{4}{x+3} \right) \cdot \frac{(x+3)(x-3)}{1}$

$8 = \frac{2}{\cancel{x-3}} \cdot \frac{(x+3)\cancel{(x-3)}}{1} - \frac{4}{\cancel{x+3}} \cdot \frac{\cancel{(x+3)}(x-3)}{1}$

$8 = 2(x+3) - 4(x-3)$

$8 = 2x + 6 - 4x + 12$

$8 = -2x + 18$

$-10 = -2x$

$\boxed{5 = x}$

ck:  $\frac{8}{25-9} = \frac{8}{16} = \frac{1}{2}$   
 $\frac{2}{2} - \frac{4}{8} = 1 - \frac{1}{2} = \frac{1}{2}$

②

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

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

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

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

$$3x(x-2) + 4(x+1) = 3(x^2 - 2x + x - 2)$$

$$3x^2 - 6x + 4x + 4 = 3(x^2 - x - 2)$$

$$\cancel{3x^2} - 2x + 4 = \cancel{3x^2} - 3x - 6$$

$$\boxed{x = -10}$$

$$ck: \frac{-30}{-9} + \frac{4}{-12} = \frac{10}{3} - \frac{1}{3} = \frac{9}{3} = 3$$