

## Warm Up

1) Multiply and simplify the expressions.

$$a) \frac{3x^2y^3z^4}{9xy^{-4}z^5} \cdot \frac{4xz^3}{yz^2}$$

$$\frac{12x^3y^3z^7}{9xy^{-3}z^7}$$

$$\frac{4x^2y^6}{3}$$

$$b) \frac{x^2-25}{x-5} \cdot \frac{x^2-3x-18}{x+5}$$

$$\frac{\cancel{(x+5)}(x-5)}{x-5} \cdot \frac{(x-6)(x+3)}{x+5}$$

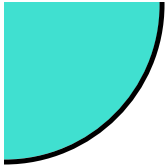
$$(x-6)(x+3)$$

2) Divide

$$\frac{x^2-13x+40}{x^2-2x-15} \div \frac{x^2-5x-24}{1}$$

$$\frac{\cancel{(x-8)}\cancel{(x-5)}}{\cancel{(x-5)}(x+3)} \cdot \frac{1}{\cancel{(x-8)}(x+3)}$$

$$\frac{1}{(x+3)(x+3)} \quad \text{or} \quad \frac{1}{(x+3)^2}$$



# DLT

\*Check add, subtract, multiply, and divide ws

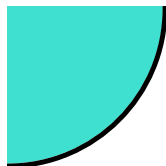


## 8.6 Solving Rational Functions

Solve for  $x$  and then check for extraneous solutions.

$$\frac{5}{x} = \frac{6}{12}$$

$$\begin{aligned} 6x &= 60 \\ x &= 10 \\ \frac{5}{10} &= \frac{6}{12} \\ \frac{1}{2} &= \frac{1}{2} \end{aligned}$$



## 8.6 Solving Rational Functions

Cross Multiply

$$\frac{3}{-2+1} = \frac{9}{4(-2)+5}$$
$$\frac{3}{-1} = \frac{9}{-3}$$
$$\frac{3}{x+1} = \frac{9}{4x+5}$$

$$3(4x+5) = 9(x+1)$$
$$12x+15 = 9x+9$$
$$3x = -6$$
$$\boxed{x = -2}$$

TOYO

## 8.6 Solving Rational Functions

Solve the equation by cross multiplying.

Check your solution (s).

$$1) \frac{1}{2x+5} = \frac{x}{11x+8}$$

$$11x+8 = 2x^2+5x$$

$$0 = 2x^2 - 6x - 8$$

$$0 = 2(x^2 - 3x - 4)$$

$$0 = (x-4)(x+1)$$

$$x-4=0$$

$$x=4$$

$$x+1=0$$

$$x=-1$$

$$\frac{1}{8+5} = \frac{4}{44+8}$$

$$\frac{1}{-2+5} = \frac{-1}{-11+8}$$

$$\frac{1}{13} = \frac{4}{52}$$

$$\frac{1}{3} = \frac{-1}{-3}$$

$$\frac{1}{13} = \frac{1}{13}$$

$$\frac{1}{3} = \frac{1}{3}$$



## 8.6 Solving Rational Functions

What is Least Common Dominator (LCD)?

a)

$$4 \cdot \frac{5}{x} + \frac{7}{4} \cdot x$$

$4x$

$$\frac{20 + 7x}{4x} = \frac{7x + 20}{4x}$$

b)

$$\frac{x-5}{x^2-9} + \frac{x+12}{x+3}$$

$(x+3)(x-3)$        $(x-3)$        $(x-3)$

$(x+3)(x-3)$

c)

$$\frac{5a^2}{4b^3c} + \frac{3c}{6a^2b}$$

TOYO

## 8.6 Solving Rational Functions

What is Least Common Dominator (LCD)?

a) 
$$\frac{6}{x^2} + \frac{7}{5}$$
  $5x^2$

b) 
$$\frac{x-1}{x^2-16} + \frac{x+2}{x+4}$$
  $(x+4)(x-4)$

c) 
$$\frac{2a}{ab^3c} + \frac{3bc}{6a^2b^2}$$

## 8.6 Solving Rational Functions

Solve and check for extraneous solutions.

Example:  $\frac{1 - \frac{8}{x-5}}{1} = \frac{3}{x}$

$x = 15 \quad x = 1$

$$\begin{aligned} 1 - \frac{8}{10} &= \frac{3}{15} \\ \frac{10}{10} - \frac{8}{10} &= \frac{3}{15} \\ \frac{2}{10} &= \frac{3}{15} \\ \frac{1}{5} &= \frac{1}{5} \end{aligned}$$

$$\begin{aligned} x(x-5) - 8x &= 3(x-5) \\ x^2 - 5x - 8x &= 3x - 15 \\ x^2 - 13x &= 3x - 15 \\ x^2 - 16x + 15 &= 0 \\ (x-15)(x-1) &= 0 \end{aligned}$$

Ex 2:  $\frac{6}{x-3} = \frac{8x^2}{x^2-9} - \frac{4x}{x+3}$

$$6(x+3) = 8x^2 - 4x(x-3)$$

$$6x + 18 = 8x^2 - 4x^2 + 12x$$

$$0 = 4x^2 + 6x - 18$$

$$0 = 2(2x^2 + 3x - 9)$$

$$0 = (2x^2 + 6x) - 3x - 9$$

$$0 = 2x(x+3) - 3(x+3)$$

$$0 = (2x-3)(x+3)$$

$$2x-3=0$$

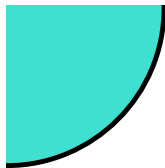
$$x = \frac{3}{2}$$

$$x+3=0$$

$$x = -3$$

$$\begin{array}{r} -18 \\ 6 \times 3 \\ \hline -18 \\ \hline 0 \end{array}$$





## 8.6 Solving Rational Functions

Solve the equation by using the LCD. Check for extraneous solutions.

5.  $\frac{7}{2} + \frac{3}{x} = 3$

6.  $\frac{2}{x} + \frac{4}{3} = 2$

7.  $\frac{3}{7} + \frac{8}{x} = 1$

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

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

10.  $\frac{5x}{x-2} = 7$

5.  $\frac{7}{2} + \frac{3}{x} = 3$

$$7x + 3(2) = 3(2x)$$

$$7x + 6 = 6x$$

$$6 = -1x$$

$$x = -6$$

$$\begin{array}{r} -12 \\ -6 \times 2 \\ \hline 4 \end{array}$$

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

$$6x^2 - 5(x+1) = 3(x+1)$$

$$6x^2 - 5x - 5 = 3x + 3$$

$$6x^2 - 8x - 8 = 0$$

$$3x^2 - 4x - 4 = 0$$

$$(3x^2 - 6x)(x+2) = 0$$

$$3x(x-2) + 2(x-2) = 0$$

$$(x-2)(3x+2) = 0$$

$$x = 2 \quad x = -\frac{2}{3}$$

Solving Fix #1-6

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

$$4(x+1) - 3(x-2) = 8$$

$$4x+4 - 3x+6 = 8$$

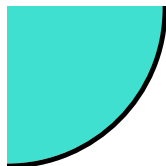
$$x = -2$$

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

$$\frac{4}{-4} - \frac{3}{-1} = \frac{8}{4}$$

$$-1 + 3 = 2$$

$$2 = 2$$



## 8.6 Solving Rational Functions

Solve the equation by using the LCD. Check for extraneous solutions.

5.  $\frac{7}{2} + \frac{3}{x} = 3$

6.  $\frac{2}{x} + \frac{4}{3} = 2$

7.  $\frac{3}{7} + \frac{8}{x} = 1$

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

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

10.  $\frac{5x}{x-2} = 7$

HW: Page 593#9-12, 15-25 odd, 33, 34

**\*WS-odds**

# DESMOS

<https://teacher.desmos.com/polygraph-rationals>

<https://teacher.desmos.com/polygraph/custom/5615f927bd554ea00761a5a6>