



Math Virtual Learning

# College Prep Algebra

May 7, 2020



College Prep Algebra  
Lesson: May 7, 2020

**Objective/Learning Target:**  
To solve rational equations

## Let's get started!

On May 5 and May 6 we did the following:

- Found the LCM of denominators in a rational equation
- Created equivalent fractions of the terms in the rational equation. Each term now has common denominators, which is the LCM of the denominators.

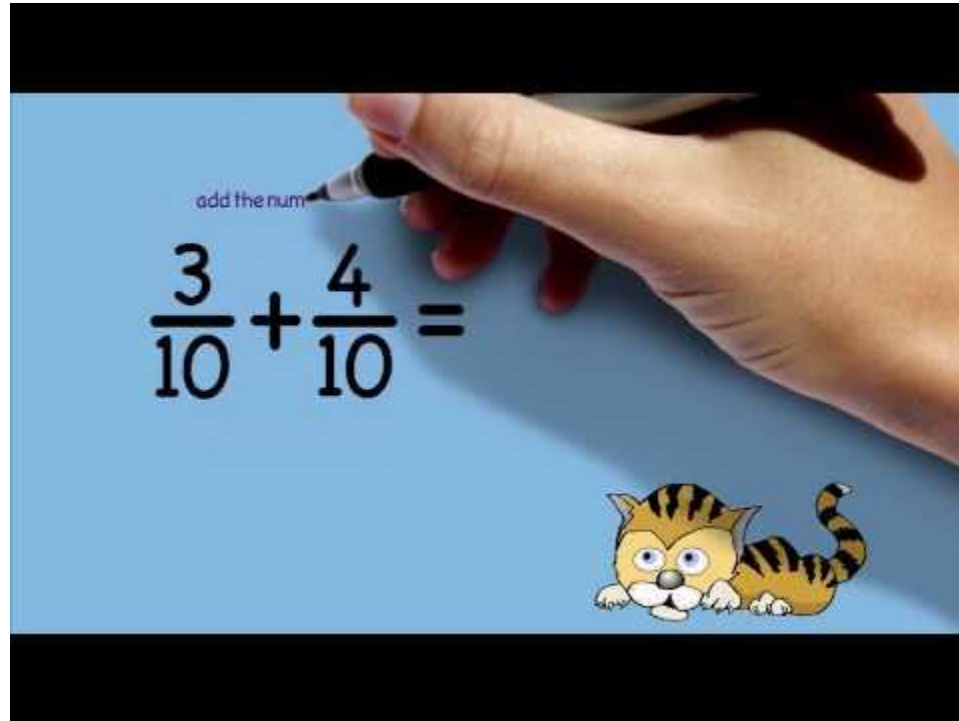
Do you remember how to add fractions?

Watch the video on the next slide.

It tells us everything we need to solve our Rational Equations.

The basics of adding fractions.

add the num.

$$\frac{3}{10} + \frac{4}{10} =$$
A hand holding a black marker is pointing to the equation. The background is light blue. In the bottom right corner, there is a cartoon illustration of a yellow and black striped tiger.

The BASIC technique of adding fractions is:  
**“Adding the tops when the denominators are the same!”**

Since we have already created common denominators,  
use the tops of the fractions  
to solve the Rational Equations!

You will not need to do anything else with the denominator.

The video reminded us that the denominator tells you  
into how many pieces a whole is cut.

So once the pieces are the same, you only work with the numerator!

1) Solve the rational equation.

May 5 and 6  
Common  
Denominators

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

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

Now that the denominators are the same, we only need to solve with the numerators!

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

$$4x = 2$$

$$\frac{4x}{4} = \frac{2}{4}$$

$$x = \frac{1}{2}$$

*Always check your solution in the original equation.*

**CHECK**

$$\frac{1}{\left(\frac{1}{2}\right)^2} + \frac{4}{\left(\frac{1}{2}\right)} = \frac{3}{\left(\frac{1}{2}\right)^2}$$

$$12 = 12$$

2) Solve the rational equation

May 5 and 6  
Common  
Denominators

$$\frac{4}{x+1} + \frac{1}{x^2 - 5x - 6} = \frac{1}{x-6}$$

$$\frac{4x - 24}{(x+1)(x-6)} + \frac{1}{(x+1)(x-6)} = \frac{x+1}{(x+1)(x-6)}$$

Ready to solve with the  
numerators!

$$4x - 24 + 1 = x + 1$$

$$4x - 23 = x + 1$$

$$-x + 23 \quad -x + 23$$

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$$\frac{3x}{3} = \frac{24}{3}$$

$$x = 8$$

**CHECK**

$$\frac{4}{(8)+1} + \frac{1}{(8)^2 - 5(8) - 6} = \frac{1}{(8)-6}$$

$$0.5 = 0.5$$

### 3) Solve the rational equation

May 5 and 6  
Common  
Denominators

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

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

Ready to solve with the  
numerators!

*Since the  
numerators  
create a LONG  
equation, go to  
the next slide to  
see the solving  
and the check.*



### 3) Solve the rational equation (Continued)

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

$$\begin{array}{r} x^2 - 4x - 3 = x^2 - 3x + 2 \\ -x^2 \qquad \qquad -x^2 \end{array}$$

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$$-4x - 3 = -3x + 2$$

$$\begin{array}{r} +4x \qquad \qquad +4x \\ \hline \end{array}$$

$$-3 = x + 2$$

$$\begin{array}{r} -2 \qquad \qquad -2 \\ \hline \end{array}$$

$$x = -5$$

**CHECK**

$$\frac{(-5)^2 - 3(-5) - 4}{(-5)^3 - (-5)^2} - \frac{1}{(-5)^2} = \frac{(-5) - 2}{(-5)^2}$$

$$-\frac{7}{25} = -\frac{7}{25}$$

#### 4) Solve the rational equation

May 5 and 6  
Common  
Denominators

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

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

Ready to solve with the numerators!

*Since the numerators create a LONG equation, go to the next slide to see the solving and the check.*

#### 4) Solve the rational equation (Continued)

$$x^2 + 4x - 1x - 4 - 3 = x^2 + 4x - 2x - 8$$

$$\begin{array}{r} x^2 + 3x - 7 = x^2 + 2x - 8 \\ -x^2 \qquad \qquad -x^2 \\ \hline \end{array}$$

$$\begin{array}{r} 3x - 7 = 2x - 8 \\ -2x \qquad -2x \\ \hline \end{array}$$

$$\begin{array}{r} x - 7 = -8 \\ +7 \qquad +7 \\ \hline x = -1 \end{array}$$

**CHECK**

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

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

## Practice:

On May 5 and May 6, you set up the rational equations so each term in the equation has a common denominator.

Continue your work from May 5 and 6 on this practice worksheet. Finish your work by Solving the Equations just as we did on the previous examples

[Practice Worksheet with solutions included](#)

[Scientific Calculator linked here](#)