Inspiring Greatness

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

College Prep Algebra

May 8, 2020

College Prep Algebra
Lesson: May 8, 2020

Objective/Learning Target:
To solve rational equations, using the LCM to reduce to Linear Equations

Let's get started!

On May 5 we determined the LCM of denominators in a rational equation

Many mathematicians would like to avoid fractions in their equations, if possible. Just like you!

So they found ANOTHER WAY to use the LCM to make the equation they are solving have NO MORE FRACTIONS!

That's what we are going to do today! It is a different technique that allows you to solve rational equations.

1) Solve the rational equation.

May 5
The LCM

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

$\text{LCM} = x \cdot x \text{ or } x^2$

Look at what happens when we **multiply** each term of the equation **with the LCM**

Multiply with LCM

$$\underset{\text{LCM}}{\frac{x^2}{1}}\cdot\frac{1}{x^2}+\underset{\text{LCM}}{\frac{x^2}{1}}\cdot\frac{4}{x}=\underset{\text{LCM}}{\frac{x^2}{1}}\cdot\frac{3}{x^2}$$

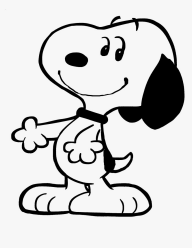
Cancel common top with bottom

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

Simplify what remains

$$1+4x=3$$

NO MORE FRACTIONS!!!



2) Solve the rational equation

May 5
The LCM

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

$$\text{LCM}=(x+1)(x-6)$$

- Multiply by LCM
- Cancel common factors

$$\underset{\text{LCM}}{\frac{(x+1)(x-6)}{1}}\cdot\frac{4}{(x+1)}+\underset{\text{LCM}}{\frac{(x+1)(x-6)}{1}}\cdot\frac{1}{(x+1)(x-6)}=\underset{\text{LCM}}{\frac{(x+1)(x-6)}{1}}\cdot\frac{1}{(x-6)}$$

Simplify what remains

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

3) Solve the rational equation

May 5
The LCM

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

$$\text{LCM}=x^2(x-1)$$

- Multiply by LCM
- Cancel common factors

$$\frac{\overset{\text{LCM}}{\cancel{x^2(x-1)}}}{1}\cdot\frac{x^2-3x-4}{\cancel{x^2(x-1)}}-\frac{\overset{\text{LCM}}{\cancel{x^2(x-1)}}}{1}\cdot\frac{1}{\cancel{x^2}}=\frac{\overset{\text{LCM}}{\cancel{x^2(x-1)}}}{1}\cdot\frac{(x-2)}{\cancel{x^2}}$$

Simplify what remains $x^2-3x-4-x+1=x^2-1x-2x+2$

4) Solve the rational equation

May 5
The LCM

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

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

- Multiply by LCM
- Cancel common factors

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

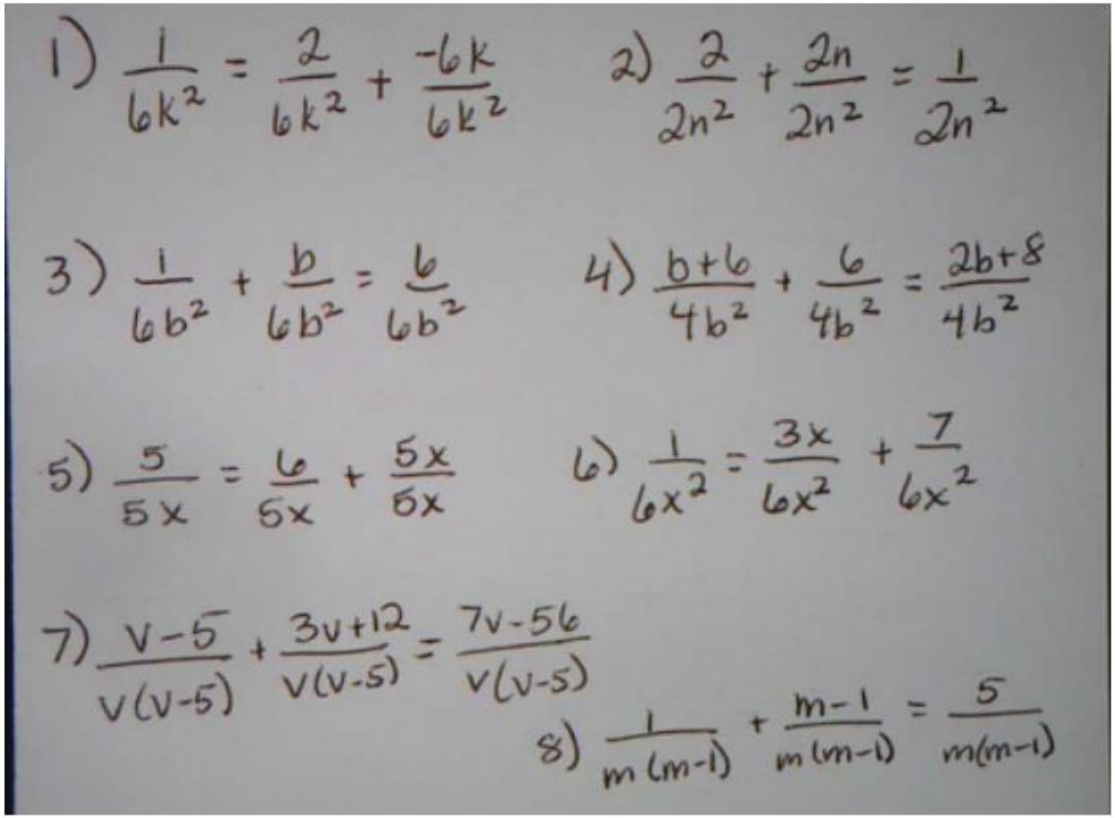
Simplify what remains $x^2 + 4x - 1x - 4 - 3 = x^2 + 4x - 2x - 8$

Practice:
On May 5, you found the LCM of the equations on this worksheet.

Use your LCM from May 5 to write the equations so that the equations no longer have fractions. Check your solutions on the following pages.

Practice Worksheet

Read the tops of the fractions.
Compare with your equation without fractions.
They should MATCH!



9) $\frac{1}{n-8} + \frac{-n+8}{n-8} = \frac{7}{n-8}$

10) $\frac{r-5}{(r-5)(r-2)} + \frac{1}{(r-5)(r-2)} = \frac{6r-30}{(r-5)(r-2)}$

11) $\frac{v-4}{v-4} = \frac{v+2}{v-4} + \frac{7v-42}{v-4}$

12) $\frac{r-4}{5r} = \frac{1}{5r} + \frac{5r}{5r}$

13) $\frac{3x}{3x} + \frac{x^2-5x-24}{3x} = \frac{x-6}{3x}$

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

15) $\frac{n^2+n+5n+5}{(n+8)(n+1)} = \frac{n^2+8n+1n+8}{(n+8)(n+1)} + \frac{6n+48}{(n+8)(n+1)}$

16) $\frac{r+5}{r(r-2)} - \frac{r^2-2r}{r(r-2)} = \frac{1}{r(r-2)}$

17) $\frac{1}{x(x-5)} = \frac{x^2+7x-5x-35}{x(x-5)} + \frac{-x^2+5x}{x(x-5)}$

18) $\frac{a^2-2a+2a-4}{(a+3)(a+2)} + \frac{-a^2-3a-2a-6}{(a+3)(a+2)} = \frac{3a+9}{(a+3)(a+2)}$

19) $\frac{p+5}{p(p+1)} = \frac{1}{p(p+1)} + \frac{-p^2+6p}{p(p+1}$

20) $\frac{5}{n^2(n+5)} = \frac{4n^2}{n^2(n+5)} + \frac{n+5}{n^2(n+5)}$