Inspiring Greatness
INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

College Prep Algebra

May 6, 2020

College Prep Algebra
Lesson: May 6, 2020

Objective/Learning Target:
To create equivalent fractions with common denominators using the least common multiple in rational equations

Let's get started! On 5/5 you learned how to find the LCM of all the denominators of an equation.

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

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

Today, you will rewrite each term in the equation so that the terms will each have the LCM as the common denominator.

We will use the same examples as Lesson 5/5.

1) Write the equation so that each term has the LCM as the common denominator

May 5 LCM example

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

$x^2 = x \cdot x$ $\quad x = x$ $\quad x^2 = x \cdot x$

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

Notice the second denominator needs one more *x* to match the LCM?

Multiply by a form of one to make equivalent fractions. May 1 lesson

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

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

DONE

2) Write the equation so that each term has the LCM as the common denominator

May 5
LCM example

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

Notice the 2nd denominator already is the LCM.

$$x + 1 = (x + 1)$$

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

$$x - 6 = (x - 6)$$

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

Examine the factored forms of the 1st and 3rd denominators. What factor does each need to make the LCM?

I need (x - 6) for the 1st fraction.
I need (x + 1) for the 3rd fraction

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

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

DONE

3) Write the equation so that each term has the LCM as the common denominator

May 5
LCM example

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

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

$$x^2=x\cdot x$$

$$x^2=x\cdot x$$

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

I need (x - 1) for both the 2nd and 3rd fractions.

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

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

DONE

Distribute the negative one

Examine the factored forms of the 2nd and 3rd denominators. <u>What factor does each need to make the LCM?</u>

4) Write the equation so that each term has the LCM as the common denominator

May 5
LCM example

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

$$1 = 1$$

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

$$x - 1 = (x - 1)$$

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

I need $(x - 1)$ **AND** $(x + 4)$ for the 1st.

I need $(x + 4)$ for the 3rd.

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

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

DONE

Examine the factored forms of the 1st and 3rd denominators. <u>What factor(s) does each need to make the LCM?</u>

Practice:
On May 5, you found the LCM of the rational equations

Now, rewrite the the equation so that each term has the LCM as the common denominator

This worksheet is the same one from May 5. Continue your work from May 5 just as the examples continued the work from May 5. Check your answers on the following pages.

Practice Worksheet

1) $\frac{1}{6k^2} = \frac{2}{6k^2} + \frac{-6k}{6k^2}$

2) $\frac{2}{2n^2} + \frac{2n}{2n^2} = \frac{1}{2n^2}$

3) $\frac{1}{6b^2} + \frac{b}{6b^2} = \frac{6}{6b^2}$

4) $\frac{b+6}{4b^2} + \frac{6}{4b^2} = \frac{2b+8}{4b^2}$

5) $\frac{5}{5x} = \frac{6}{5x} + \frac{5x}{5x}$

6) $\frac{1}{6x^2} = \frac{3x}{6x^2} + \frac{7}{6x^2}$

7) $\frac{v-5}{v(v-5)} + \frac{3v+12}{v(v-5)} = \frac{7v-56}{v(v-5)}$

8) $\frac{1}{m(m-1)} + \frac{m-1}{m(m-1)} = \frac{5}{m(m-1)}$

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