Inspiring Greatness

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

Algebra 2/Honors Algebra 2

April 22, 2020

Lesson: April 22, 2020

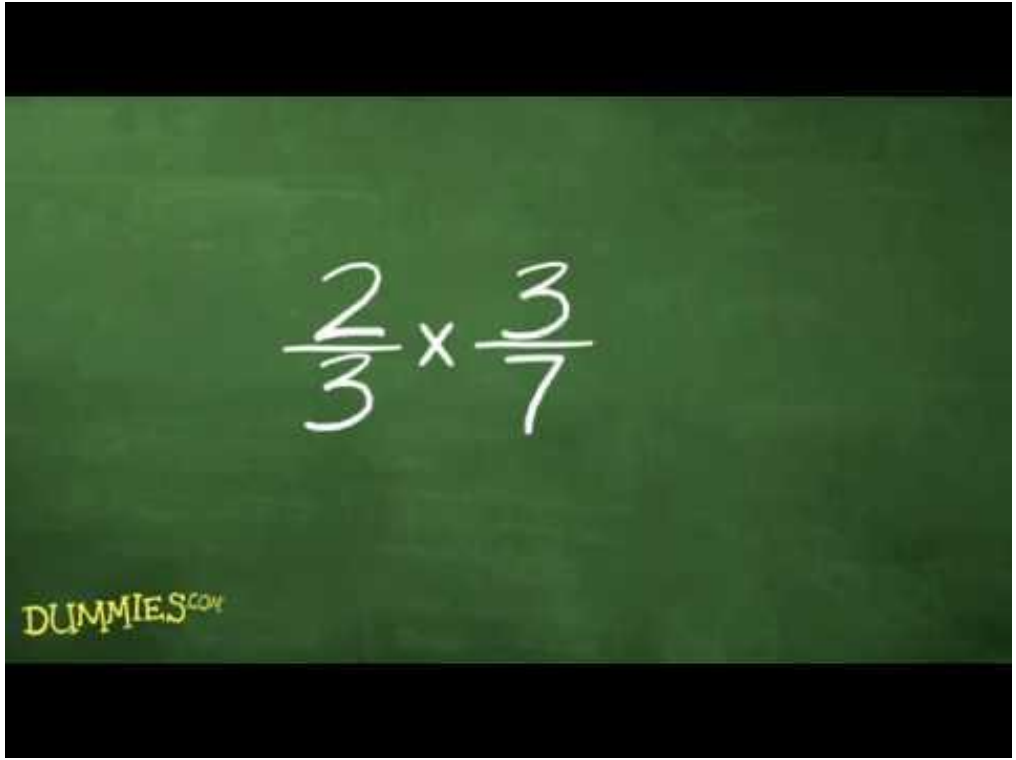
Objective/Learning Target:
Students will multiply rational expressions.

Let's Get Started:

What do you remember about multiplying fractions?

$$\frac{2}{4} \times \frac{3}{6}$$

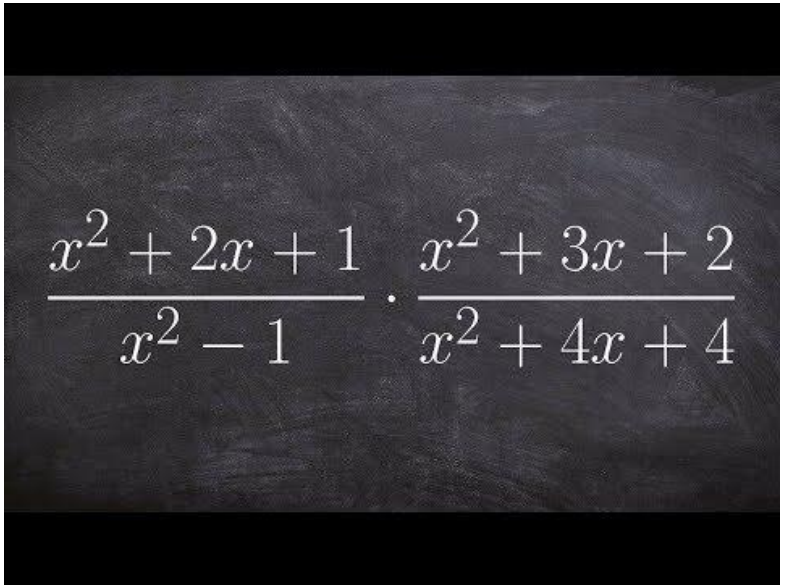
Watch Video:



Today you will learn how to multiply rational expressions that look like

$$\frac{45x^2}{x-9} \cdot \frac{x^2-5x-36}{3x^3+12x^2}$$

Watch the video working through the above example. Take notes so you can refer to them later.



Steps for Multiplying Rational Expressions:
(write this down)

- Factor everything
- Identify the domain (this is the restricted values for x)
- Cancel (only if the factor is the same on the top and bottom)
- Write out the simplified answer (what is left after canceling)

Let's look at example #1:

(write this down)

Problem:

$$\frac{x^2-x}{2x^2+13x-7}\cdot\frac{2x^2+5x-3}{x^2+2x-3}$$

Step 1: Factor

Step 2: Find the domain by setting the factors in the denominator equal to zero

Step 3: Cancel

Step 4: Write out the simplified answers

$$\frac{x^2-x}{2x^2+13x-7}\cdot\frac{2x^2+5x-3}{x^2+2x-3}$$

$$=\frac{x(x-1)}{(2x-1)(x+7)}\cdot\frac{(2x-1)(x+3)}{(x-1)(x+3)}$$

$$=\frac{x\cancel{(x-1)}\cancel{(2x-1)}\cancel{(x+3)}}{\cancel{(2x-1)}(x+7)\cancel{(x-1)}\cancel{(x+3)}}$$

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

Let's look at example #2:

(write this down)

Problem:

$$\frac{x^2-4x-45}{x^2+10x+25}\cdot\frac{x^2+3x-10}{x^2-11x+18}$$

Step 1: Factor

Step 2: Find the domain by setting the factors in the denominator equal to zero

Step 3: Cancel

Step 4: Write out the simplified answers

$$\frac{x^2-4x-45}{x^2+10x+25}\cdot\frac{x^2+3x-10}{x^2-11x+18}$$

$$=\frac{(x+5)(x-9)}{(x+5)(x+5)}\cdot\frac{(x-2)(x+5)}{(x-2)(x-9)}$$

$$=\frac{\cancel{(x+5)}\cancel{(x-9)}\cancel{(x-2)}\cancel{(x+5)}}{\cancel{(x+5)}(x+5)\cancel{(x-2)}\cancel{(x-9)}}$$

$$=1$$

Restrictions:

$x \neq -5,\ x \neq 2$ *or* $x \neq 9$

Multiply Rational Expressions Practice:

On the same sheet of paper, multiply/simplify the following practice problems.

23) $\frac{x^2 - 10x + 25}{10x - 100} \cdot \frac{x - 10}{45 - 9x}$

24) $\frac{45x^2}{x - 9} \cdot \frac{x^2 - 5x - 36}{3x^3 + 12x^2}$

25) $\frac{8v - 56}{8v + 48} \cdot \frac{v^2 + 9v + 18}{8v^2 + 24v}$

26) $\frac{9r^3 - 54r^2}{9r^2 + 45r} \cdot \frac{9r^2 + 9r}{9r^3 - 54r^2}$

27) $\frac{m + 1}{3m - 15} \cdot \frac{8m - 80}{m^2 - 9m - 10}$

28) $\frac{6n + 6}{n + 9} \cdot \frac{n^2 + 6n - 27}{6n + 6}$

Answer Key:

Once you have completed the problems, check your answers here.

23) $\frac{x^2 - 10x + 25}{10x - 100} \cdot \frac{x - 10}{45 - 9x}$

$-\frac{(x-5)}{90}$

24) $\frac{45x^2}{x - 9} \cdot \frac{x^2 - 5x - 36}{3x^3 + 12x^2}$

15

25) $\frac{8v - 56}{8v + 48} \cdot \frac{v^2 + 9v + 18}{8v^2 + 24v}$

$\frac{v-7}{8v}$

26) $\frac{9r^3 - 54r^2}{9r^2 + 45r} \cdot \frac{9r^2 + 9r}{9r^3 - 54r^2}$

$\frac{r+1}{r+5}$

27) $\frac{m + 1}{3m - 15} \cdot \frac{8m - 80}{m^2 - 9m - 10}$

$\frac{8}{3(m-5)}$

28) $\frac{6n + 6}{n + 9} \cdot \frac{n^2 + 6n - 27}{6n + 6}$

$n - 3$

Additional Practice:

Click on the links below to get additional practice and to check your understanding!

Multiplying Rational Expressions Example 1 - video

Multiplying Rational Expressions Example 2 - video

Multiplying Rational Expressions Example 3 - video

Multiplying Rational Expressions Practice - worksheet and answers