Multiplying Mixed Numbers

Prerequisite Skills: Understanding of and ability to convert fractions and mixed numbers, multiplying fractions by fractions, like and unlike denominators, distributive property, use of the generic rectangle, and prime factorization

Objective: Students will learn and use three methods for multiplying mixed numbers: Decomposition with Distributive Property, Converting to Improper Fractions, and Using the Generic Rectangle

Lesson:

Today we are going to apply what we have learned about multiplying with whole numbers and multiplying with fractions, to multiplying mixed numbers.

We discovered the other day, that when we multiply fractions, the product is smaller because it is a part of a part. Are there any predictions or thought

DECOMPOSITION and the DISTRIBUTIVE PROPERTY

$2\frac{3}{4} \quad 1\frac{1}{3}$

Let's decompose these mixed numbers so they are a little easier to work with

$\left(\quad - \right) \quad \left(\quad - \right)$

And now we can go ahead and use the distributive property

$= \quad \left(\quad + - \right) + - \left(\quad + - \right)$

Let's continue to simplify this expression

$= \quad + - + - + -$

Now we'll need to make our denominators common, so we can easily add them

$= \quad + - \left(- \right) + - \left(- \right) + -$

$= 2 + \frac{8}{12} + \frac{9}{12} + \frac{3}{12}$

$= 2 + \frac{8+9+3}{12}$

$= 2 + \frac{20}{12}$

We know that there are some wholes in here because the numerator is larger than the denominator

$= 2 + \frac{12}{12} + \frac{8}{12}$

We know that the $+ \; -$

YOU TRY: $-\frac{}{} \bullet -\frac{}{}$

IMPROPER FRACTIONS

We can also use what we know about mixed numbers and improper fractions, to simplify this expression

$-\frac{}{} \bullet -\frac{}{}$

YOU TRY: – • –

GENERIC RECTANGLE

Since many of you like using the generic rectangle as a tool for multiplication, I'm going to show you how the generic rectangle works with multiplying mixed numbers. Remember that the generic rectangle is basically the distributive property, just organized in a rectangle.

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		+	–
1	2		$\frac{3}{4}$
+			
$\frac{1}{3}$	$\frac{2}{3}$		$\frac{3}{12}$

Now we need to add up our partial products

= + –+ –+ —

We can use the work we did in the previous methods to add these products

= + —

$= 2 + \frac{12}{12} +$