Adding Fractions with Unlike Denominators
MA64131

Activity Introduction

Our top story: adding fractions and mixed numbers with unlike denominators. And now, here's an ice skater who loves denominators – Daaaaaaaaaan Anchormann!

Direct Instruction

Thank you, Wheels. Hello, I'm Dan Anchormann, and I'll have you know my mustache is insured for one million dollars!

Today we'll be talking about what to do when you add fractions and mixed numbers with denominators that are not the same.

Here with more on this story is a correspondent who's far above the lowest common denominator – Lord Rottington and his faithful servant, Antonio.

Model 1

Why, hello! My name is Lord Rottington, and today I will be talking about how to add fractions with unlike denominators. You know, this reminds me of an amusing story…

Once upon a time on my many travels, I found myself quite lost in the Desert of Delirium when I stopped into a dromedary trader's shop to purchase a camel.

As soon as I walked into the shop, I put down a sizeable sum of Rotting pounds on the trader's counter, but this gentleman flatly said he could not help me.

"Why, my money is as good as anybody else's," I told the man. "Ah," he said, "that's true where you come from, but here we only use the type of money we call Delira." He

informed me I could change my Rotting pounds into Delira, and only then he could help me.

Well, to make a long story short, it took fourteen days to cross the desert after that. I survived somehow by eating sand, and, in the end, I located a bank to change my Rotting pounds into Delira. I never did buy that camel, though. Now where was I?

Adding fractions and mixed numbers with unlike denominators, sir.

Ah, yes! You see, much as I had to change to equivalent money in my story, to add fractions with unlike denominators, you need to change the fractions to equivalent fractions with common denominators before you do anything else.

That means you need to find the least common denominator of the fractions.

Do you recall what that is? The least common denominator is similar to the least common multiple. You simply use the denominators to find the multiples.

After you do that, you must then rewrite the fractions with the least common denominator. That means you need to find equivalent fractions with the same denominator.

Then you need to add the numerators, keep the denominators the same and, last but not least, simplify your answer.

So my friend, are you feelin' good about what you just learned? Or, do you want to see this one more time, in case you missed something?

Model 2

Now let's return to Lord Rottington with an example for you to practice together.

Tally-ho! Let's use the steps to solve a problem.

Like this one: add one-half and one-third.

Remember the first step to adding these fractions? It tells us we need to change them to equivalent fractions with a common denominator before we can do anything else

That means we need to list the multiples of the denominators, two and three. As you can see, the least common multiple of two and three is six.

Now that we have found the least common denominator, we need to rewrite the fractions with the common denominator, six.

) Do you see how we are solving this problem vertically? Doing it this way makes it easier to follow the steps and see the work we need to do.

Now, one-half is equivalent to three-sixths, and one-third is equivalent to two-sixths.

Next, we add the numerators and keep the denominators the same. Three-sixths plus two-sixths equals five-sixths.

The last step is to simplify the answer, but the fraction, five-sixths, is already simplified, or in lowest terms.

Finally, we can check our answer using pictures. The blue circle represents one-half; the yellow circle represents one-third; and when these two circles are combined, or added, the result is five-sixths.

Think you've got it? Well, if you are ready to move on, lemme know. We could also go back a bit, to get a refresher if you need one.

Model 3

Okay, let's go back to Lord Rottington for another example.

Here's another problem for us to solve together.

Since the denominators are not the same, we need to rewrite the fractions with the least common denominator. The least common multiple of five, six, and two is thirty.

So now we're ready to rewrite the fractions with the least common denominator, thirty.

Two-fifths is equal to twelve-thirtieths; one-sixth is equal to five-thirtieths; and one-half is equal to fifteen-thirtieths.

All we have left to do is solve the problem, fellow learner!

To add fractions, you have to add the numerators: twelve plus five plus fifteen is thirty-two.

And the denominator, thirty, stays the same. But thirty-two-thirtieths is an improper fraction.

That means we have to change it to a mixed number: one and two-thirtieths. And don't forget, we also need to make sure our answer is in simplest terms.

One and two-thirtieths reduced to simplest terms is one and one-fifteenths.

So, the fractions two-fifths, plus one-sixth, plus one-half is one and one-fifteenth, in simplified terms. Brilliant!

Now, do you think you're ready to tackle some practice problems with me, or would you like to see that last one once more?

Direct Instruction

Welcome back. Let's return to Lord Rottington, who is now going to talk about how to add mixed numbers with unlike denominators.

Model 1

Hello again! Now, adding mixed numbers with unlike denominators is very similar to adding fractions with unlike denominators with one slight difference…

When you add mixed numbers, there is the added step of including whole numbers in your addition.

Of course, the first step is the same; you still need to change the fractions to equivalent fractions with common denominators.

) Now, let's look at this problem as an example: add four-and-one-half and seven-and-one-third.

Remember, before we can add fractions with unlike denominators, we first must rewrite those fractions with their least common denominator.

The least common multiple of two and three is six.

Four-and one-half is equivalent to four-and-three-sixths; seven-and-one-third is equivalent to seven-and-two-sixths.

Now we can add the numerators and keep the denominators the same: three-sixths plus two-sixths equals five-sixths.

The next step is to add the whole numbers: four plus seven is eleven, correct? And, last of all, we simplify the answer. The fraction eleven-and-five-sixths is already in lowest terms. Stupendous!

And… pause! What do you think? Are you ready to move on and learn more? If not, no problem. We can go back and see it again.

Model 2

And now let's go back one more time to Lord Rottington with the final part of today's top story.

Okay, here is another problem for us to look at: solve one-and-two-tenths plus two-thirds. Simplify your answer.

Since the denominators are not the same, what do we have to do? That's right - we need to change the fractions to equivalent fractions with common denominators.

So we rewrite the fractions with the least common denominator: one-and-two-tenths equals one-and-six-thirtieths; and two-thirds equals twenty-thirtieths.

Next we can add the numerators: six plus twenty is twenty-six; the denominator stays the same.

Then we add the whole numbers: one plus zero is one.

That means one-and-six-thirtieths plus twenty-thirtieths equals one-and-twenty-six-thirtieths. Is that our final answer? Ah, not so fast, my young friend.

The greatest common factor of twenty-six and thirty is two. That means we can simplify the fraction, making our final answer one-and-thirteen-fifteenths. Indubitably!

Now I fear I must leave you. I'm traveling far off to the mysterious Zen Fens and must convert my Rotting pounds to Zen Fen Yen! Ta-ta for now!

It's decision time, my friend. What do you think you wanna do? Keep going? Or go back for a quick review?

End of Activity Review

Alright, allow me to sum things up for you.

To add fractions and mixed numbers with unlike denominators, you have to first change those fractions to equivalent fractions with common denominators.

That means you need to find the least common denominator of the fractions and rewrite those fractions with that common denominator.

Then you add the numerators and keep the denominators the same. If you have mixed numbers, you then need to add the whole numbers. And, last but not least, be sure to simplify your answer in the end.

Okay, my friend. Do you want a little extra time to mull things over? Or, do you want to keep right on going? It's up to you.