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Chapter 8: Fractions

Ms. Q. Review

This month, we'll learn all about fractions.

First, let's review what we already know.

What are some things you all know about fractions?

A fraction is a number that is the result of division.

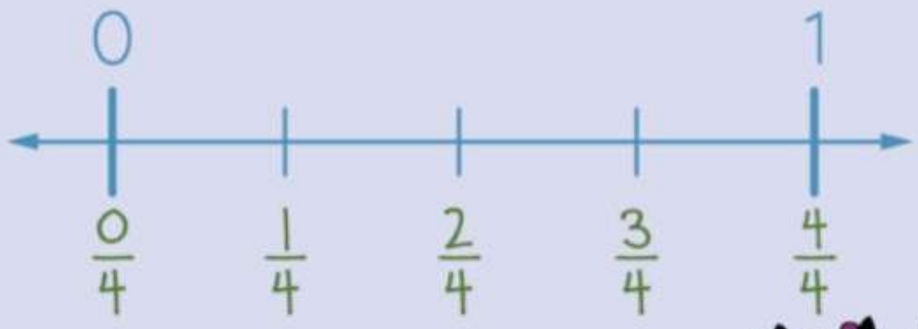
For example, $3 \div 4 = \frac{3}{4}$.

$$3 \div 4 = \frac{3}{4}$$

IN THE FRACTION $\frac{3}{4}$, THE 3 IS CALLED THE ***NUMERATOR***, AND THE 4 IS CALLED THE ***DENOMINATOR***.

Good. Where is $\frac{3}{4}$ on the number line?

To place $\frac{3}{4}$ on the number line, we divide the number line between 0 and 1 into four equal parts.



We can label the fourths on the number line from $\frac{0}{4} = 0$ to $\frac{4}{4} = 1$.

$\frac{3}{4}$ is right here.

Well done. Can a fraction be greater than 1?

Sure.

For example, $\frac{4}{1}=4$.

You can write any whole number as a fraction just by putting it over 1.

$\frac{4}{1}=4$

SOME PEOPLE CALL A FRACTION "IMPROPER" IF ITS NUMERATOR IS LARGER THAN ITS DENOMINATOR. SINCE THERE'S NOTHING WRONG WITH "IMPROPER" FRACTIONS, WE JUST CALL THEM FRACTIONS.

That's right. Are there other fractions that equal 4?

A fraction equals 4 if its numerator is 4 times its denominator.

$\frac{12}{3}=12\div3=4$

$\times4\left(\frac{40}{10}=40\div10=4\right.$

$\frac{68}{17}=68\div17=4$

Very good.

Who can name a fraction that is *greater* than 4...

...but *less* than 5?

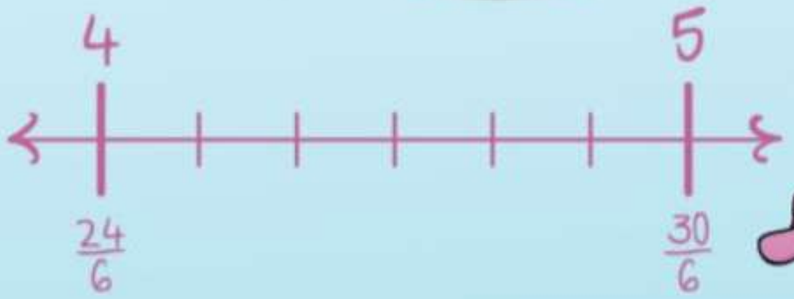
How about $\frac{28}{6}$?

Let's check. Where is $\frac{28}{6}$ on the number line?

Is $\frac{28}{6}$ between 4 and 5?

We know that $\frac{24}{6} = 24 \div 6 = 4$.

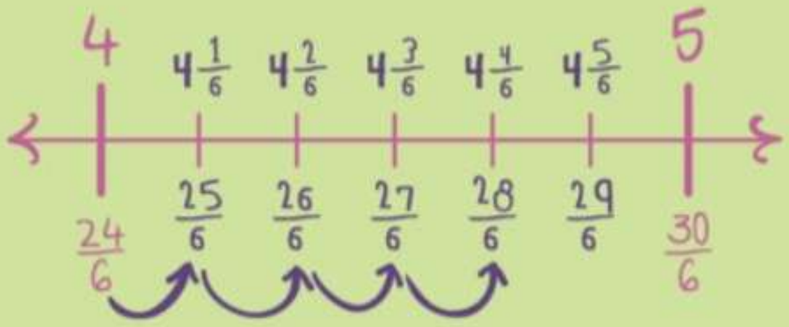
And $\frac{30}{6} = 30 \div 6 = 5$.



So, $\frac{28}{6}$ is between 4 and 5.

$\frac{28}{6}$ is four sixths more than 4.

We can write $\frac{28}{6}$ as a ***mixed number:*** $4\frac{4}{6}$.



$$\frac{28}{6} = 4 + \frac{4}{6} = 4\frac{4}{6}$$

A MIXED NUMBER CAN BE USED TO WRITE A FRACTION THAT IS GREATER THAN 1. A MIXED NUMBER IS WRITTEN AS A WHOLE NUMBER FOLLOWED BY A FRACTION THAT IS LESS THAN 1. LEARN MORE ABOUT MIXED NUMBERS BEGINNING ON PAGE 58.

We can simplify the fractional part of $4\frac{4}{6}$.

$4\frac{4}{6}$

How do we simplify $4\frac{4}{6}$?

We simplify a fraction by dividing its numerator and denominator by the same number.

The number we divide by has to be a factor of both the numerator and the denominator.

Since 4 and 6 both have 2 as a factor, we can simplify $\frac{4}{6}$ by dividing both 4 and 6 by 2.

$\frac{4}{6} = \frac{2}{3}$ (÷2, ÷2)

WHEN TWO NUMBERS HAVE A FACTOR IN COMMON, THE FACTOR IS CALLED A ***COMMON FACTOR***. FOR EXAMPLE, 7 IS A COMMON FACTOR OF 21 AND 35.

So, $4\frac{4}{6}$ simplifies to $4\frac{2}{3}$.

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

Since the numerator and denominator don't have any common factors besides 1, we can't simplify any more.

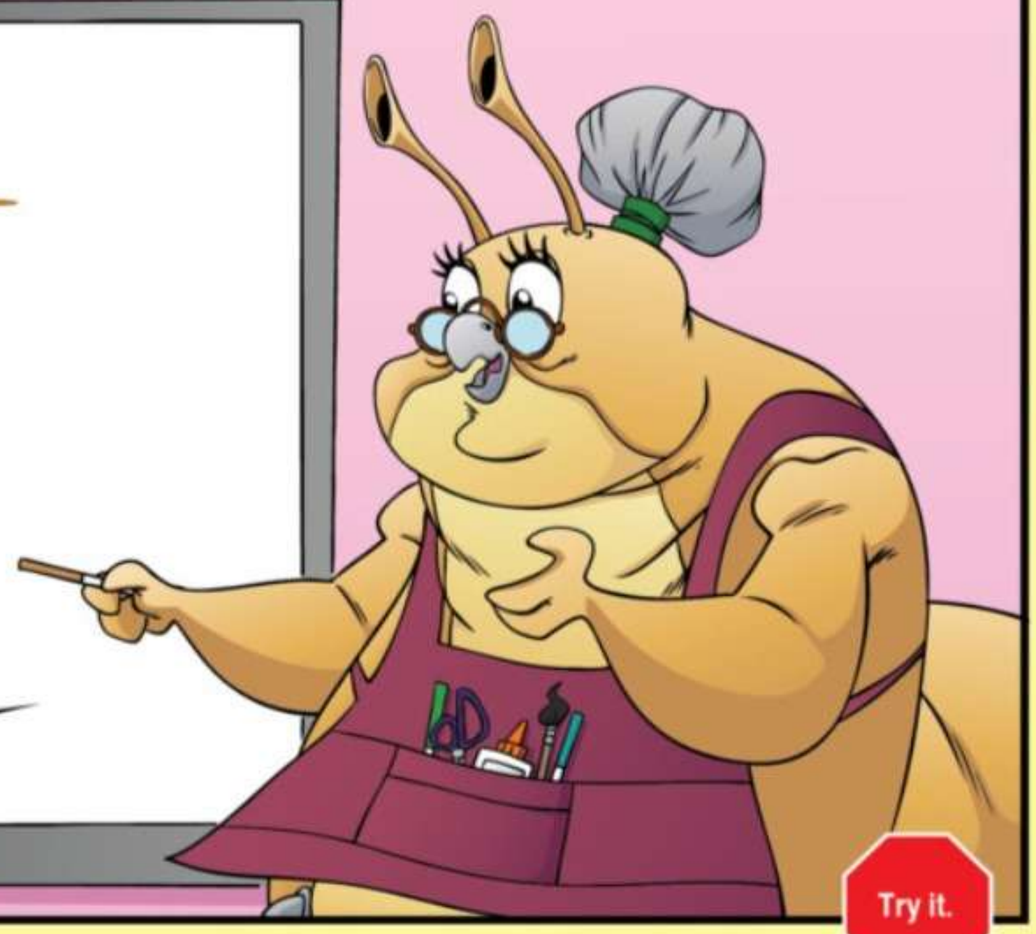
When a fraction can't be simplified, we say that the fraction is in ***simplest form.***

Nice work. There's just one thing left to review.

How do we compare the fractions in each of these three pairs?

$<, >,$ or $=$

1. $\frac{4}{9}$ ___ $\frac{5}{9}$
2. $\frac{7}{10}$ ___ $\frac{7}{11}$
3. $\frac{8}{21}$ ___ $\frac{3}{7}$



Try it.

Five ninths is bigger than four ninths, because there are more ninths.

$\frac{4}{9} < \frac{5}{9}$

Seven tenths is bigger than seven elevenths, because tenths are bigger than elevenths.

$\frac{7}{10} > \frac{7}{11}$

It's harder to compare $\frac{8}{21}$ and $\frac{3}{7}$, because the two fractions don't have the same denominator or the same numerator.

$\frac{8}{21}$ $\frac{3}{7}$

But, we can ***convert*** one or both fractions to make them easier to compare.

How?

Converting a fraction is like simplifying, only in reverse.

To convert a fraction, we ***multiply*** its numerator and denominator by the same number.

For example, we can convert $\frac{3}{7}$ to $\frac{6}{14}$...

...or to $\frac{30}{70}$.

$\frac{3}{7} = \frac{6}{14}$ (×2)

$\frac{3}{7} = \frac{30}{70}$ (×10)

How can converting $\frac{3}{7}$ help us compare it to $\frac{8}{21}$?

We can multiply the numerator and the denominator of $\frac{3}{7}$ by 3 to give $\frac{3}{7}$ the same denominator as $\frac{8}{21}$.

$\frac{8}{21}$ $\frac{3}{7} \overset{\times 3}{=} \frac{9}{21}$

Then, since $\frac{8}{21} < \frac{9}{21}$, we know that $\frac{8}{21} < \frac{3}{7}$.

$\frac{8}{21} < \frac{3}{7} = \frac{9}{21}$

Very good. Are there any questions?

Yes, Grogg?

I have a few.

Why doesn't glue stick to the inside of the bottle?

Math questions, Grogg!

Why do they call it ***quick***sand if it's so slow?

And why is "abbreviation" such a long word?

How come my ***feet*** smell, but my ***nose*** runs?!

Maybe we should let Ms. Q. ask all the questions, Grogg.

IF YOU HAVE TROUBLE UNDERSTANDING THE MATERIAL IN THIS SECTION, WE RECOMMEND REVIEWING THE FRACTION CHAPTER IN BEAST ACADEMY 3D.

MATH TEAM
Adding Fractions

What do you get when you add $\frac{3}{7}+\frac{2}{7}$?

Isn't adding sevenths just like adding anything else?

What do you mean, Grogg?

Well, if I add 3 books and 2 books, I get 5 books.

If I add 3 pencils and 2 pencils, I get 5 pencils.

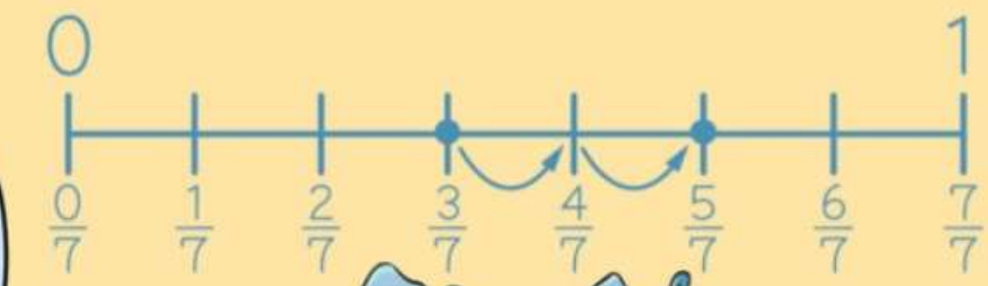
And if I add 3 sausage biscuits and 2 sausage biscuits, I get 5 sausage biscuits.

So, adding 3 sevenths plus 2 sevenths equals 5 sevenths.

$$\frac{3}{7}+\frac{2}{7}=\frac{5}{7}$$

We can show the addition on the number line.

Starting at $\frac{3}{7}$, we move right a distance of $\frac{2}{7}$. That puts us at $\frac{5}{7}$.



Great job.

Try this one. What is $\frac{5}{9}+\frac{4}{9}$?

$$\frac{5}{9}+\frac{4}{9}$$

Adding 4 ninths to 5 ninths gives us 9 ninths...

...which equals 1!

$$\frac{5}{9}+\frac{4}{9}=\frac{9}{9}=1$$

Nice work. Adding sevenths or ninths is just like adding books, or pencils, or sausage biscuits.

To add two fractions that have the same denominator...

...add the numerators, and keep the denominator.

$$\frac{a}{c}+\frac{b}{c}=\frac{a+b}{c}$$

R&G
Mixed Numbers

That's weird.

What?

So?

A 5-pack of Fun-Doh weighs 16 ounces.

What do you mean?

So... How could *5* cans of Fun-Doh weigh *16* ounces!?

If I divide 16 ounces of Fun-Doh equally into 5 cans, each can gets 3 ounces.

But, there is an ounce left over.

What happens to the extra ounce?

$$5\overline{)16}\quad 3,\ 15,\ 1$$

How much does a can of Fun-Doh weigh?

Each can holds the same amount. So, the last ounce is divided equally among the 5 cans.

Each can has an additional $1 \div 5 = \frac{1}{5}$ ounce.

So, there are $3 + \frac{1}{5} = 3\frac{1}{5}$ ounces of Fun-Doh in each can?

Yup.

We can write the result of division as a fraction or a mixed number instead of a quotient and a remainder.

CLEARANCE 2-Sleeved Shirts

6-Legged Pants

4-Legged

Fun-Doh

I'm gonna need to see another example.

Take a look at this can of soup.

It holds 26 ounces, and says it will serve 3 monsters. How many ounces are in each serving?

I need to divide the number of ounces by the number of servings...

...26÷3.

Right, but since 26 is not divisible by 3, we write the number of ounces as a fraction or a mixed number.

How would you write 26÷3 as a fraction and as a mixed number?

I see. We can just write $26 \div 3$ as a fraction.

$26 \div 3 = \frac{26}{3}$.

That's right.

So, each serving is $\frac{26}{3}$ ounces.

How much is $\frac{26}{3}$ ounces?

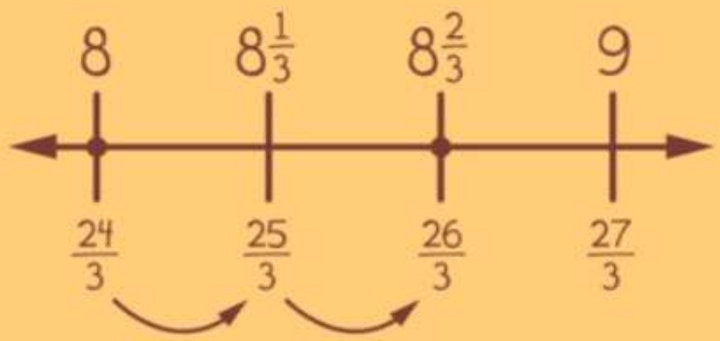
scratch scratch

It'll be easier to tell if we convert $\frac{26}{3}$ to a mixed number.

We know that $\frac{24}{3} = 8$.

$\frac{26}{3}$ is just $\frac{24}{3} + \frac{2}{3}$.

So, $\frac{26}{3}$ ounces is $8 + \frac{2}{3} = 8\frac{2}{3}$ ounces.



$$3\overline{)26}\quad 8,\ -24,\ 2$$

That makes sense.

If I divide 26 ounces of soup into 3 equal servings, each serving gets 8 whole ounces.

That leaves 2 ounces to split 3 ways.

So, each serving gets another $2 \div 3 = \frac{2}{3}$ ounce.

That makes $8 + \frac{2}{3} = 8\frac{2}{3}$ ounces of soup in each serving.

That's great!

To convert $\frac{26}{3}$ into a mixed number, we can use the quotient and remainder of $26 \div 3$!

The quotient gives us the whole number part, and the remainder gives us the numerator of the fraction.

The denominator is the same as in the original fraction. $\frac{26}{3} = 8\frac{2}{3}$.

Try $\frac{80}{7}$.

$$\begin{array}{r} 8 \\ 3\overline{)\,26} \\ -24 \\ \hline 2 \end{array} \quad \rightarrow \quad 8\frac{2}{3}$$

$80 \div 7$ has quotient 11 and remainder 3.

So, $\frac{80}{7} = 11\frac{3}{7}$.

$$\begin{array}{r} 11 \\ 7\overline{)\,80} \\ -77 \\ \hline 3 \end{array} \qquad \frac{80}{7} = 11\frac{3}{7}$$

Now we know how to change a fraction into a mixed number.

How do we change a mixed number back to a fraction?

I don't know, but I bet we can figure it out.

Let's try $3\frac{4}{5}$.

How would you write $3\frac{4}{5}$ as a fraction?


3 3 1/5 3 2/5 3 3/5 3 4/5 4
15/5 16/5 17/5 18/5 19/5 20/5
3 4/5 is 3+4/5.
And 3=15/5.
So, 3 4/5 = 15/5 + 4/5 = 19/5.
Sunglasses


I could use some new sunglasses.
BEAST QUARTERLY


Store Hours
They never carry my style.

RECESS

Rummy $\frac{7}{56}$

Rummy 7/56 is a 2-player card game similar to the popular card game Rummy 500. In Rummy 7/56, players score points by creating pairs or sets of equivalent fractions and mixed numbers, called melds.

The game uses a standard deck of playing cards with the face cards (K, Q, J) removed. Aces are treated as 1's. Shuffle and deal 9 cards face down to both players. Place the remaining cards face down in a pile called the stock. Flip the top card from the stock to begin the discard pile. During play, discards are placed as shown on the right so that each card in the pile is visible.

Play

Players alternate turns. During each turn, a player draws, plays melds (optional), then discards.

Drawing

A player has two options:

a) Draw the top card from the stock; or

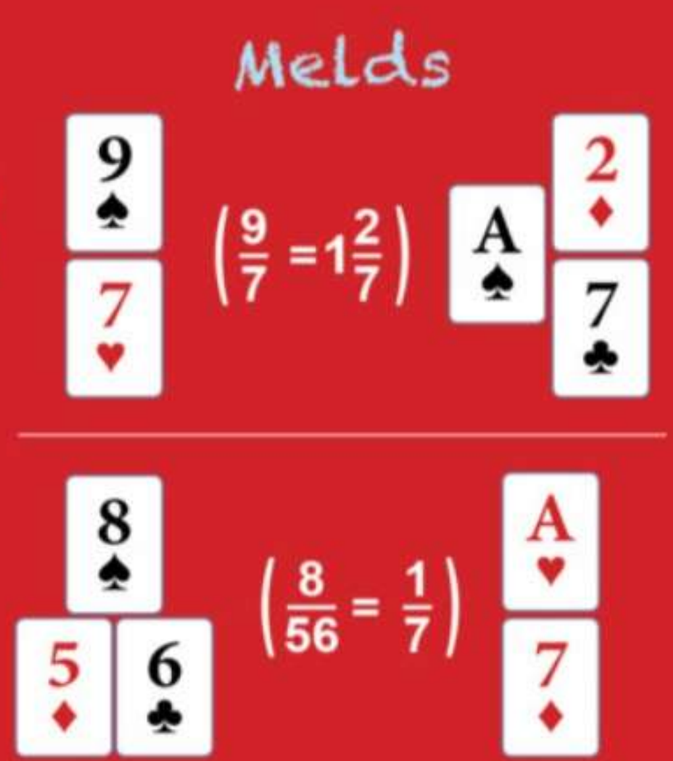
b) Take any card from the discard pile and all cards on top of it. The bottom card drawn from the discard pile must be played in a meld on the same turn it is drawn.

For example, if Winnie chooses to take the 4 of diamonds from the discard pile above, she must also pick up the three cards above it (10♠, A♣, and 7♠). Winnie must then play a meld with the 4 of diamonds. The other cards drawn may be played in a meld or kept in her hand.

Playing Melds

A player may play one or more melds face up. A meld is 2 or more cards from the player's hand representing digits of a fraction or mixed number. Each meld played must equal a meld that has already been played (by either player), or another meld played at the same time. Two sample melds are shown on the right.

- Duplicate fractions may not be used (8/9=8/9 is not allowed).
- Fractions that equal whole numbers are not allowed (for example, 24/6 and 8/2).
- Players cannot play all their cards but must keep at least one card to discard.



Discarding

To end his or her turn, a player must discard one card to the top of the discard pile.

The End and Scoring

The game ends when a player has no cards after discarding, or when a player's turn ends and the stock is empty. Players score one point for each card they have played in a meld and lose one point for each card that remains in their hand. The player with the most points wins.

MATH TEAM
Adding Mixed Numbers

Let's try adding mixed numbers.

How would you add $1\frac{3}{7}+2\frac{2}{7}$?

$1\frac{3}{7}+2\frac{2}{7}$

We could convert $1\frac{3}{7}$ and $2\frac{2}{7}$ into fractions.

Then, we just add them like we did before.

Since $1=\frac{7}{7}$, we have $1\frac{3}{7}=\frac{7}{7}+\frac{3}{7}=\frac{10}{7}$.

And since $2=\frac{14}{7}$, we have $2\frac{2}{7}=\frac{14}{7}+\frac{2}{7}=\frac{16}{7}$.

$1\frac{3}{7}+2\frac{2}{7}=\frac{10}{7}+\frac{16}{7}=\frac{26}{7}=3\frac{5}{7}$

Adding $\frac{10}{7}+\frac{16}{7}$...

...we get $\frac{26}{7}$.

$26\div7$ has quotient 3 and remainder 5. So, we can write $\frac{26}{7}$ as a mixed number: $3\frac{5}{7}$.

Can't we add mixed numbers without converting them to fractions?

You can.

How would you add $1\frac{3}{7}+2\frac{2}{7}$ ***without*** converting?

Try it.

We know that $1\frac{3}{7}=1+\frac{3}{7}$...

...and $2\frac{2}{7}=2+\frac{2}{7}$.

We can add the whole numbers and the fractions separately.

$$1\tfrac{3}{7}+2\tfrac{2}{7}$$
$$=(1+\tfrac{3}{7})+(2+\tfrac{2}{7})$$
$$=(1+2)+(\tfrac{3}{7}+\tfrac{2}{7})$$
$$=3+\tfrac{5}{7}$$
$$=3\tfrac{5}{7}$$

$1+2=3$.

$\frac{3}{7}+\frac{2}{7}=\frac{5}{7}$.

So, $1\frac{3}{7}+2\frac{2}{7}=3\frac{5}{7}$.

Great job. It's usually a lot easier to add mixed numbers by adding the whole numbers and the fractions separately.

Sometimes things get a little tricky, though.

Try this one.

$5\frac{7}{8}+4\frac{3}{8}$

Try it.

$5+4$ is 9, and $\frac{7}{8}+\frac{3}{8}=\frac{10}{8}$.

So, $5\frac{7}{8}+4\frac{3}{8}=9\frac{10}{8}$!

$$5\tfrac{7}{8}+4\tfrac{3}{8}$$
$$=5+4+\tfrac{7}{8}+\tfrac{3}{8}$$
$$=9\tfrac{10}{8}$$

I don't think we're done.

The fractional part of a mixed number has to be ***less*** than 1.

And, we can simplify $\frac{10}{8}$.

$$=9\tfrac{10}{8}$$

How would you write $9\frac{10}{8}$ as a mixed number in simplest form?

$\frac{10}{8}$ simplifies to $\frac{5}{4}$.

$\frac{10}{8} = \frac{5}{4} = 1\frac{1}{4}$

And $\frac{5}{4} = 1\frac{1}{4}$.

$9\frac{10}{8} = 9 + \frac{10}{8} = 9 + 1\frac{1}{4} = 10\frac{1}{4}$

So, $9\frac{10}{8}$ equals $9+1\frac{1}{4}$, which is $10\frac{1}{4}$.

WE COULD HAVE ALSO CONVERTED $\frac{10}{8}$ TO $1\frac{2}{8}$ FIRST, THEN SIMPLIFIED $1\frac{2}{8}$ TO $1\frac{1}{4}$.

Nice job!

One good way to organize your work when adding mixed numbers is to stack them.

$$\begin{array}{r} 5\frac{7}{8} \\ +\ 4\frac{3}{8} \\ \hline 9\frac{10}{8} \end{array}$$

We add the fractional parts and the whole numbers separately.

If your answer is a mixed number, make sure the fractional part is simplified and less than 1.

$$\begin{array}{r} 5\frac{7}{8} \\ +\ 4\frac{3}{8} \\ \hline \end{array}$$

$9\frac{10}{8} = 9\frac{5}{4} = 9 + 1\frac{1}{4} = \boxed{10\frac{1}{4}}$

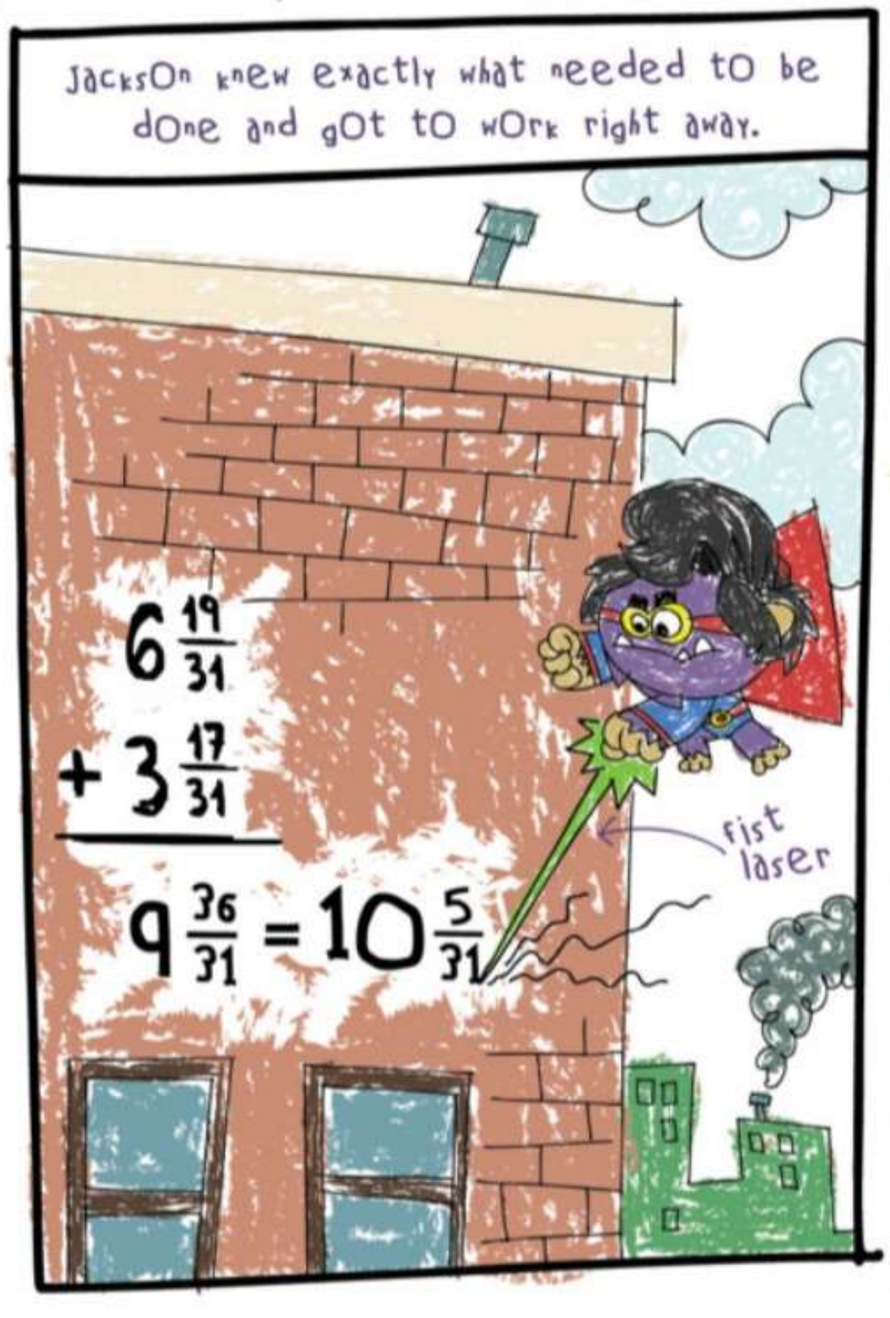
Some of us ***really*** need to simplify.

name: GrOgg

Homework: Write and solve a story problem involving fractions in the space below.

FractiOn JacksOn

½ MOnster, ½ amazing!




WOODSHOP
FRACTION SUBTRACTION
Before we begin today's project, you'll all be needin' to know how to add 'n' subtract fractions.
We just learned how to add fractions at Math Team practice!
Great. We'll focus on subtraction, then.
Try this one to start.
$\frac{7}{11} - \frac{4}{11}$
If we have 7 elevenths and take away 4 elevenths, that leaves 3 elevenths.
We can show the subtraction on the number line.
Starting at $\frac{7}{11}$, we move left a distance of $\frac{4}{11}$. That puts us at $\frac{3}{11}$.
To subtract two fractions, we subtract the numerators, and keep the denominator.
0
1
$\frac{0}{11}$ $\frac{1}{11}$ $\frac{2}{11}$ $\frac{3}{11}$ $\frac{4}{11}$ $\frac{5}{11}$ $\frac{6}{11}$ $\frac{7}{11}$ $\frac{8}{11}$ $\frac{9}{11}$ $\frac{10}{11}$ $\frac{11}{11}$
$\frac{7}{11} - \frac{4}{11} = \frac{7-4}{11} = \frac{3}{11}$
WHEN SUBTRACTING TWO FRACTIONS WITH THE SAME DENOMINATOR, $\frac{A}{C} - \frac{B}{C} = \frac{A-B}{C}$.

Aye. Let's try includin' some mixed numbers. What do you get when you subtract $2\frac{3}{5} - 1\frac{1}{5}$?

We could convert $2\frac{3}{5}$ and $1\frac{1}{5}$ into fractions.

$2\frac{3}{5} - 1\frac{1}{5}$

$2\frac{3}{5} = \frac{13}{5}$, and $1\frac{1}{5} = \frac{6}{5}$.

So, $2\frac{3}{5} - 1\frac{1}{5} = \frac{13}{5} - \frac{6}{5}$.

$2\frac{3}{5} - 1\frac{1}{5}$

$= \frac{13}{5} - \frac{6}{5}$

$= \frac{7}{5}$

$= 1\frac{2}{5}$

And $\frac{13}{5} - \frac{6}{5}$ equals $\frac{7}{5}$, which is $1\frac{2}{5}$.

If we stack the mixed numbers, we can subtract without converting.

$$\begin{array}{r} 2\frac{3}{5} \\ -\,1\frac{1}{5} \\ \hline \end{array}$$

2-1=1...

...and $\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$.

$$\begin{array}{r} 2\frac{3}{5} \\ -\,1\frac{1}{5} \\ \hline 1\frac{2}{5} \end{array}$$

Good thinkin'! Subtractin' two mixed numbers can get tricky, though. Try this one.

$15\frac{4}{9} - 8\frac{8}{9}$

Let's try stacking the subtraction again!

Try it.

15−8=7, and $\frac{4}{9}-\frac{8}{9}$=...

...ummm...

$15\frac{4}{9}$
$-8\frac{8}{9}$

Grogg! We can't take away 8 ninths from 4 ninths.

We need more ninths on top.

I know where to get more ninths!

Where from, Grogg?

We can take $\frac{9}{9}$ from the 15.

$15\frac{4}{9}$
$=14+\frac{9}{9}+\frac{4}{9}$
$=14\frac{13}{9}$

I see.

If we take 1 from 15, we can write 1 as $\frac{9}{9}$.

Then, we add $\frac{9}{9}$ to $\frac{4}{9}$ to get $\frac{13}{9}$.

So, $15\frac{4}{9}$ equals $14\frac{13}{9}$.

WRITING $15\frac{4}{9}$ AS $14\frac{13}{9}$ IS CALLED ***REGROUPING*** THE MIXED NUMBER.

Now, we can subtract.

14−8=6, and $\frac{13}{9}-\frac{8}{9}=\frac{5}{9}$, so...

...$14\frac{13}{9}-8\frac{8}{9}=6\frac{5}{9}$!

$15\frac{4}{9}$
$-8\frac{8}{9}$
→
$14\frac{13}{9}$
$-8\frac{8}{9}$
$6\frac{5}{9}$

It's just like subtracting whole numbers, when we take a ten and turn it into 10 ones...

...or turn a hundred into 10 tens.

$$\begin{array}{r} 3\ 13 \\ 8\not{1}\not{3} \\ -\ 127 \\ \hline 716 \end{array} \qquad \begin{array}{r} 5\ 15 \\ \not{6}\not{5}8 \\ -\ 86 \\ \hline 572 \end{array}$$

But, instead of turning a ten into 10 ones or a hundred into 10 tens, we turned a 1 into 9 ninths.

$$\begin{array}{r} 14\frac{13}{9} \\ \not{15}\ \not{4}/_{A} \\ -\ 8\frac{8}{9} \\ \hline 6\frac{5}{9} \end{array}$$

Yo ho ho! Ye be a clever bunch.

$14\frac{13}{9}$ and $15\frac{4}{9}$ be different ways to write the same number.

Writin' $15\frac{4}{9}$ as $14\frac{13}{9}$ be called ***regrouping***.

$$\begin{array}{r} 14\frac{13}{9} \\ \not{15}\ \not{4}/_{A} \\ -\ 8\frac{8}{9} \\ \hline 6\frac{5}{9} \end{array}$$

Now, ye be ready for today's project.

Begin by trimmin' $3\frac{3}{4}$ inches from the end of a $12\frac{1}{4}$-inch wooden dowel.

What be the length of the resulting dowel?

How long will a $12\frac{1}{4}$-inch dowel be after cutting $3\frac{3}{4}$ inches from one end?

We can write $12\frac{1}{4}$ as $11\frac{5}{4}$, then subtract.

$11-3=8$, and $\frac{5}{4}-\frac{3}{4}=\frac{2}{4}$, so...

...$11\frac{5}{4}-3\frac{3}{4}=8\frac{2}{4}$.

And, we can simplify $\frac{2}{4}$ to $\frac{1}{2}$.

$$\begin{array}{r} 11\frac{5}{4} \\ -\ 3\frac{3}{4} \\ \hline 8\frac{2}{4} \end{array} = 8\frac{1}{2}$$

So, the trimmed dowel will be $8\frac{1}{2}$ inches long.

Aye.

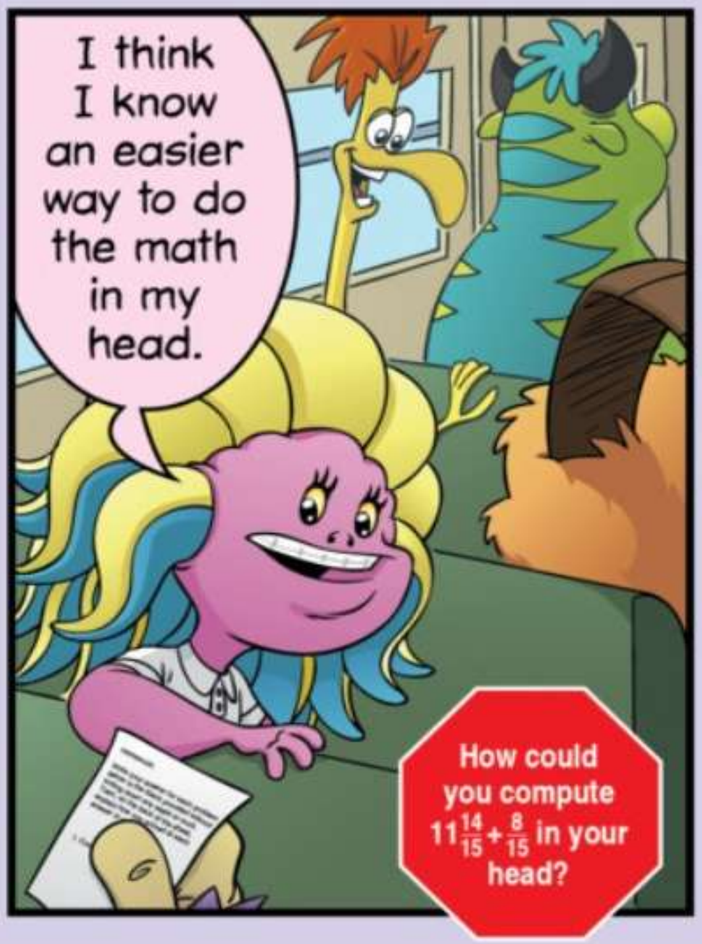
Once you've got yer $8\frac{1}{2}$-inch dowel, attach it to the stand we made yesterday.

What are we making, anyway?

Peg legs!

I'll grab some paints so we can decorate 'em!

School Bus Mental Math



To add eight fifteenths to $11\frac{14}{15}$, we can start by adding one fifteenth to $11\frac{14}{15}$. That gives us 12.

Then, we just add 7 more fifteenths.

$12+\frac{7}{15}=12\frac{7}{15}$.

IN MATH, WE WRITE:

$$11\tfrac{14}{15}+\tfrac{8}{15}$$
$$=11\tfrac{14}{15}+\left(\tfrac{1}{15}+\tfrac{7}{15}\right)$$
$$=\left(11\tfrac{14}{15}+\tfrac{1}{15}\right)+\tfrac{7}{15}$$
$$=12+\tfrac{7}{15}$$
$$=12\tfrac{7}{15}$$

Great idea, Winnie.

$11\frac{14}{15}+\frac{8}{15}=12\frac{7}{15}$.

What's the second problem?

$6\frac{3}{11}-3\frac{9}{11}$.

I got it.

Me, too.

I know!

Huh?

How'd you guys do that so fast?

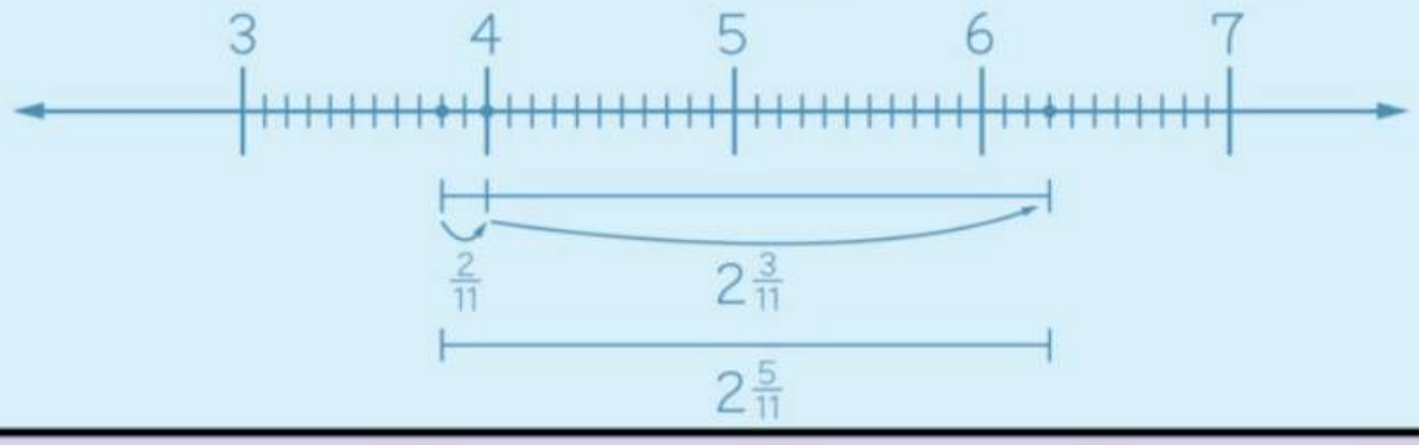
How could you compute $6\frac{3}{11}-3\frac{9}{11}$ in your head?

I found the difference by counting up.

From $3\frac{9}{11}$ to 4 is $\frac{2}{11}$.

Then, from 4 to $6\frac{3}{11}$ is $2\frac{3}{11}$ more.

So, the difference is $2\frac{3}{11} + \frac{2}{11} = 2\frac{5}{11}$.

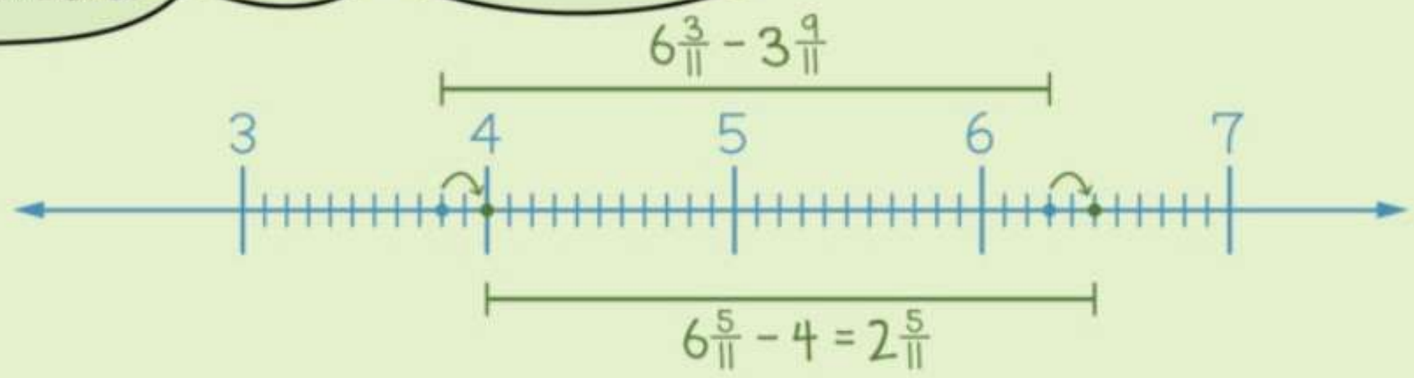


I got the same answer a different way.

To make the subtraction easier, I added $\frac{2}{11}$ to both numbers.

Adding $\frac{2}{11}$ to both numbers in a subtraction problem doesn't change their difference.

$6\frac{3}{11} - 3\frac{9}{11}$ equals $6\frac{5}{11} - 4$, which is $2\frac{5}{11}$.



I did something else.

$3\frac{9}{11}$ is close to 4, and subtracting 4 is a lot easier than subtracting $3\frac{9}{11}$.

$3\frac{9}{11}$ is $\frac{2}{11}$ less than 4.

$$6\tfrac{3}{11} - 3\tfrac{9}{11}$$
$$= 6\tfrac{3}{11} - 4 + \tfrac{2}{11}$$
$$= 2\tfrac{3}{11} + \tfrac{2}{11}$$
$$= 2\tfrac{5}{11}$$

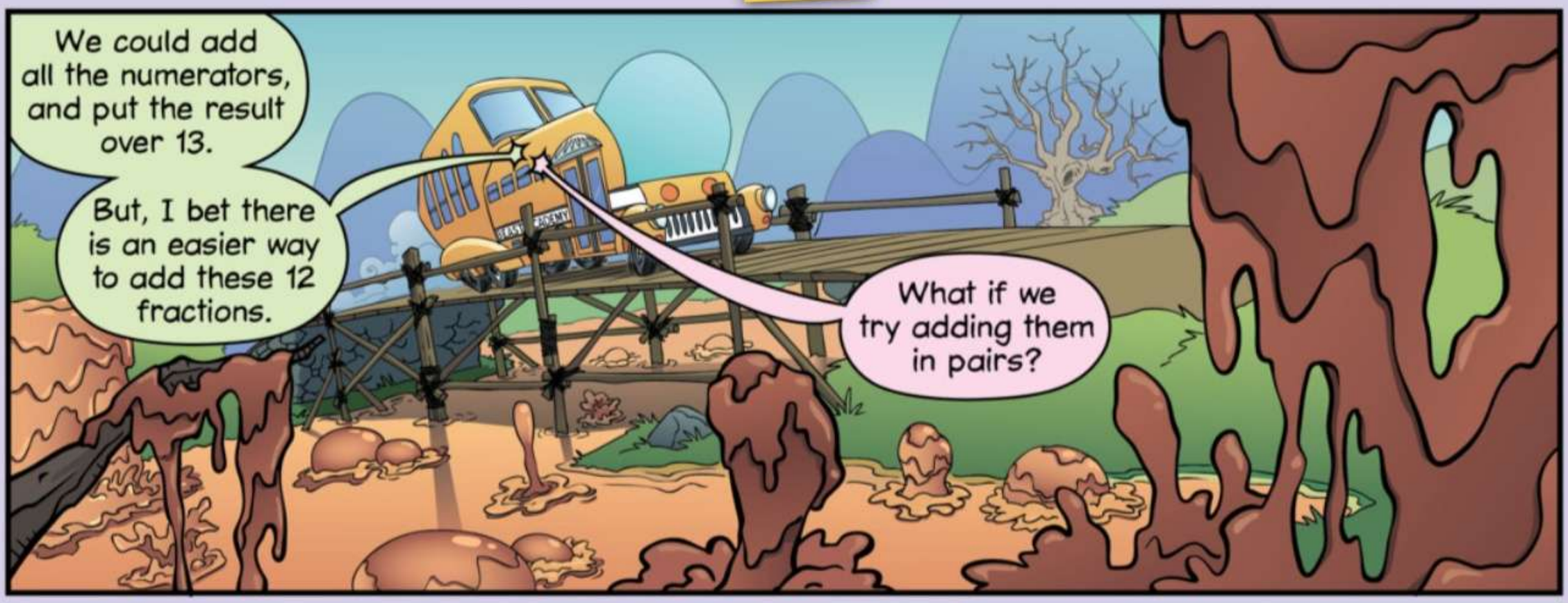
So, to take away $3\frac{9}{11}$, I took away 4, then gave back $\frac{2}{11}$.

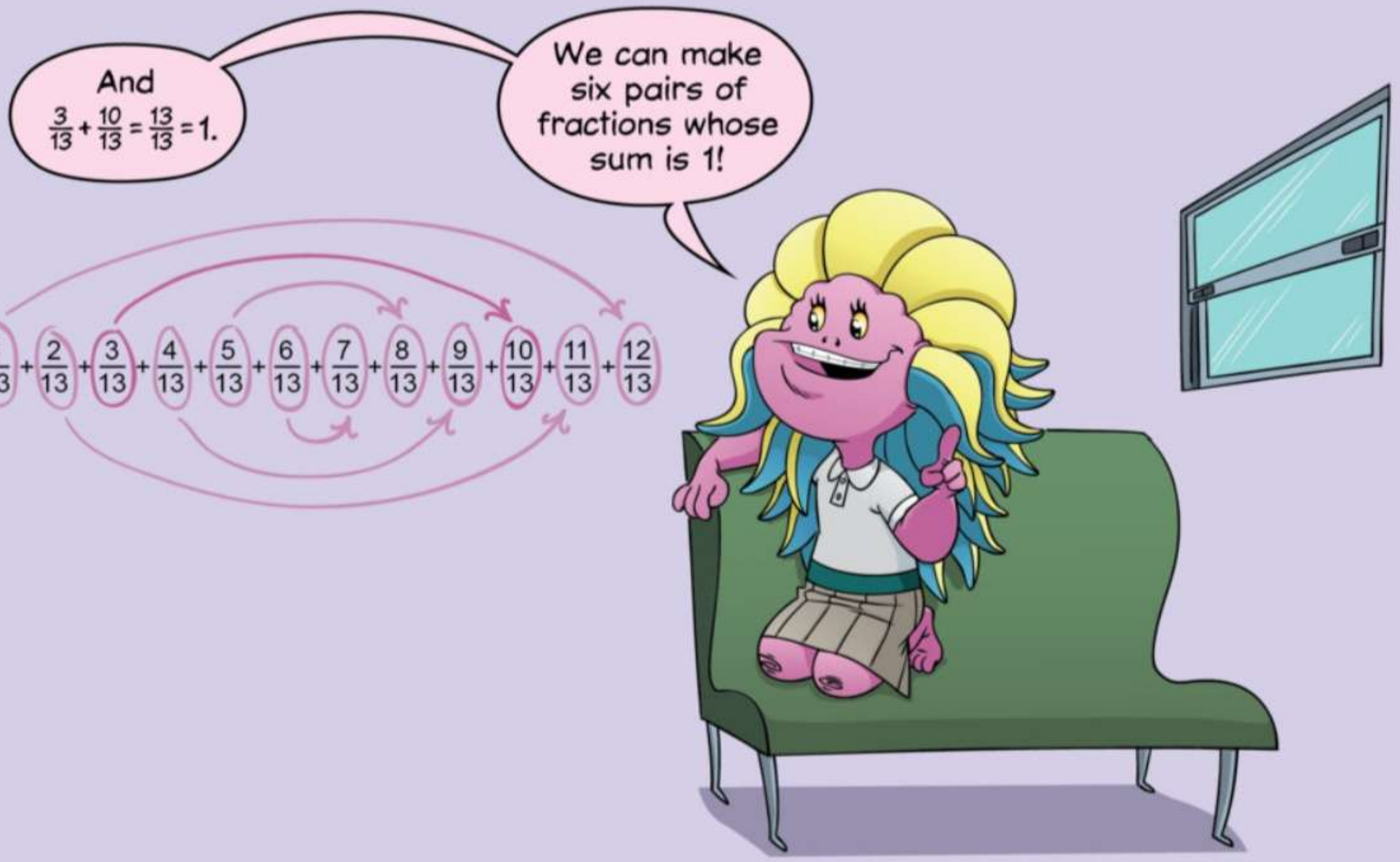
There are lots of different ways to think about subtraction. We all got $2\frac{5}{11}$!

What's the last problem?

We need to add $\frac{1}{13} + \frac{2}{13} + \frac{3}{13} + \frac{4}{13} + \frac{5}{13} + \frac{6}{13} + \frac{7}{13} + \frac{8}{13} + \frac{9}{13} + \frac{10}{13} + \frac{11}{13} + \frac{12}{13}$.

Can you find an easy way to solve this one in your head?





3. Compute: $\frac{1}{13}+\frac{2}{13}+\frac{3}{13}+\frac{4}{13}+\frac{5}{13}+\frac{6}{13}+\frac{7}{13}+\frac{8}{13}+\frac{9}{13}+\frac{10}{13}+\frac{11}{13}+\frac{12}{13}$

The sum of all six pairs is 6!

ADEMY

Got it!

Here's my stop!