Understanding Equivalent Fractions

homebased

TODAY'S MATH GOAL

By the end of this lesson,
I will be able to find equivalent fractions using fraction circles, tape diagrams and number lines.

BIG QUESTION:

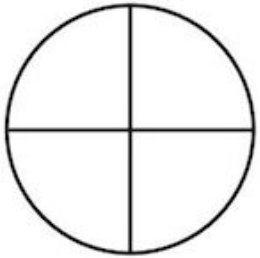
How can visual models help me understand equivalent fractions?

Write down the Big Question in your notecatcher.

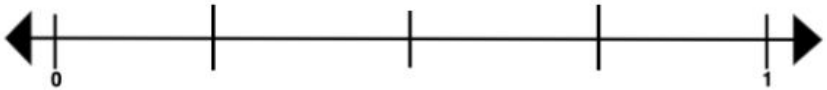
What are Equivalent Fractions?

Equivalent fractions are fractions that are equal to each other even though they have different numerators and denominators.

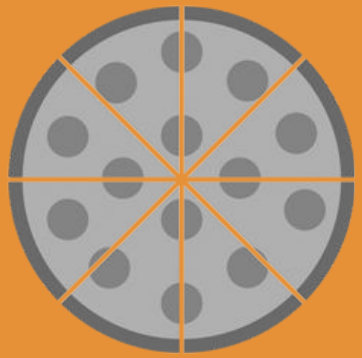
How can this be?



Let's use our understanding of **visual models** (fraction circles, tape diagrams and number lines) to see how we can find equivalent wholes, halfs, and fourths!



When you see this symbol, write down the vocabulary word and definition on your notecatcher.



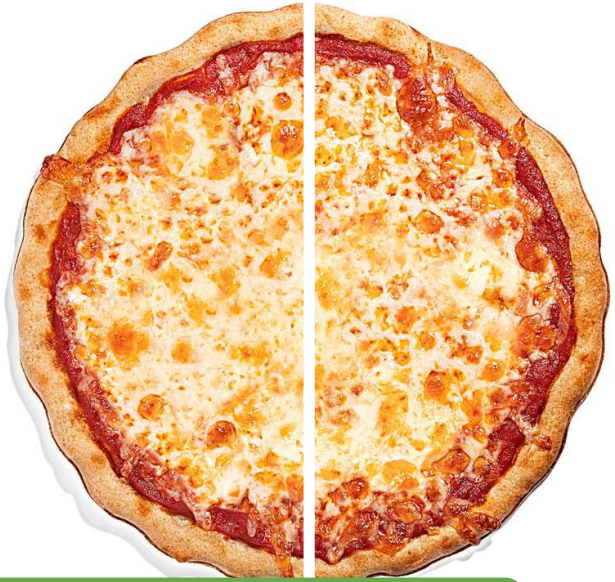
Finding Equivalent Wholes with the Pizza Model!

Visualizing Equivalent Fractions w/ Pizza!

Here we have a whole pizza and a pizza cut into two-halves. They are **equivalent because they are equal in size** **even though one is whole and one is sliced**!

1

=



$\frac{2}{2}$

$\frac{1}{1}$

written as a fraction

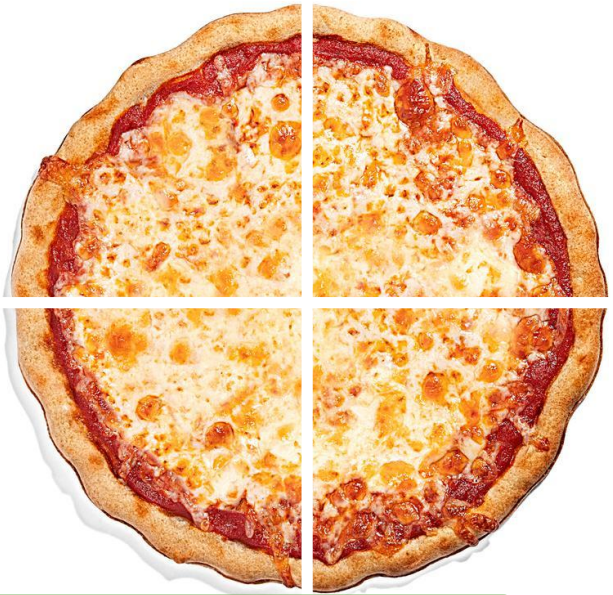
How many *halves* are equivalent to 1 whole?

Visualizing Equivalent Fractions w/ Pizza!

Here we have a whole pizza and a pizza cut into four-fourths. They are **equivalent**!

1

=



$\frac{4}{4}$

$\frac{1}{1}$

written as a fraction

How many *fourths* are equivalent to 1 whole?

Visualizing Equivalent Fractions w/ Pizza!

Here we have a whole pizza and a pizza cut into eight-eighths. They are **equivalent**!

1

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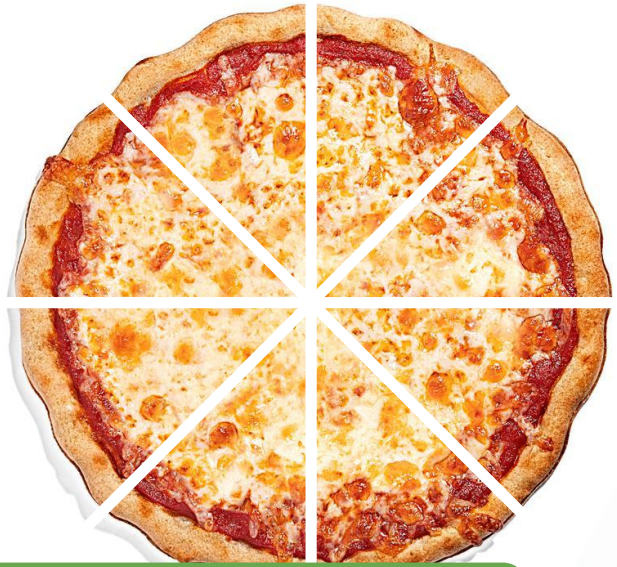


$\frac{8}{8}$

$\frac{1}{1}$

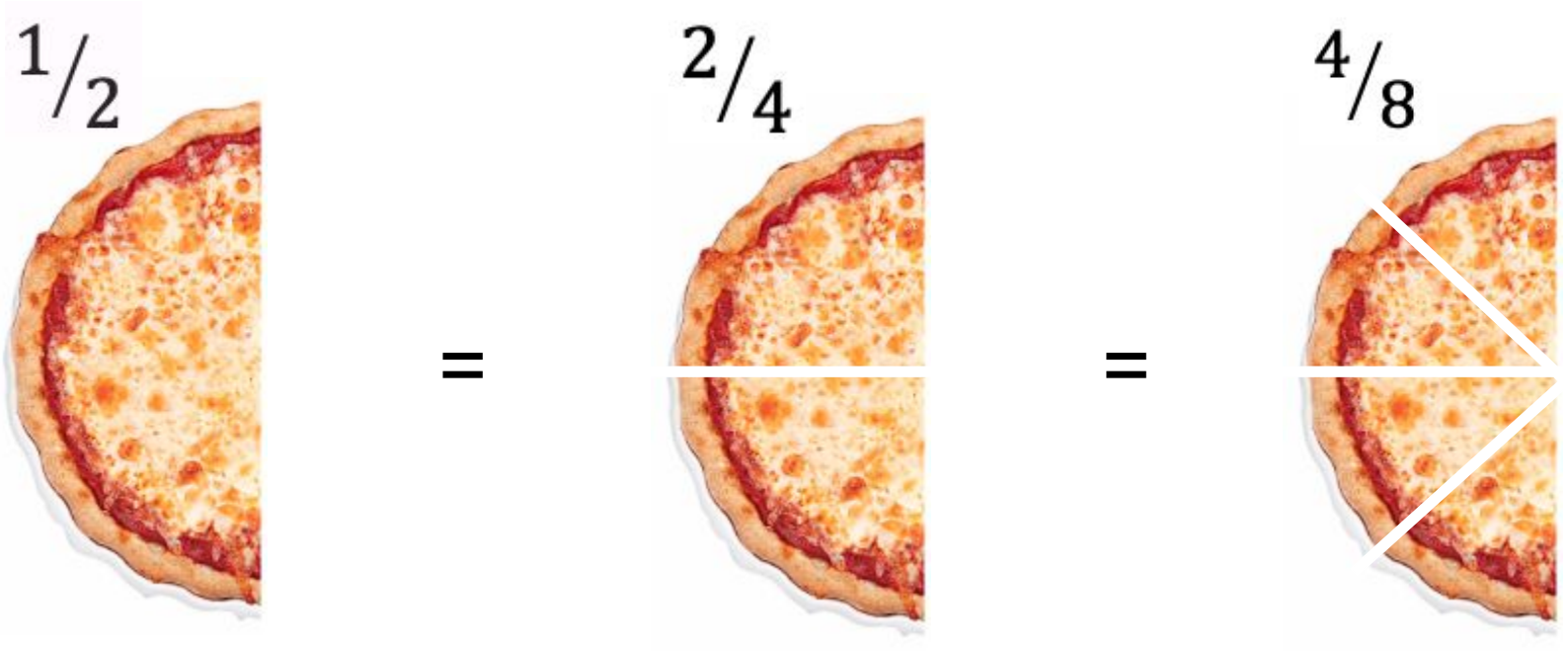
written as a fraction

Remember, when the numerator matches the denominator, it always equals 1 whole!

Finding Equivalent Halves, Fourths and Eighths!

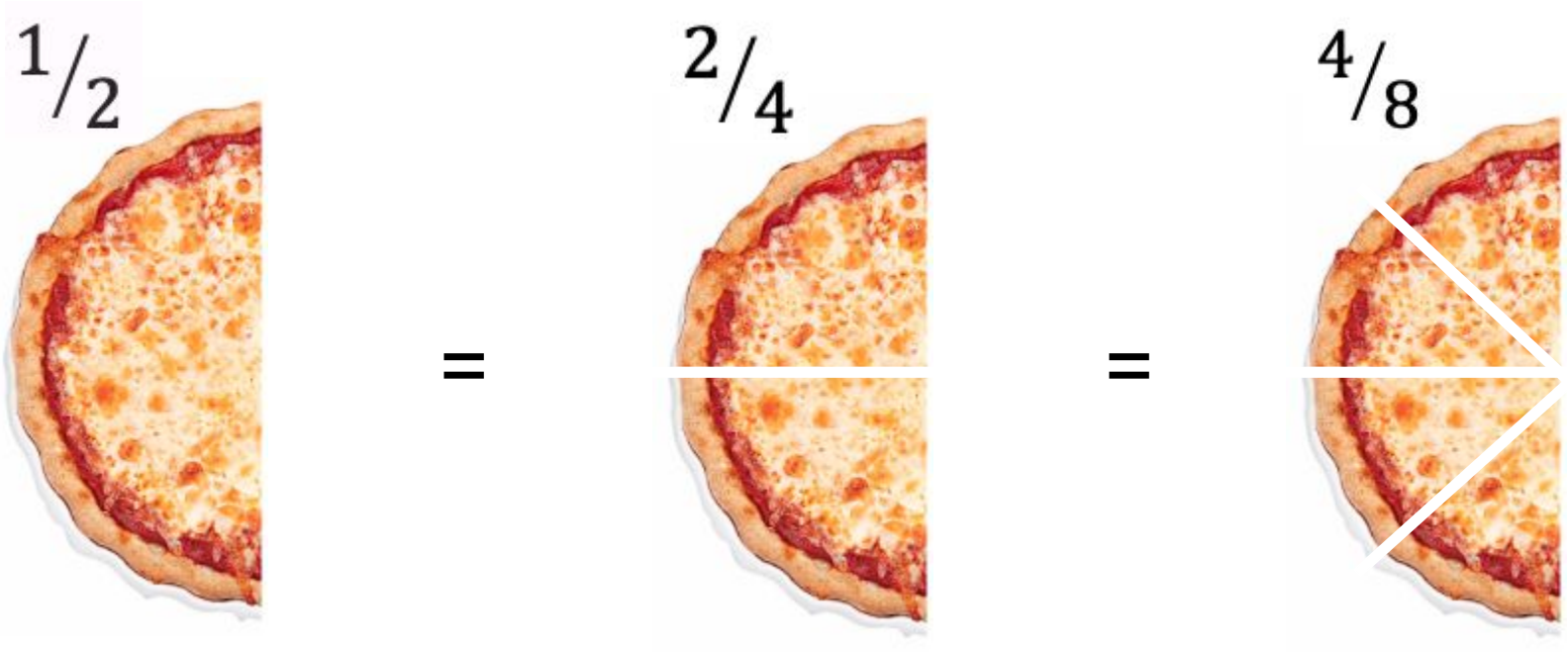
Visualizing Equivalent Fractions w/ Pizza!

Here we have three different fractions of a whole pizza, or parts of a whole.
Look closely at the three fractions. Are they **equivalent**? Why or why not?



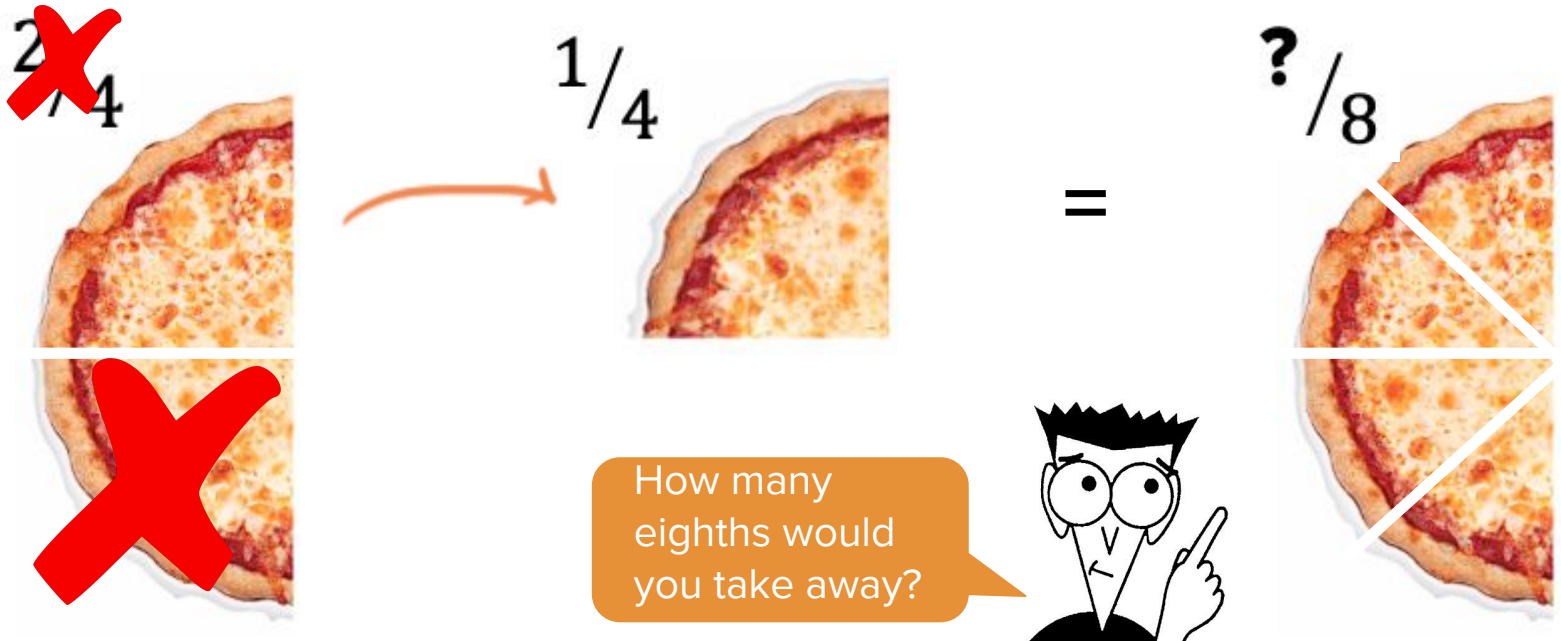
Visualizing Equivalent Fractions w/ Pizza!

Yes, these fractions of a whole pizza are equivalent because they all equal one-half of a pizza. No matter how these pizzas are sliced, it's all the same amount!



Visualizing Equivalent Fractions w/ Pizza!

What happens when we take ¼ away from the first model? **How many eighths** would we need to take away from the second model to create equivalent fractions?

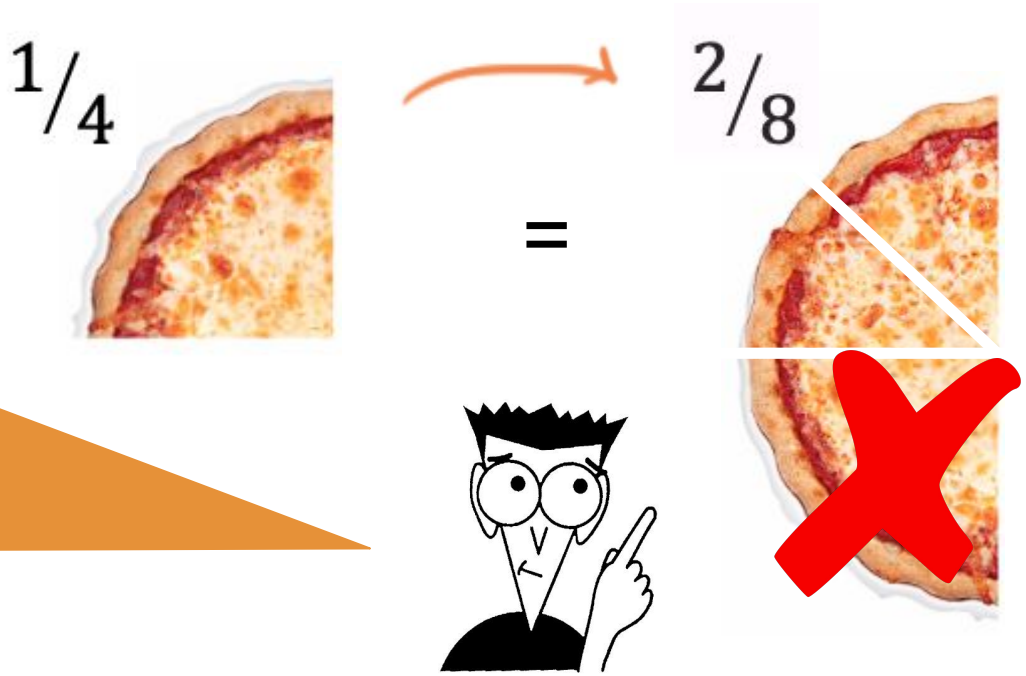


Visualizing Equivalent Fractions w/ Pizza!

If we take a one-fourth away from the first model, **how many eighths** would we take away from the second model to create equivalent fractions?

Yes, we need to take away two-eighths from the second model. **One-fourth is the same, or equal to, two-eighths**.

They are **equivalent**!



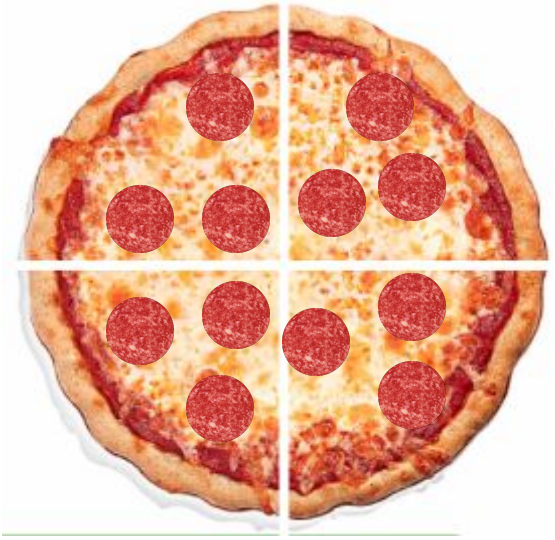
Real World Word Problem!

Show your work in your notes as we solve this word problem together.

Get Your Noggin Joggin!

It's Friday at Ella and Emma's house. Ella and Emma are identical twin sisters!

When dinner time rolls around, their mom orders two pizzas—one cheese and one pepperoni. After the pizzas arrive, the girls notice that they are sliced differently. The cheese pizza is cut into eighths but the pepperoni is cut into fourths like this:



Is your noggin joggin?

Ella doesn't like pepperoni, so she grabs two slices of cheese pizza.

Emma sees her sister take two slices. So, Emma takes two for herself—two slices of pepperoni! Things always have to be identical with Ella and Emma.

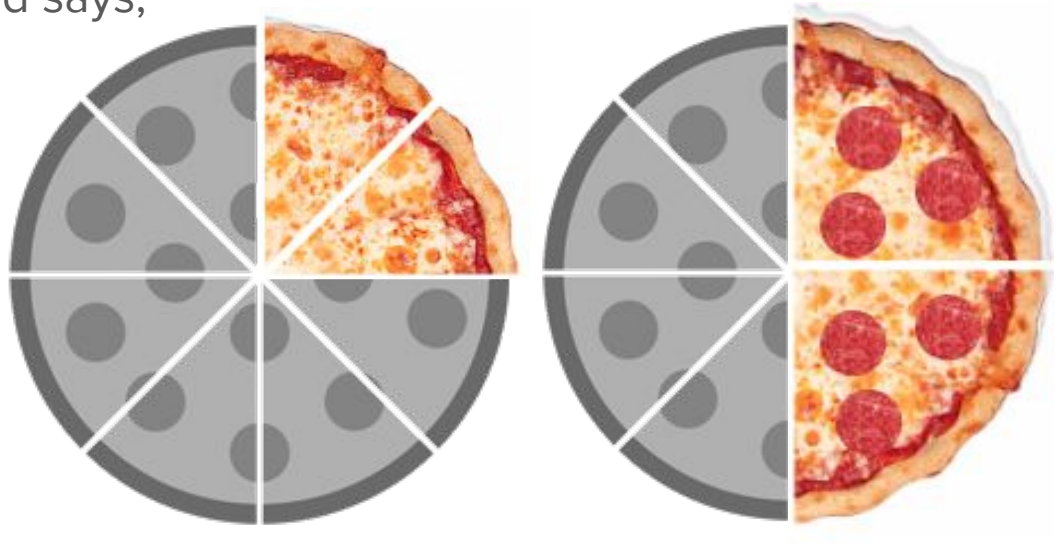
But Ella looks at Emma's plate and says,

"Hey, that's not fair!"

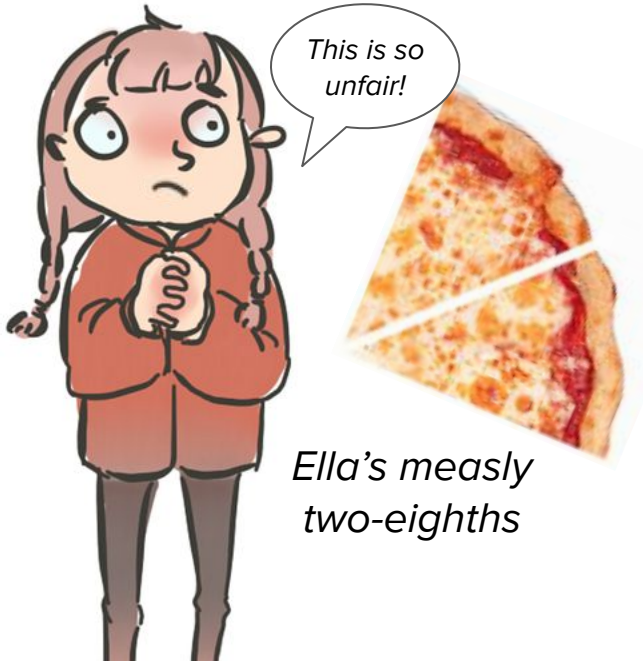
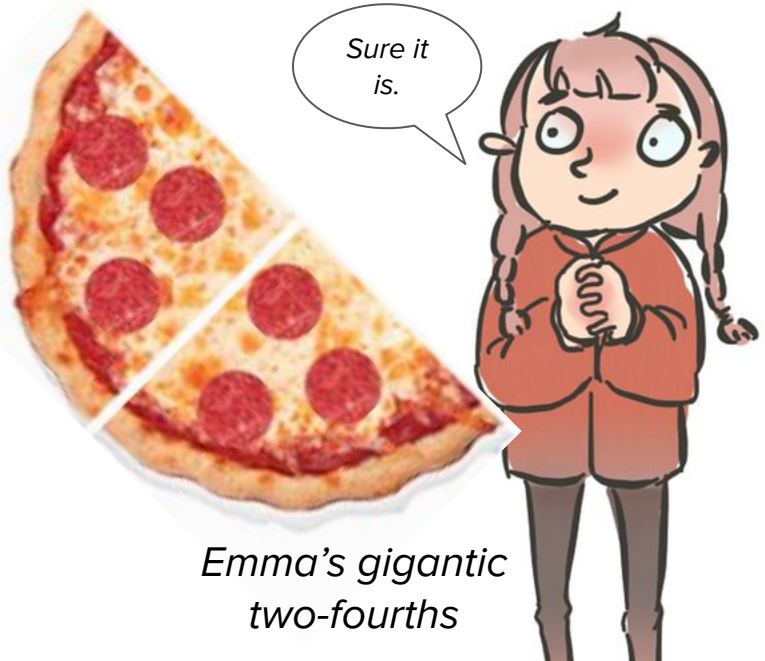
Emma replies,

"Sure it is. We both have two slices."

Who do you agree with? Why?



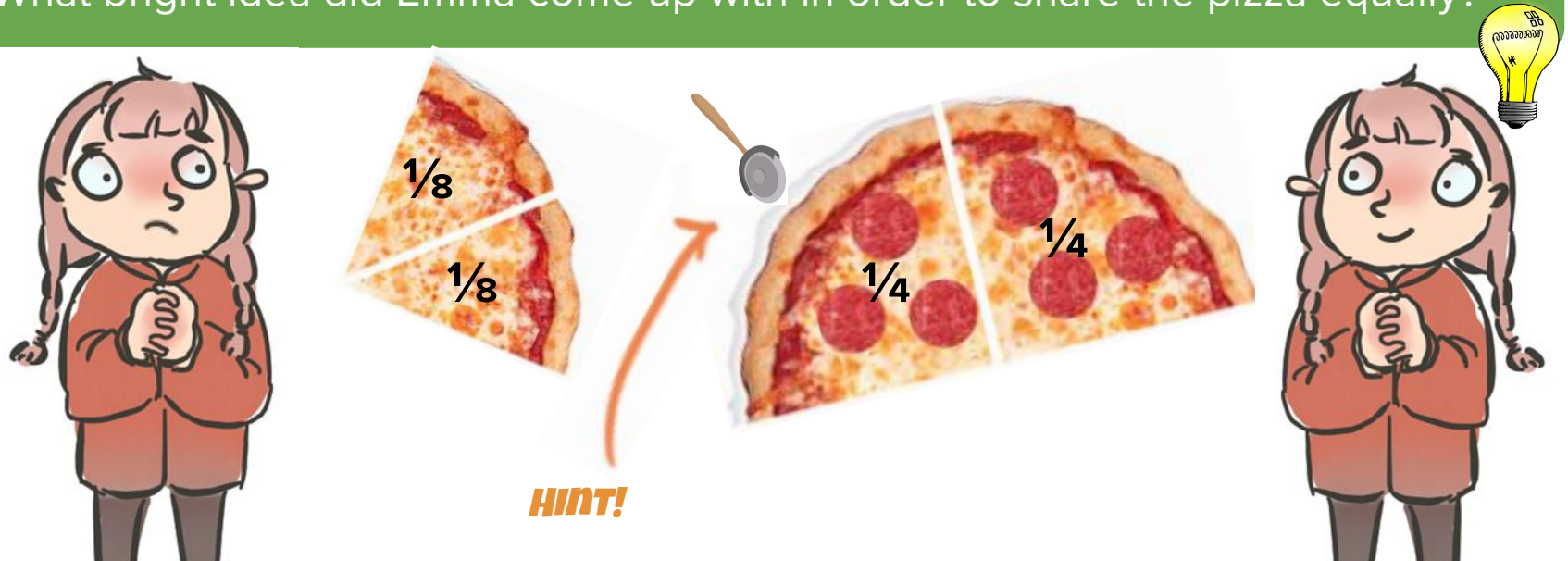
WHO DID YOU AGREE WITH? WHY OR WHY NOT?

Ella's Slices	Emma's Slices
 *Ella's measly two-eighths*	 *Emma's gigantic two-fourths*

Yes, it looks like Ella got a raw deal!

After seeing how much bigger her slices of pizza were compared to her twin sister's, Emma apologized to Ella and offered up a solution.

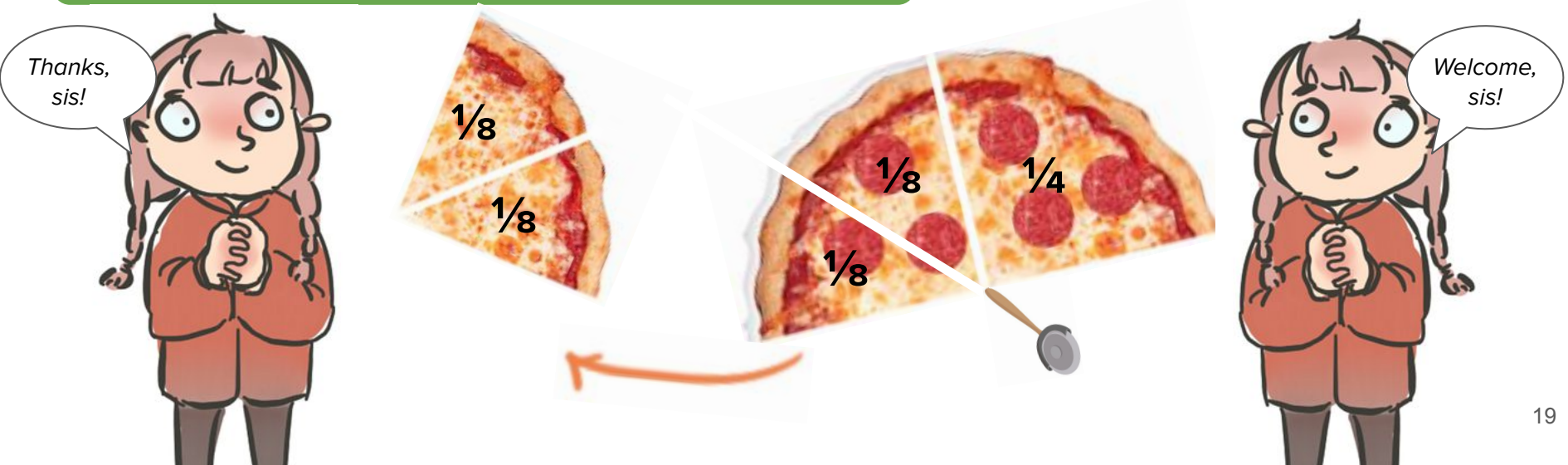
What bright idea did Emma come up with in order to share the pizza equally?



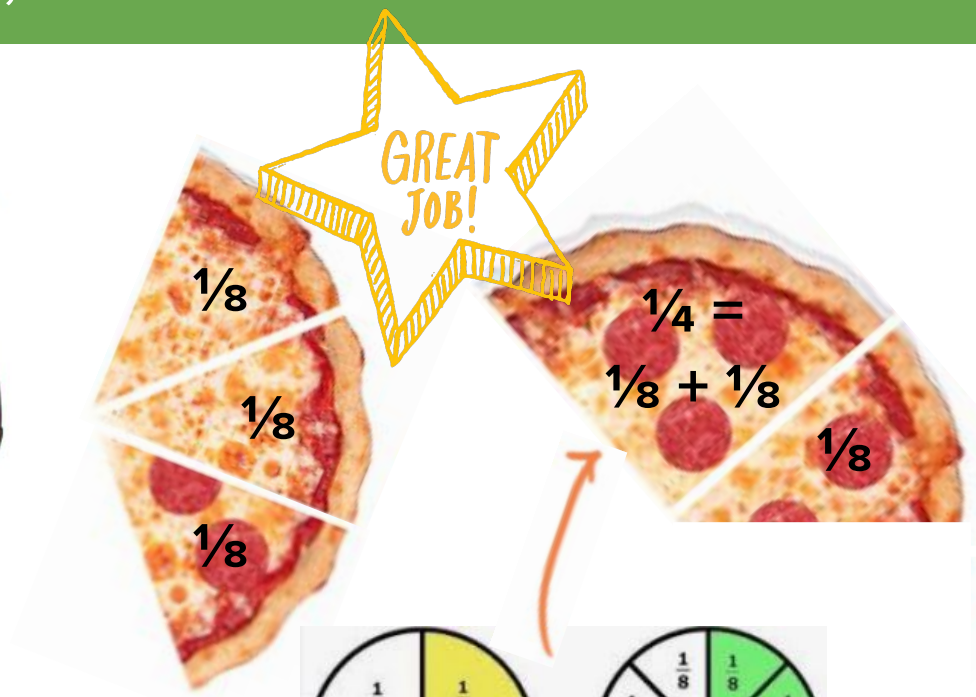
MAKING IT RIGHT!

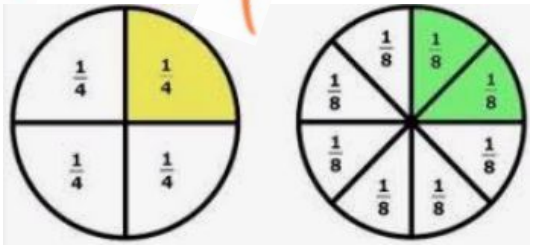
Emma cut one slice of her pizza into two slices, which turned fourths in eighths!
By doing so, Emma created equivalent fractions that could be shared with Ella.

How many eighths do both sisters have now?



Yes, both Ella and Emma now have 3/8!





Shading Equivalent Fractions Using Fraction Circles

Shading Equivalent Fractions

One of the best ways to understand if fractions are equivalent is to use a visual model that we can easily shade in and compare.

$\frac{1}{2}$ $\frac{2}{4}$ $\frac{4}{8}$

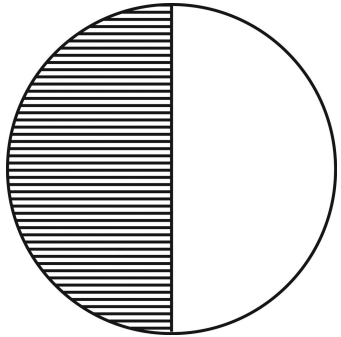
Notice how each fraction has a different **numerator** and a different **denominator**!

Let's look again at these three equivalent fractions and see how they can be represented using fraction circles and shading.

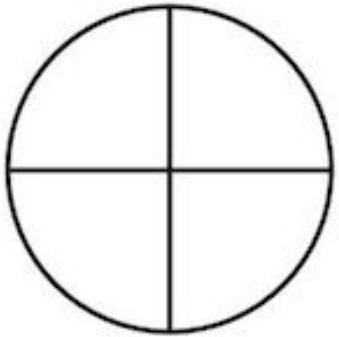
Shading Equivalent Fractions

Here we only have the one-half fraction circle shaded in.

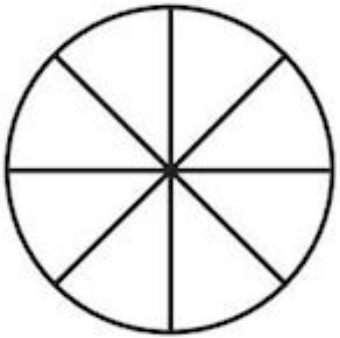
$\frac{1}{2}$



$\frac{2}{4}$



$\frac{4}{8}$

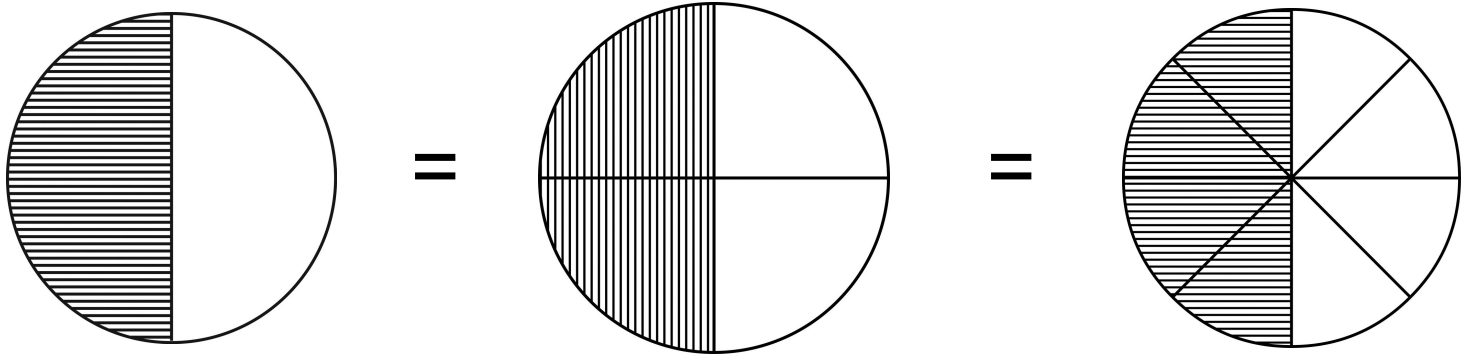


How would you shade in the two other models so that they equal *one-half*?

Visualizing Equivalent Fractions

Yes, you would need to shade in two-fourths and four-eighths to match one-half!

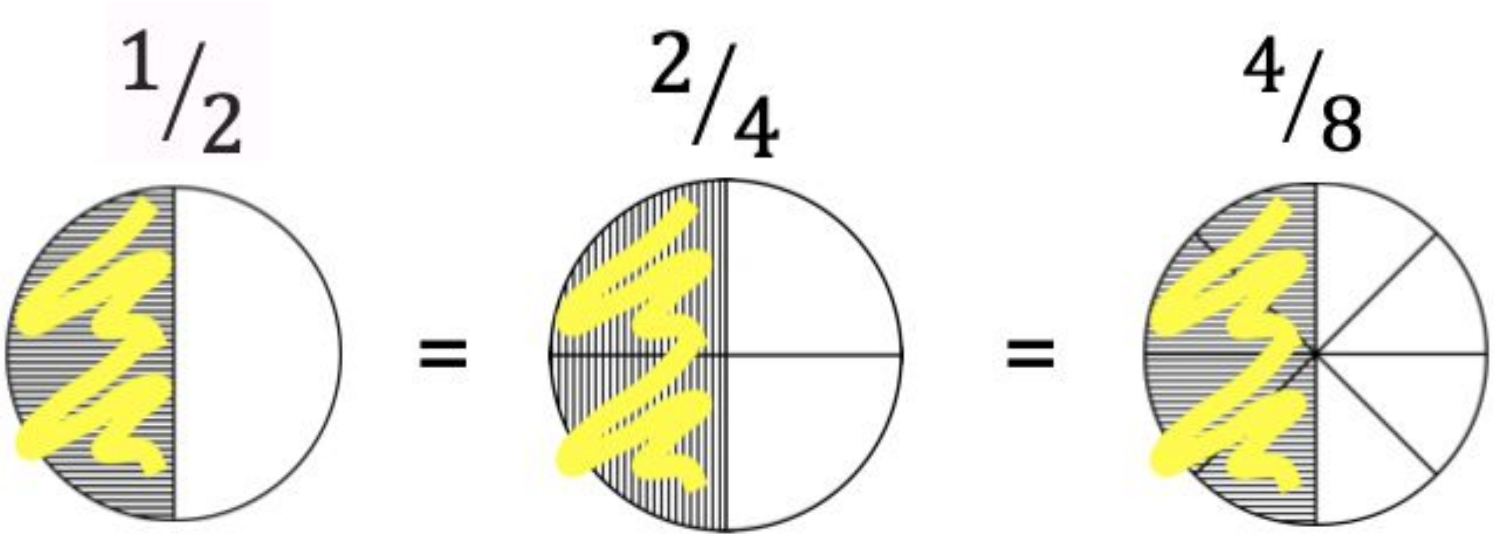
$\frac{1}{2}$ = $\frac{2}{4}$ = $\frac{4}{8}$



Yes, one-half is equal to two-fourths is equal to four-eighths. They are equivalent!

Visualizing Equivalent Fractions

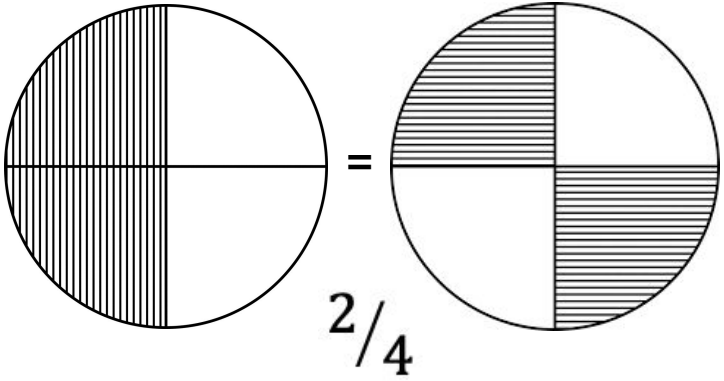
All three models have an **equal area shaded in.** **Therefore, they are equivalent**.

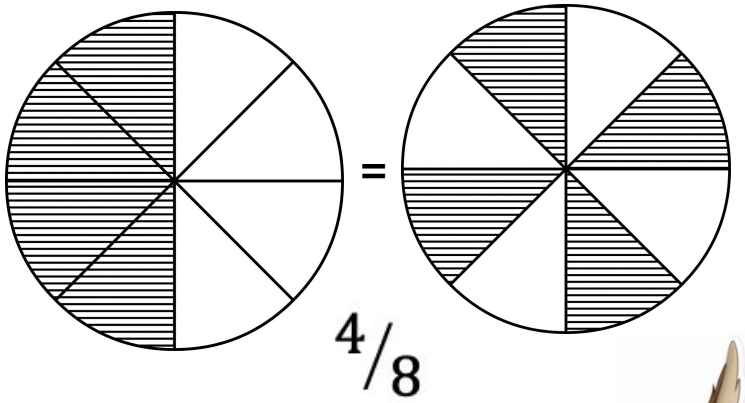


Again, *one-half* is equal to t*wo-fourths* is equal to *four-eighths*. They are equivalent!

Common Mistakes

Sometimes, the fraction circles you are given are shaded in differently. Like this:





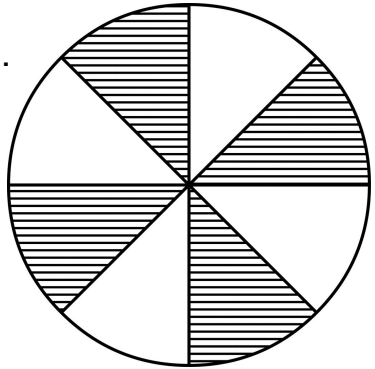
Don’t be fooled by tricksters who move the pieces around on you!

Use your imagination to move the pieces into easier patterns, or use your cut-outs to physically move fraction parts around to see if they match or not.

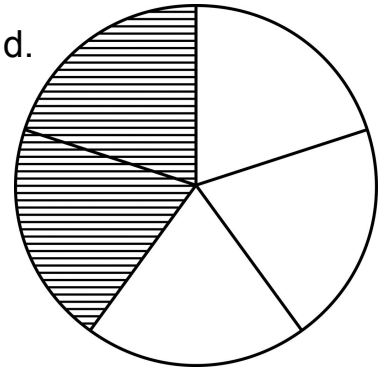
Let's Check for Understanding!

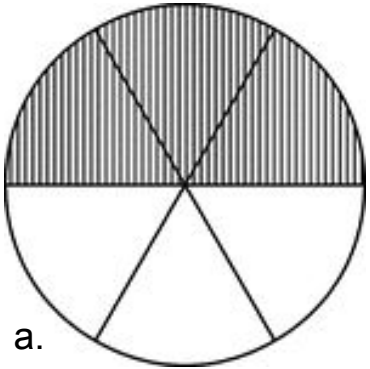
Which fraction circle is NOT equivalent to the others?

b.

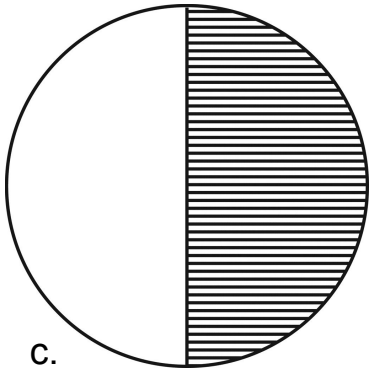


d.

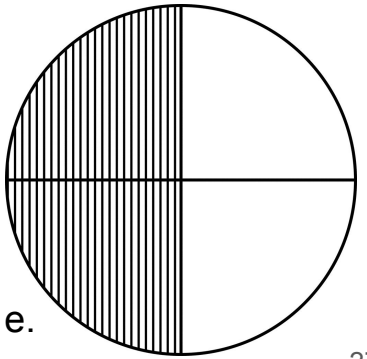




a.



c.



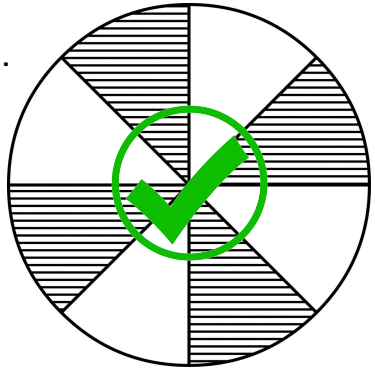
e.

Let's Check for Understanding!

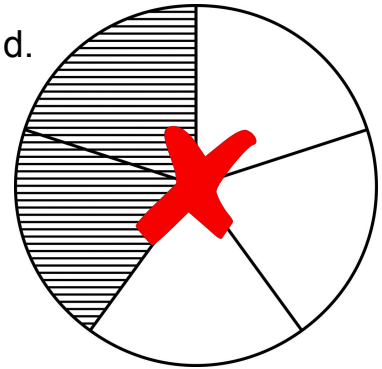
Which fraction circle is NOT equivalent to the others?

Four of these models all equal ½!

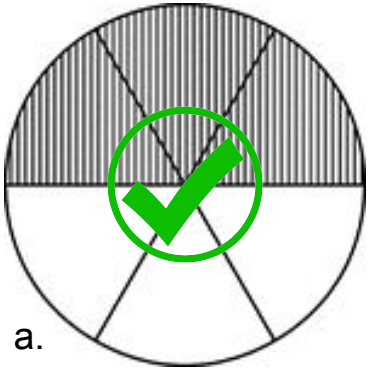
b.



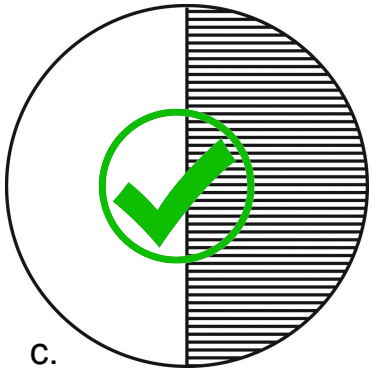
d.



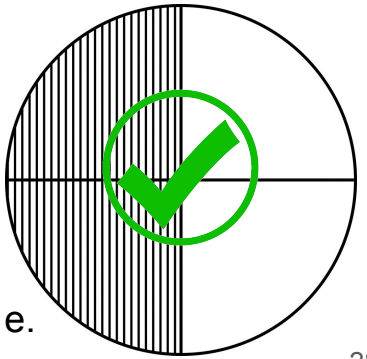
But fraction d. represents ⅝ which is NOT equal to ½ .



a.



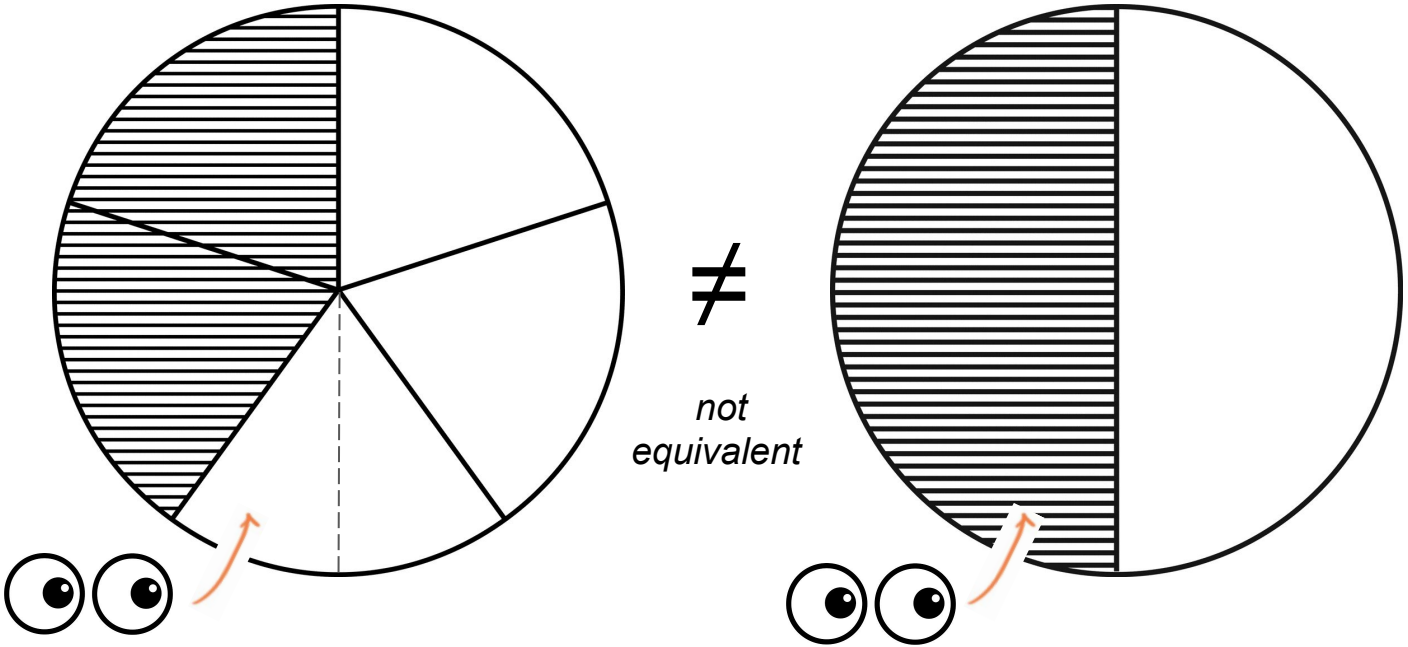
c.



e.

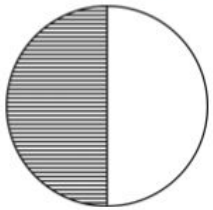
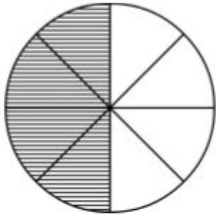
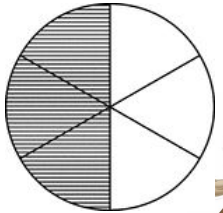
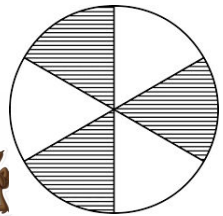
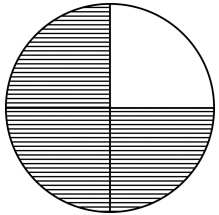
Let's check for understanding!

See how $\frac{2}{5}$ is **NOT** equal to $\frac{1}{2}$? Their shaded areas don't match up.



Review: Equivalent Fraction Circles

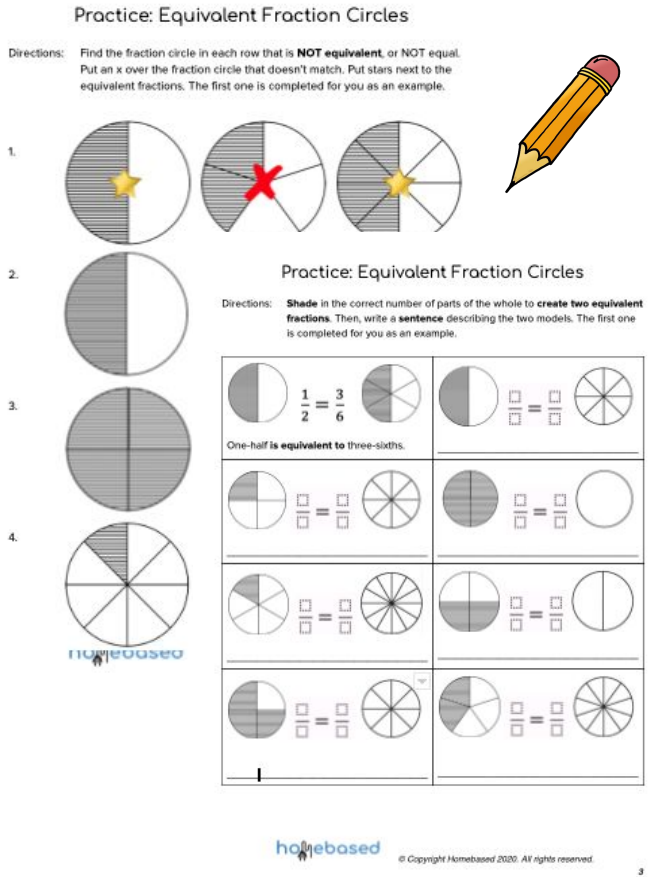
IMPORTANT

Equivalent fractions are EQUAL to each other even though they have different numerators and denominators.	Be careful when a trickster shades a fraction circle. You could miss equivalent fractions if you don't catch the pattern.	Remember: numerator = shaded parts denominator = total parts
$\frac{1}{2}$  = $\frac{4}{8}$ 	$\frac{3}{6}$  =  $\frac{3}{6}$ 	$\frac{3}{4}$  three shaded / four total

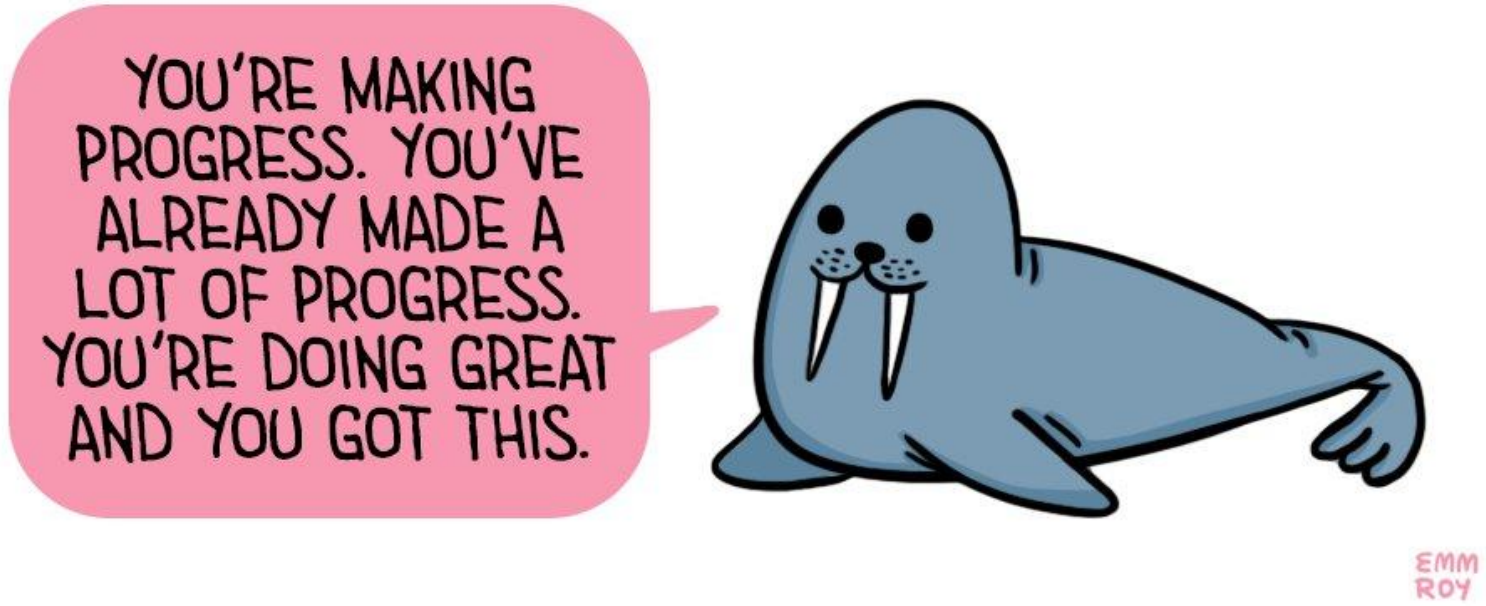
Practice:
Equivalent Fraction Circles

Stop and complete the worksheets on pages 2 and 3 of your student packet.

Look back at the Review on slide 30 if you get stuck. ;)



Wally here suggests you take a quick 5-minute brain break!

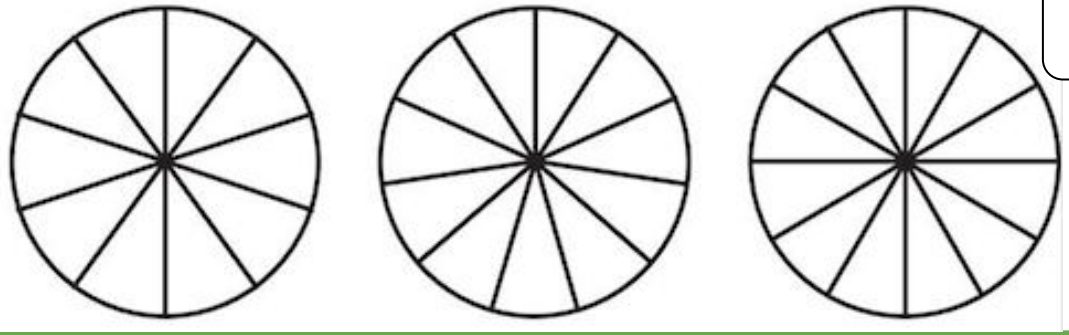


Equivalent Fractions with Tape Diagrams and Number Lines

Equivalent Fractions

One thing we know about visual models is drawing fraction circles can get tricky.

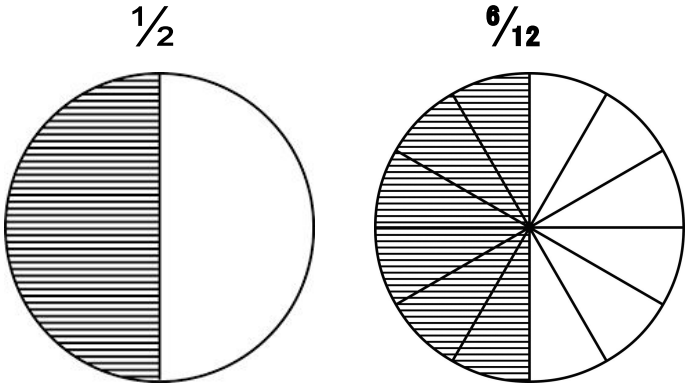
It takes a lot of practice and attention to create fraction circles for tenths, elevenths and twelfths for example:

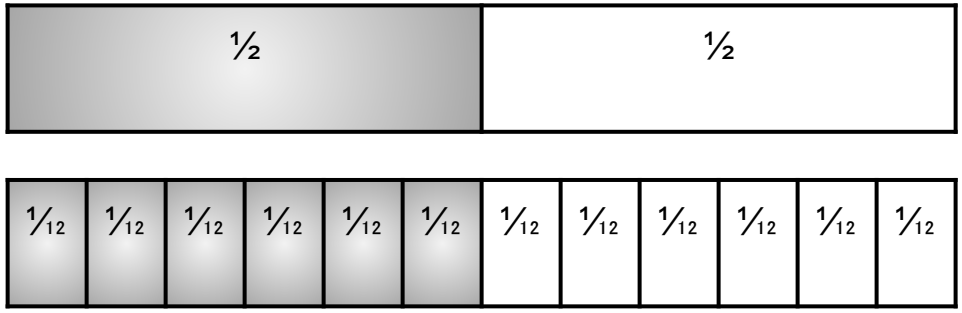


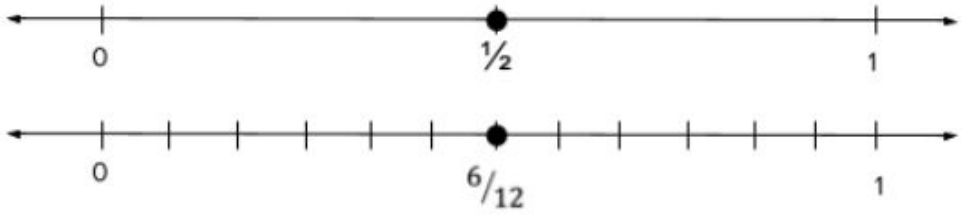
When it comes to shading and finding equivalents, it can be hard to tell if a fraction circle is equal to another or not. So, what tools do we have to fix this problem?

We have tape diagrams and number lines!

Take a look at how different visual models can help you see equivalent fractions more easily:



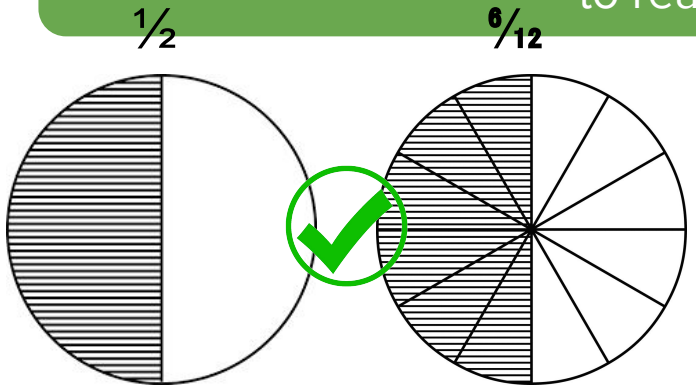


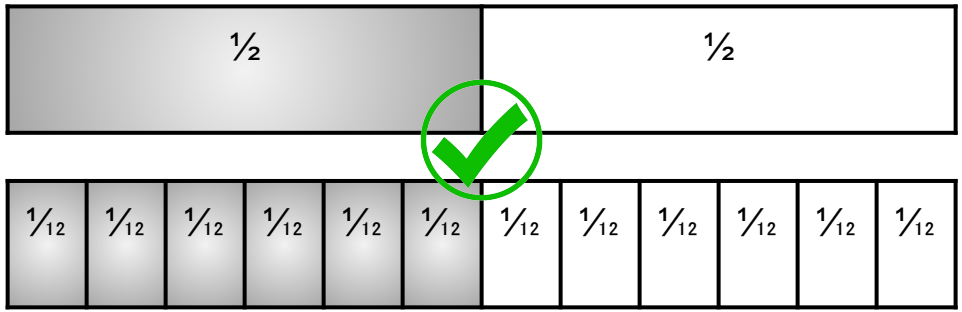


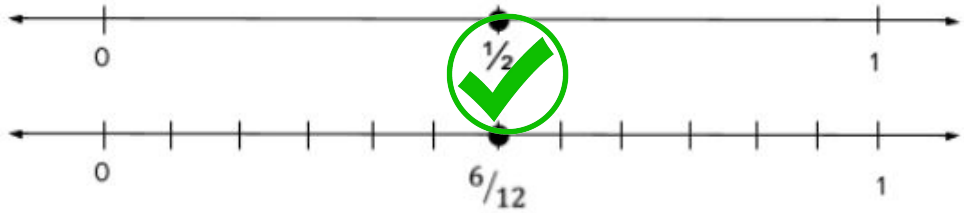
Which model do you prefer to work with? Why?

We have tape diagrams and number lines!

In math, just as in life, there's usually more than one strategy, tool or way to reach the correction solution!



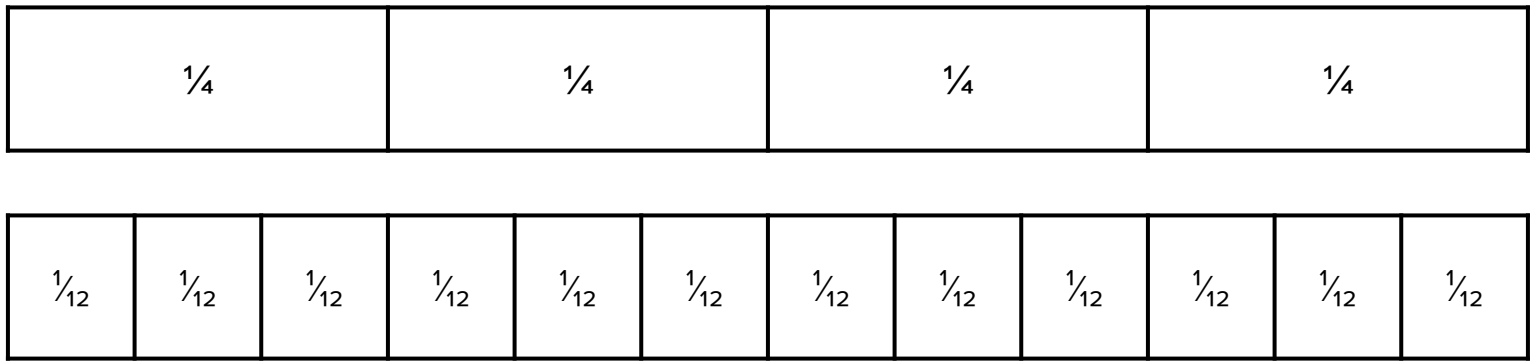




Equivalent Fractions using Tape Diagrams

Let's use tape diagrams to see if ¼ and $^{3}/_{12}$ are equivalent fractions:

First, make a fourths tape diagram and label it.

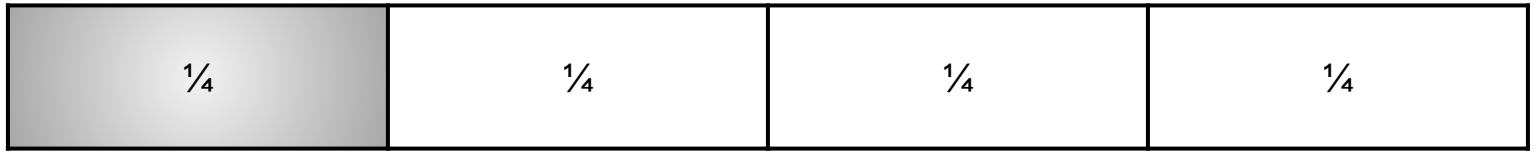


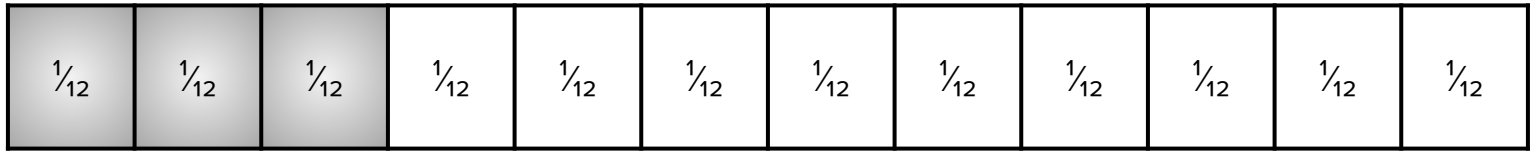
Then, make a twelfths tape diagram and label it.

Equivalent Fractions using Tape Diagrams

Let's use tape diagrams to see if $\frac{1}{4}$ and $\frac{3}{12}$ are equivalent fractions:

Next, shade in $\frac{1}{4}$.





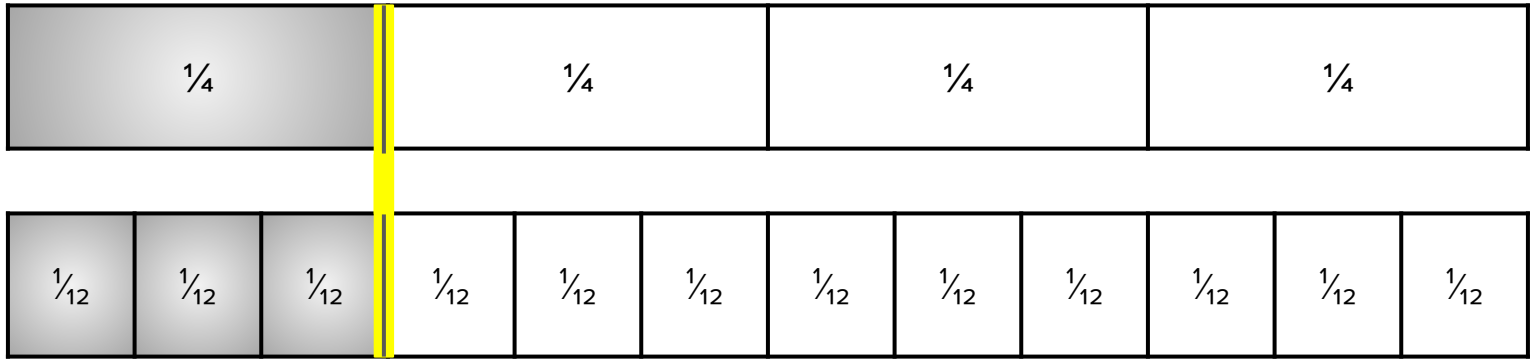
After that, shade in $\frac{3}{12}$.

Are $\frac{1}{4}$ and $\frac{3}{12}$ equivalent?

Equivalent Fractions using Tape Diagrams

Let's use tape diagrams to see if ¼ and $^{3}/_{12}$ are equivalent fractions:

If the shading in both models match or line up, the fractions are equivalent.



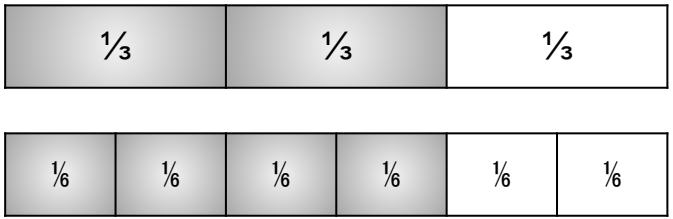
A perfect match.

Yes, they are equivalent fractions! ¼ = $^{3}/_{12}$

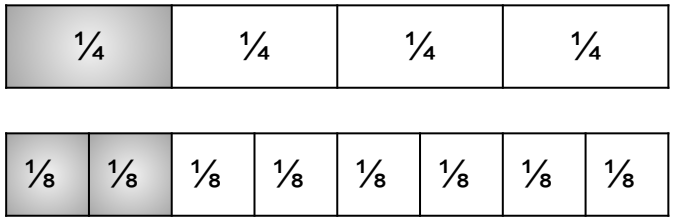
Let's Check for Understanding

Which group of tape diagrams does NOT represent equivalent fractions?

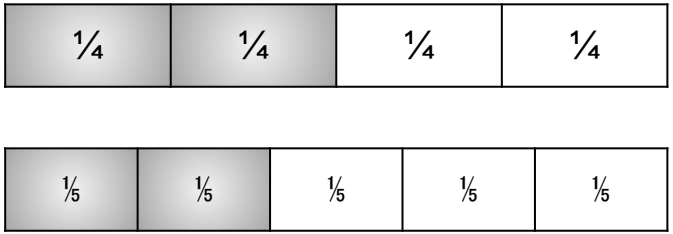
a.



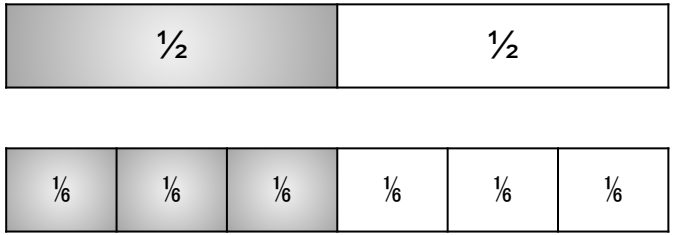
b.



c.



d.

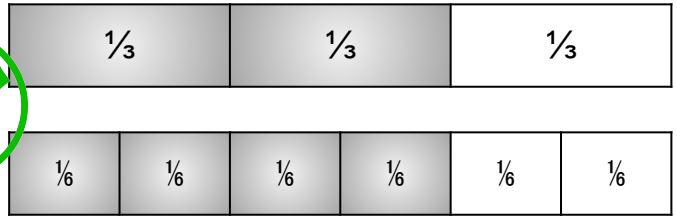


Let's Check for Understanding

Which group of tape diagrams does NOT represent equivalent fractions?

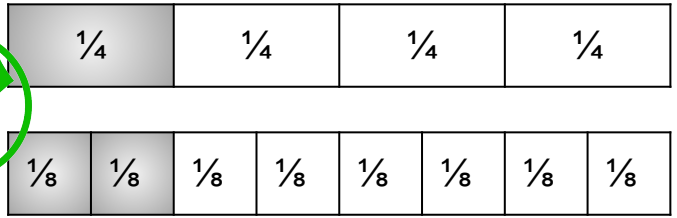
a.

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



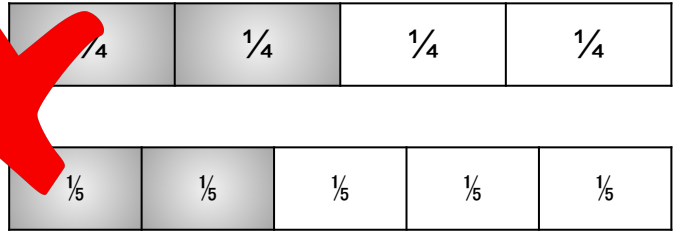
b.

$\frac{1}{4} = \frac{2}{8}$



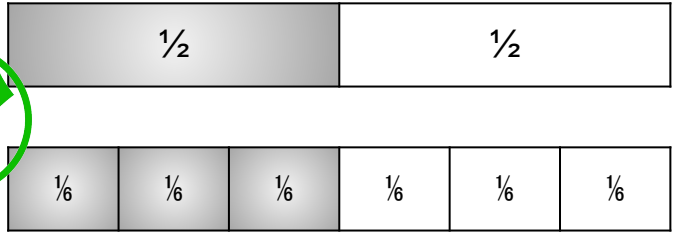
c.

$\frac{2}{4} \neq \frac{2}{5}$



d.

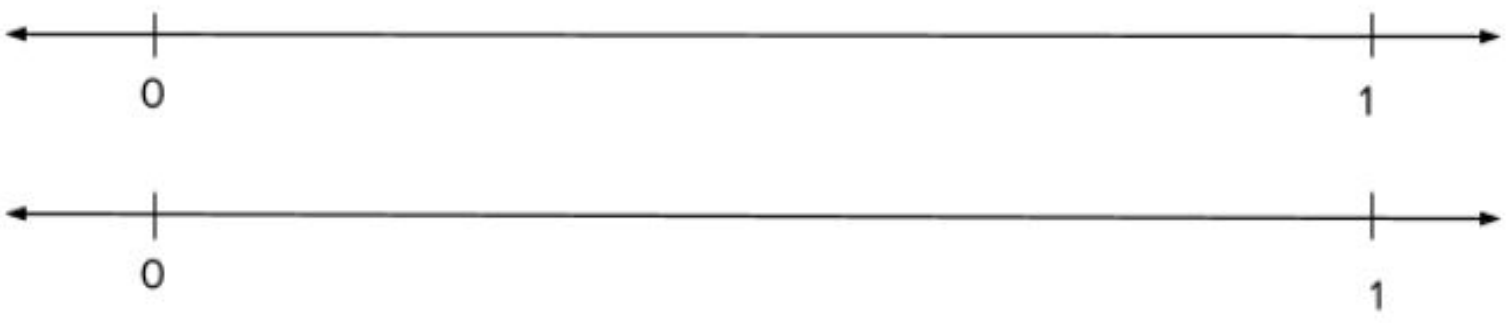
$\frac{1}{2} = \frac{3}{6}$



Equivalent Fractions on Number Lines

Luckily, equivalent fractions on number lines work very similar to equivalent fractions using tape diagrams.

First, draw two number lines on top of each.



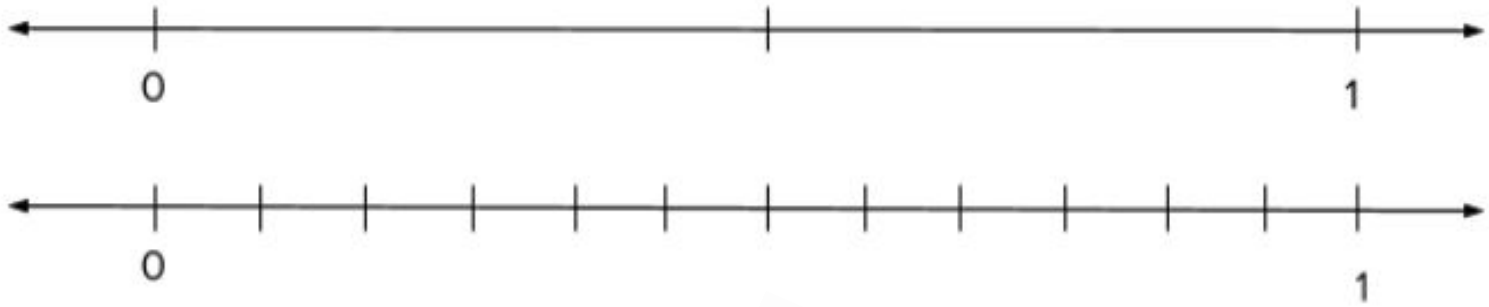
Make sure the tick marks for the 0s and 1s line up!.

Follow along with each step on slides 42-46 in your notecatcher.

Equivalent Fractions on Number Lines

Let's use these number lines to see if $\frac{1}{2}$ *is equivalent to* $\frac{6}{12}$*:*

Divide the first number line into halves.

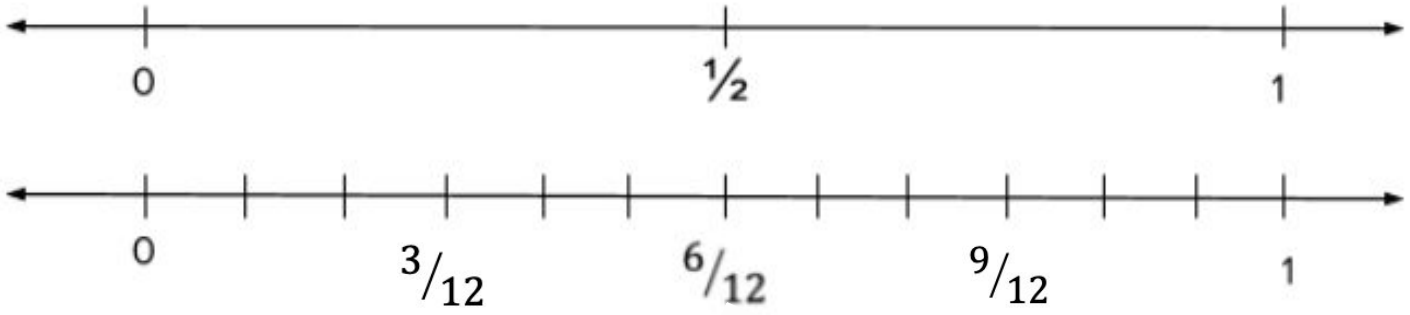


Divide the second number line into twelfths.

Equivalent Fractions on Number Lines

Let's use these number lines to see if $\frac{1}{2}$ *is equivalent to* $\frac{6}{12}$*:*

Label the first number with halves.

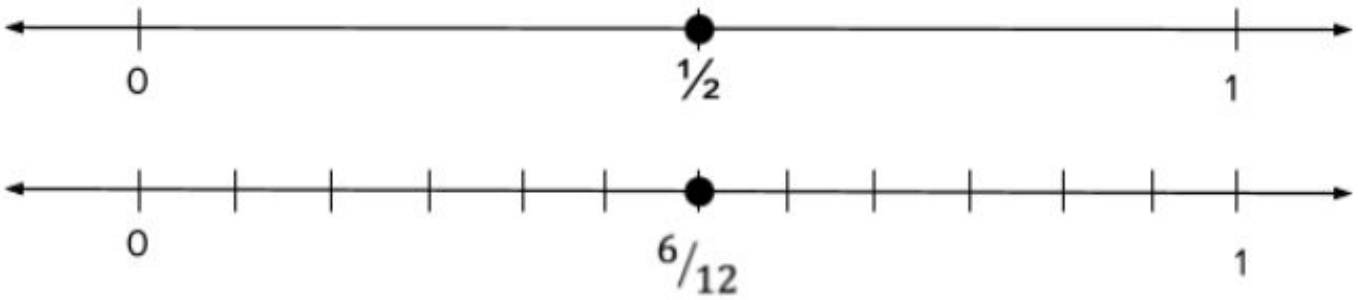


Label your second number line with twelfths. You don't have to label every tick mark if you know what they represent.

Equivalent Fractions on Number Lines

Let's use these number lines to see if $\frac{1}{2}$ *is equivalent to* $\frac{6}{12}$*:*

Plot your point to represent $\frac{1}{2}$*.*



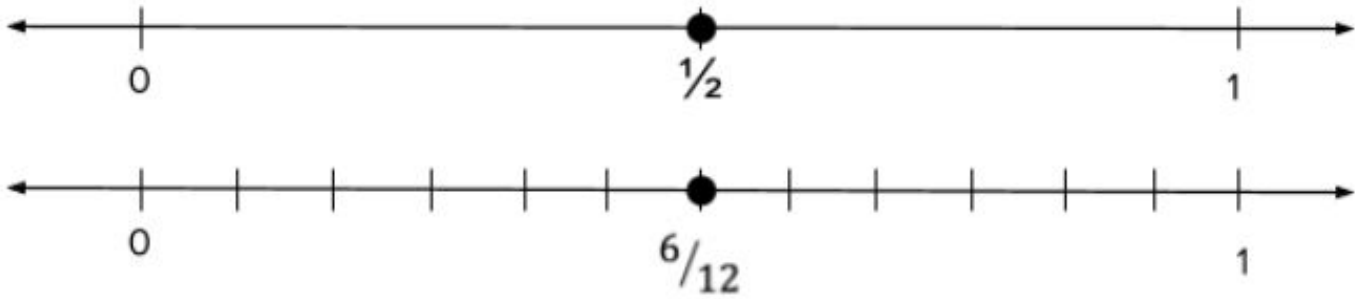
Do the points line up?

Plot your point to represent $\frac{6}{12}$*.*

Equivalent Fractions on Number Lines

Yes, ½ is equivalent to $\frac{6}{12}$! One-half equals six-twelfths.

If the points line up, the fractions are equivalent.

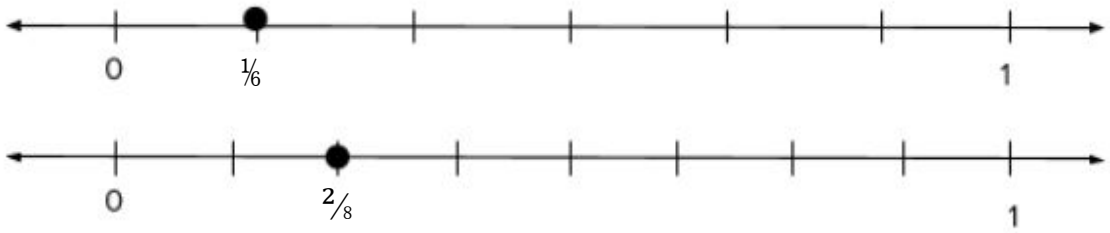


Looks like a perfect match!

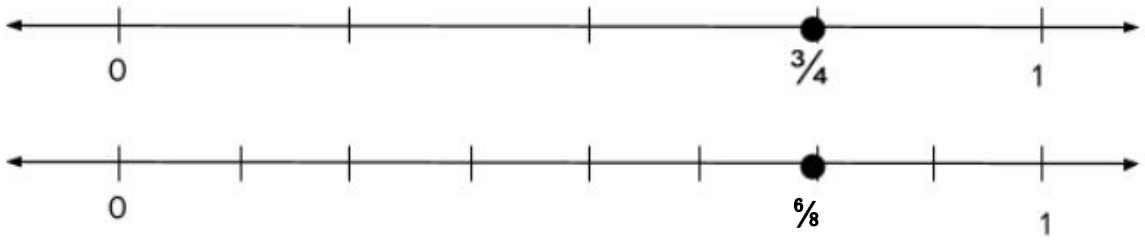
Let's Check for Understanding

Which set of number lines does NOT show equivalent fractions?

a.



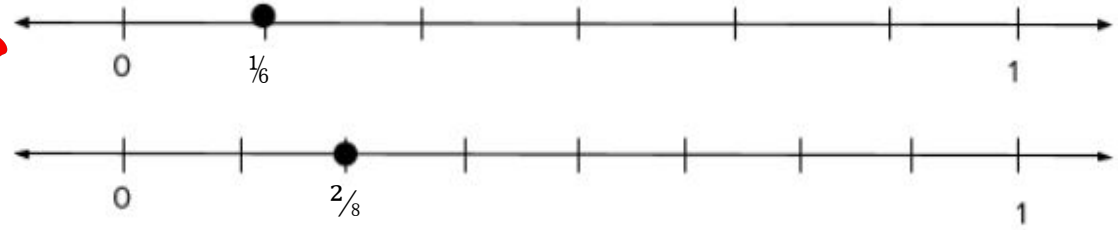
b.



Let's Check for Understanding

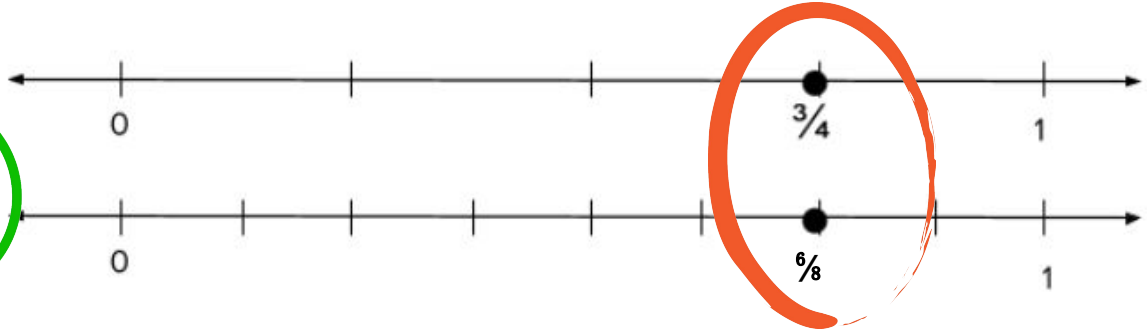
Which set of number lines does NOT show equivalent fractions?

a.



The points do NOT line up, so $\frac{1}{6} \neq \frac{2}{8}$.

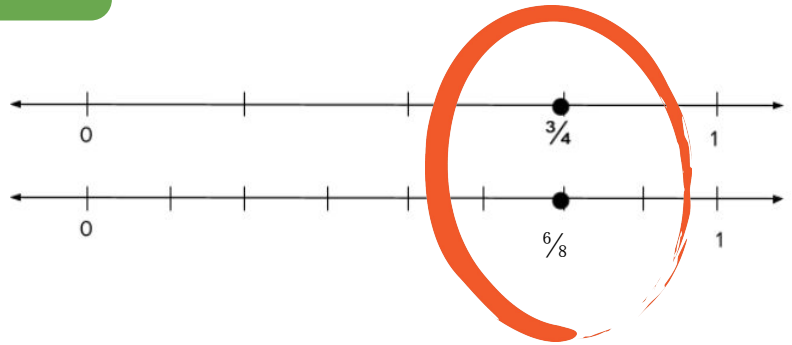
b.



The points line up, so $\frac{3}{4} = \frac{6}{8}$.

Review: Equivalent Fractions

IMPORTANT

Tape Diagrams	Number Lines
	

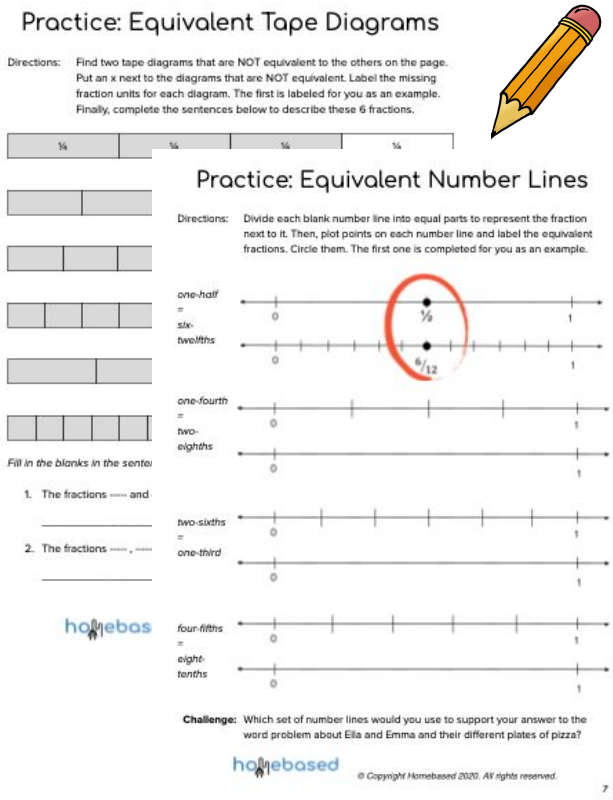
$\frac{3}{4} = \frac{6}{8}$

As long as your tape diagrams and number lines are divided into the right fraction units, all you have to look for is shading or points that line up. If everything lines up, you have **equivalent fractions**!

Practice:
Equivalent Fractions Using Tape Diagrams and Number Lines

Stop and complete the worksheets on pages 4-7 of your student packet.

Look back at the Review on slides 49 if you get stuck. ;)



Exit Ticket Time!

Congratulations on finishing a whole new math skill.

Now it's time to show what you know.

Complete the final problems on the next slide by showing your work on the blank exit ticket included in your student packet.

0 1 2 3 4 5 6 7

1. **Fill in the missing fractions** represented by the first two shaded fraction circles.

2. Shade in the third fraction circle so that it's **equivalent** to the first two fraction circles.

3. How many **thirds** is equivalent to $\frac{6}{9}$? Use the tape diagrams to help you solve.

4. Divide the number line into **sixths**. Then, **plot a point that is equivalent** to the fractions represented by the tape diagrams above.

0 1 2 3 4 5 6 7

After working hard, I can find equivalent fractions using fraction circles, tape diagrams and number lines.