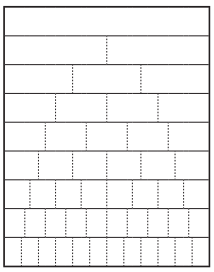
4.9 Common fractions: Reviewing equivalent fractions

In this lesson, students create and use fraction strips (length models) to find, then write equivalent fractions.

Step 1 Preparing the lesson

Fraction poster



You will need:

- 1 fraction poster from *The Number Case*

Each student will need:

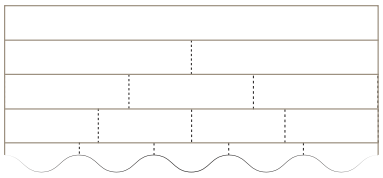
- several strips of paper (*Note:* Strips approximately 1 in wide can be made from 8 $\frac{1}{2}$ in by 11 in paper, cut lengthwise.)
- ruler
- adhesive tape or glue
- construction paper
- Student Journal 4.9

Step 2 Starting the lesson

Distribute the resources. Have the students fold the strips into parts of equal length to show halves, fourths, eighths, and sixteenths. This can be done by folding the strips in half several times. Encourage students to experiment folding other strips into thirds, then fold two of these strips into sixths and also ninths (**SMP7**).

After students have found a range of fractions, ask them to shade and label one of the equal-sized parts on each strip to show different unit fractions such as one-half, one-third, or one-fourth. Have the students sort the number strips and tape or paste the strips on construction paper to create a fraction chart. Students should be careful to align the end points of each strip.

Step 3 Teaching the lesson



Display the fraction poster, as shown. Say, *This chart is similar to what you have made. The top strip shows one whole. Which strip has been divided into exactly two equal parts? What fraction of that strip could we shade?* (One-half.) *What parts of other strips could we shade to show the same fraction? How do you know?*

Invite individuals to identify the other strips and the matching fractions on the poster ($\frac{2}{4}$, $\frac{4}{8}$, $\frac{3}{6}$, $\frac{5}{10}$, and $\frac{6}{12}$). Using their own fraction chart, have the students align a ruler vertically at one-half to check or find fractions that are equivalent ($\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, and $\frac{8}{16}$). Then ask, *How can you prove these fractions are equivalent without using the fraction chart?* Have the students turn to the student beside them and discuss their ideas, then invite students to share their suggestions with the class. Reinforce those suggestions that involve using the relationships between the numerator and denominator of each fraction. (**SMP6** and **SMP7**)

$\frac{3}{4}$ is equivalent to $\square$

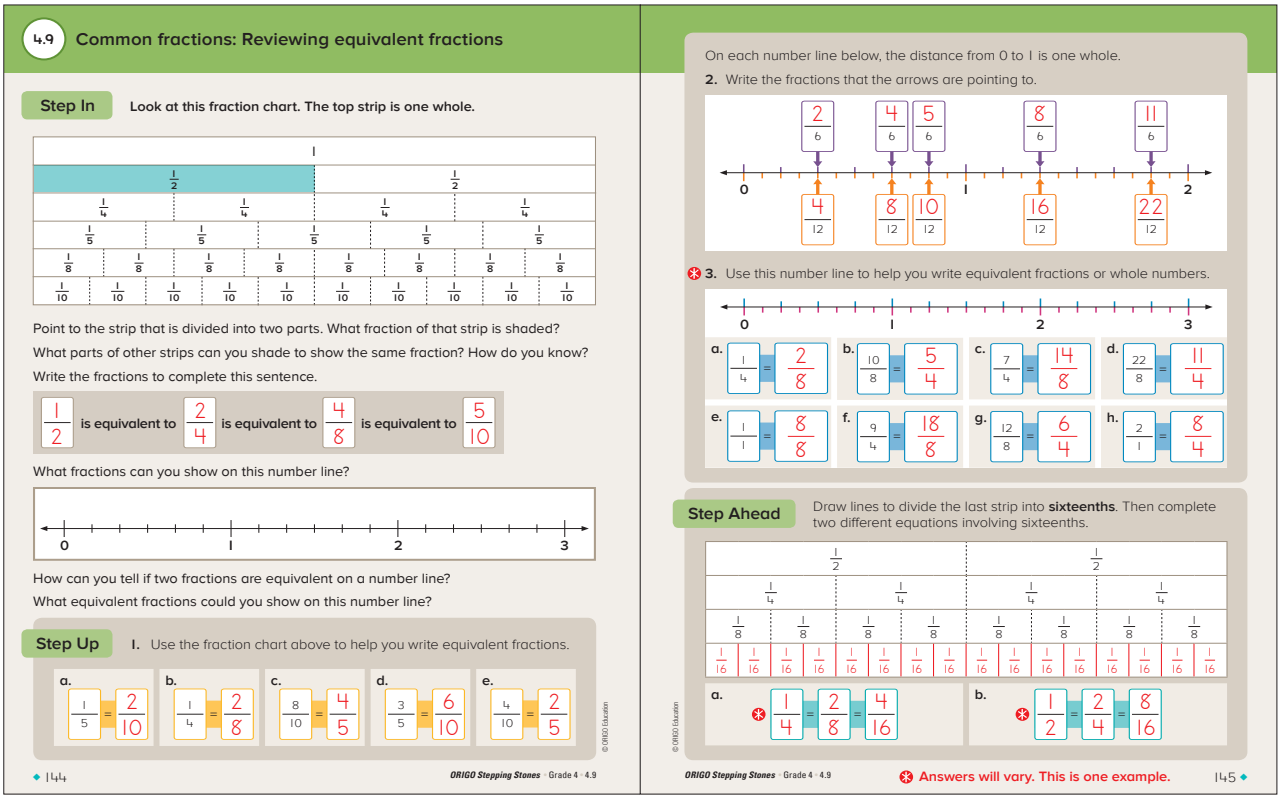
Write the comparison statement, as shown, on the board. Ask, *What fractions on the fraction chart are equivalent to three-fourths? How do you know?* Have the students identify the matching fractions on the large poster ($\frac{6}{8}$ and $\frac{9}{12}$), then on their personal charts ($\frac{6}{8}$ and $\frac{12}{16}$). Discuss the relationship between the numerator and denominator of each fraction (**SMP6** and **SMP7**).

ELL

Have the students discuss the word *equivalent* before moving on with the activity. Ensure they understand the difference between the words *whole* as in one entire piece, and *hole* as in a hollow in the ground.

Draw the number line, as shown, on the board.

Student Journal 4.9, pp. 144–145



4.9 Common fractions: Reviewing equivalent fractions

Step In Look at this fraction chart. The top strip is one whole.

Point to the strip that is divided into two parts. What fraction of that strip is shaded?
What parts of other strips can you shade to show the same fraction? How do you know?
Write the fractions to complete this sentence.

$\frac{1}{2}$ is equivalent to $\frac{2}{4}$ is equivalent to $\frac{4}{8}$ is equivalent to $\frac{5}{10}$

What fractions can you show on this number line?

How can you tell if two fractions are equivalent on a number line?
What equivalent fractions could you show on this number line?

Step Up 1. Use the fraction chart above to help you write equivalent fractions.

a. $\frac{1}{5} = \frac{2}{10}$ b. $\frac{1}{4} = \frac{2}{8}$ c. $\frac{8}{10} = \frac{4}{5}$ d. $\frac{3}{5} = \frac{6}{10}$ e. $\frac{4}{10} = \frac{2}{5}$

144 ORIGO Stepping Stones · Grade 4 · 4.9

On each number line below, the distance from 0 to 1 is one whole.

2. Write the fractions that the arrows are pointing to.

3. Use this number line to help you write equivalent fractions or whole numbers.

a. $\frac{1}{4} = \frac{2}{8}$ b. $\frac{10}{8} = \frac{5}{4}$ c. $\frac{7}{4} = \frac{14}{8}$ d. $\frac{22}{8} = \frac{11}{4}$
e. $\frac{1}{1} = \frac{8}{8}$ f. $\frac{9}{4} = \frac{18}{8}$ g. $\frac{12}{8} = \frac{6}{4}$ h. $\frac{2}{1} = \frac{8}{4}$

Step Ahead Draw lines to divide the last strip into **sixteenths**. Then complete two different equations involving sixteenths.

a. $\frac{1}{4} = \frac{2}{8} = \frac{4}{16}$ b. $\frac{1}{2} = \frac{2}{4} = \frac{8}{16}$

ORIGO Stepping Stones · Grade 4 · 4.9 Answers will vary. This is one example. 145

Say, *The distance between each whole number is one whole. Where should I place marks to split each whole number distance into thirds?* Have the students guide you in placing marks on the number line. Then ask, *Where is $\frac{5}{3}$ on the number line?* When students have identified the point ask, *What would $\frac{5}{3}$ be equivalent to in ninths? How can we change the number line to help us?* Work with the students to split the distance between each thirds mark into three as well, so that the distance between each whole number is split into ninths. Then count on by ninths from one whole ($\frac{9}{9}$) to establish that $\frac{5}{3}$ is equivalent to $\frac{15}{9}$ because they share the same position on the number line.

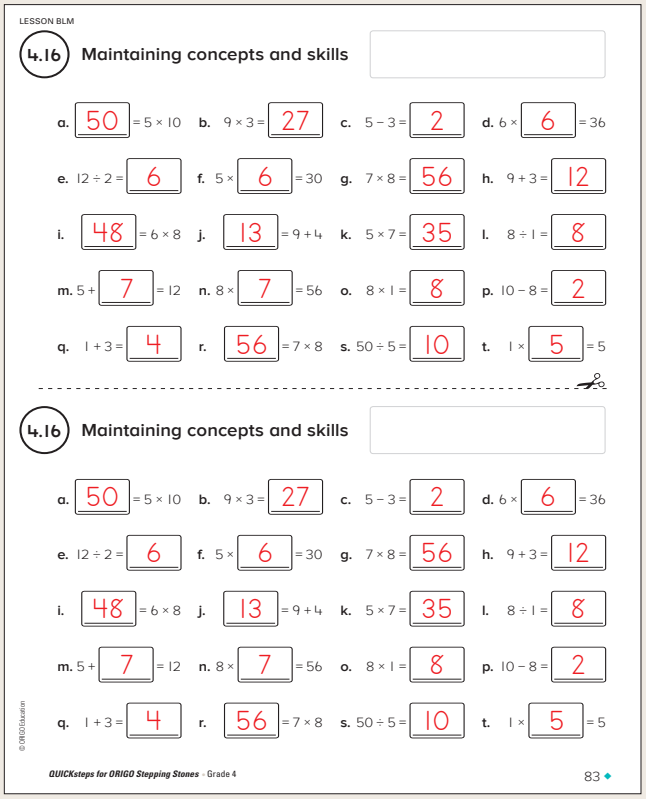
Work through the Step In discussion (Student Journal 4.9) with the whole class. Use the fraction poster to establish that fractions such as $\frac{4}{4}$ represent one whole because the denominator tells how many parts are needed to fill the whole and the numerator tells how many parts are already filled in. Also emphasize that whole numbers such as 3 can be written as a fraction with 1 as a denominator. It takes 1 part to fill the whole and 3 parts are filled in making the number greater than 1. Read the Step Up and Step Ahead instructions with the students. Make sure they know what to do, then have them work independently to complete the tasks.

Step 4 Reflecting on the work

Discuss the students' answers to Student Journal 4.9. Ask, *What patterns or relationships do you notice when fractions are equivalent?* Encourage students to describe the relationships between and among the numerators and denominators of the equivalent fractions. (**SMP6** and **SMP7**)

Maintaining concepts and skills

Make copies of Blackline Master 4.16. Cut the page in half and give each student one strip to complete. Alternatively, write the equations on the board and have the students copy and complete them, or just write the answers.



LESSON BLM

4.16 Maintaining concepts and skills

a. 50 = 5 × 10 b. 9 × 3 = 27 c. 5 − 3 = 2 d. 6 × 6 = 36

e. 12 ÷ 2 = 6 f. 5 × 6 = 30 g. 7 × 8 = 56 h. 9 + 3 = 12

i. 48 = 6 × 8 j. 13 = 9 + 4 k. 5 × 7 = 35 l. 8 ÷ 1 = 8

m. 5 + 7 = 12 n. 8 × 7 = 56 o. 8 × 1 = 8 p. 10 − 8 = 2

q. 1 + 3 = 4 r. 56 = 7 × 8 s. 50 ÷ 5 = 10 t. 1 × 5 = 5

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QUICKsteps for ORIGO Stepping Stones • Grade 4 83

Small group differentiation

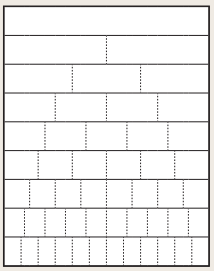
Extra help

Each group of students will need:

- 1 fraction poster from *The Number Case*
- non-permanent marker

Organise students into groups and distribute the resources. Display the fraction poster and say, *Each of these strips shows one whole. Some of the strips have been divided into equal parts. What fractions would I show if I shaded one part of each strip?* Have the students identify each fraction. Ask, *What are some different ways to show one-half?* Invite volunteers to shade one-half of selected strips. Reinforce that $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, $\frac{5}{10}$, and $\frac{6}{12}$ are equivalent lengths on the fraction poster, and each fraction covers half of one whole strip. Repeat the activity with students finding fractions equivalent to one-fourth and other fractions.

Fraction poster

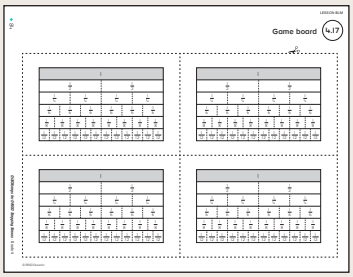


Extra practice

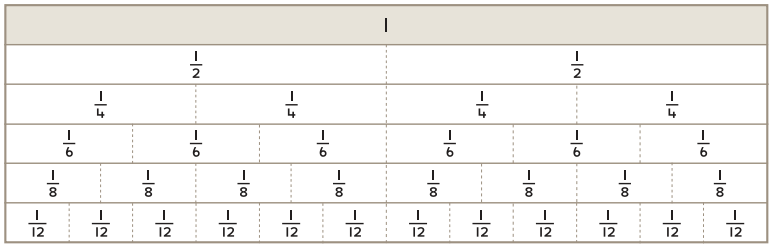
Each pair of students will need:

- 1 copy of Blackline Master 4.17
- 1 cube labeled: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{12}$

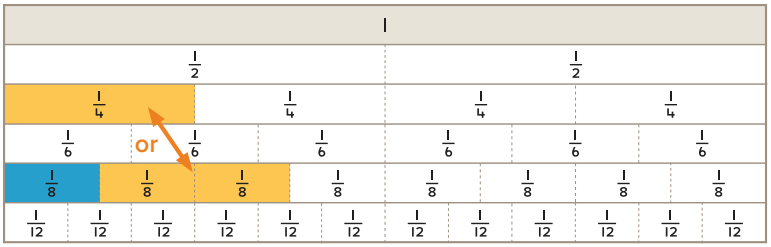
Blackline Master 4.17



Organize students into pairs and distribute the resources. Students take turns to roll the cube and shade that fraction of a strip on their game board. They can shade either the fraction shown on the cube, or an equivalent fraction. For example, on her turn (Emily) rolls $\frac{1}{8}$ and shades $\frac{1}{8}$ in the eighths row.



On her second roll (Emily) rolls $\frac{1}{4}$. She can either shade $\frac{1}{4}$ in the fourths row or $\frac{2}{8}$ in the eighths row ($\frac{2}{8}$ being equivalent to $\frac{1}{4}$), which would make $\frac{3}{8}$ the total amount shaded in the eighths row.

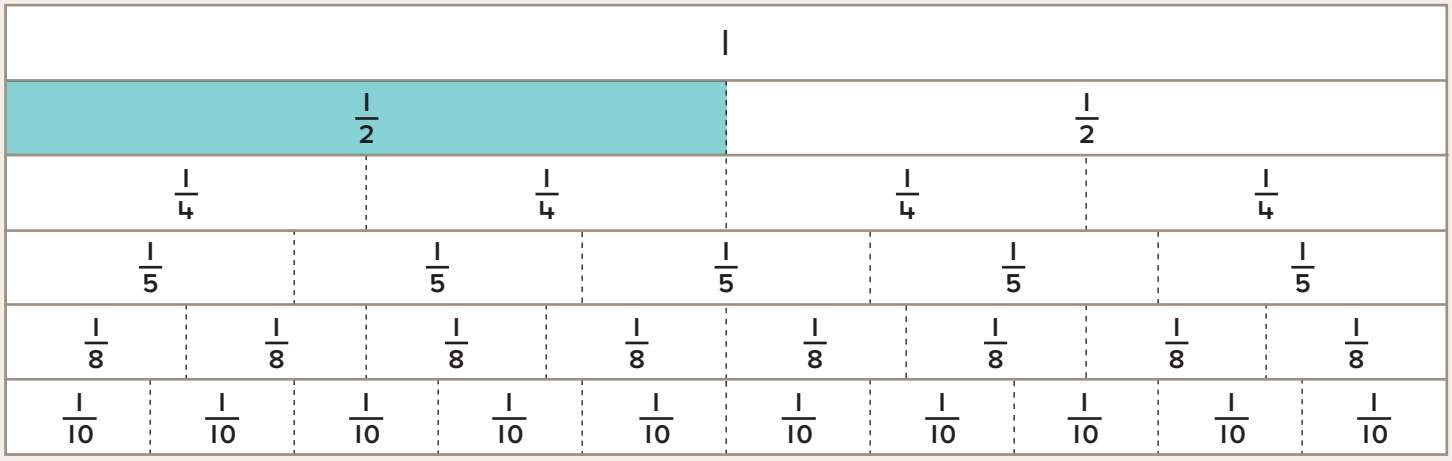


The first student to completely shade two strips wins. Repeat as time allows.

4.9 Common fractions: Reviewing equivalent fractions

Step In

Look at this fraction chart. The top strip is one whole.



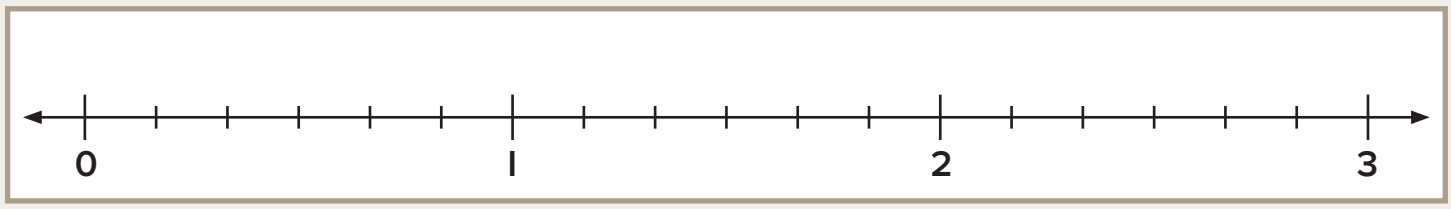
Point to the strip that is divided into two parts. What fraction of that strip is shaded?

What parts of other strips can you shade to show the same fraction? How do you know?

Write the fractions to complete this sentence.

___ is equivalent to ___ is equivalent to ___ is equivalent to ___

What fractions can you show on this number line?



How can you tell if two fractions are equivalent on a number line?

What equivalent fractions could you show on this number line?

Step Up

1. Use the fraction chart above to help you write equivalent fractions.

a. $\frac{1}{5} = \frac{\quad}{\quad}$

b. $\frac{1}{4} = \frac{\quad}{\quad}$

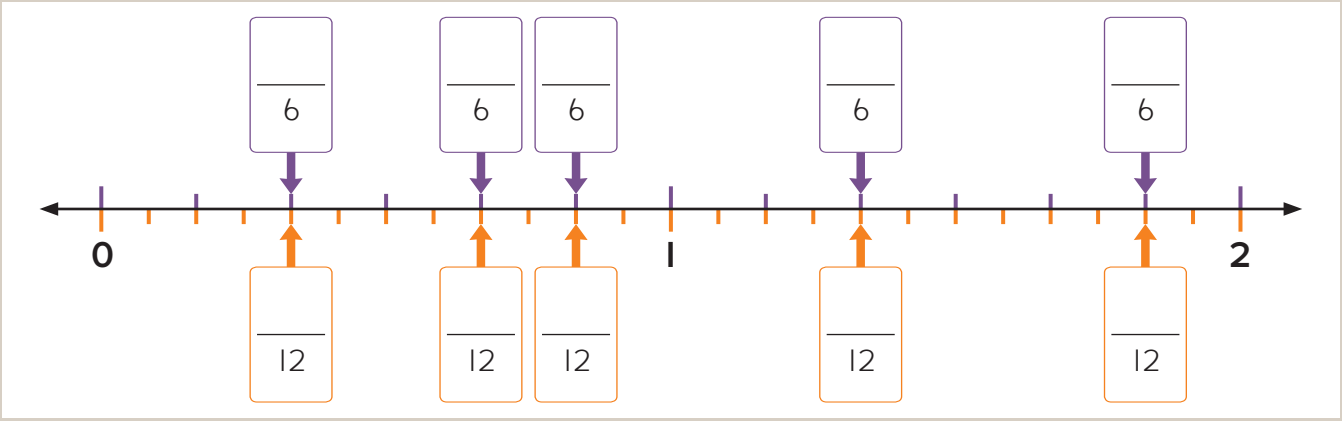
c. $\frac{8}{10} = \frac{\quad}{\quad}$

d. $\frac{3}{5} = \frac{\quad}{\quad}$

e. $\frac{4}{10} = \frac{\quad}{\quad}$

On each number line below, the distance from 0 to 1 is one whole.

2. Write the fractions that the arrows are pointing to.



3. Use this number line to help you write equivalent fractions or whole numbers.

a. $\frac{1}{4} = \square$

b. $\frac{10}{8} = \square$

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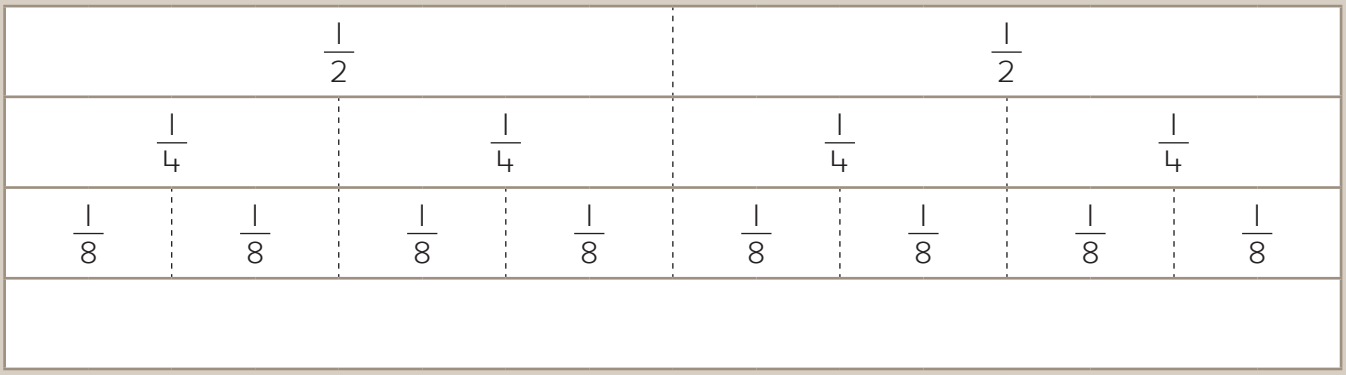
Step Ahead

Draw lines to divide the last strip into **sixteenths**. Then complete two different equations involving sixteenths.



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4.9 Common fractions: Reviewing equivalent fractions

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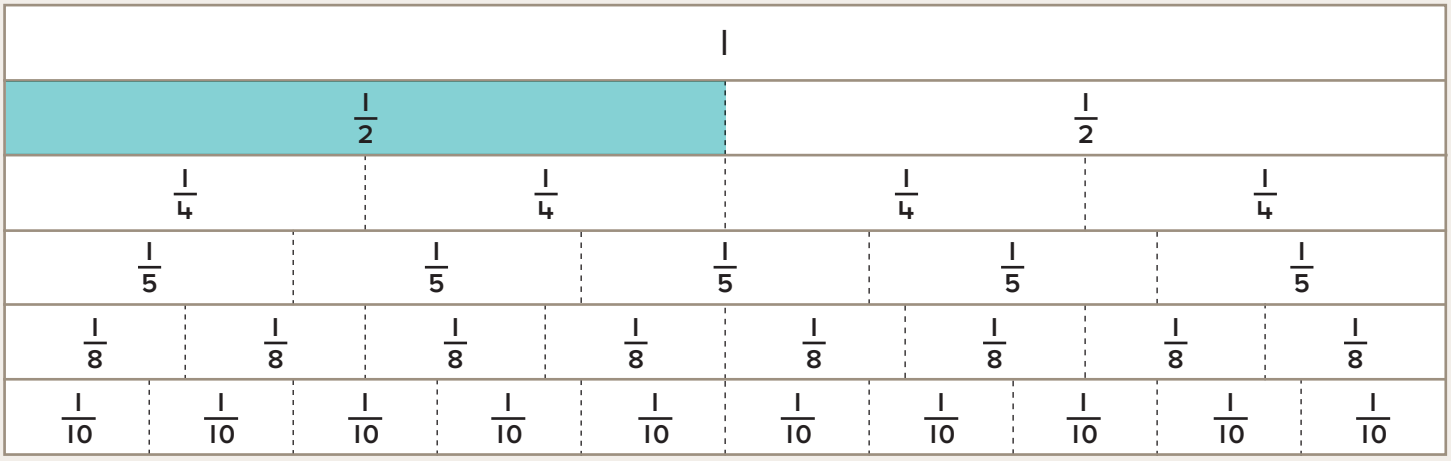

Point to the strip that is divided into two parts. What fraction of that strip is shaded?

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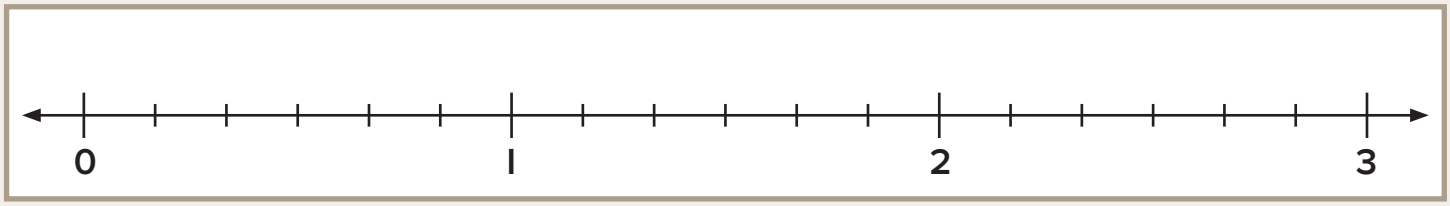
What fractions can you show on this number line?



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d. $\frac{3}{5} = \frac{6}{10}$

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On each number line below, the distance from 0 to 1 is one whole.

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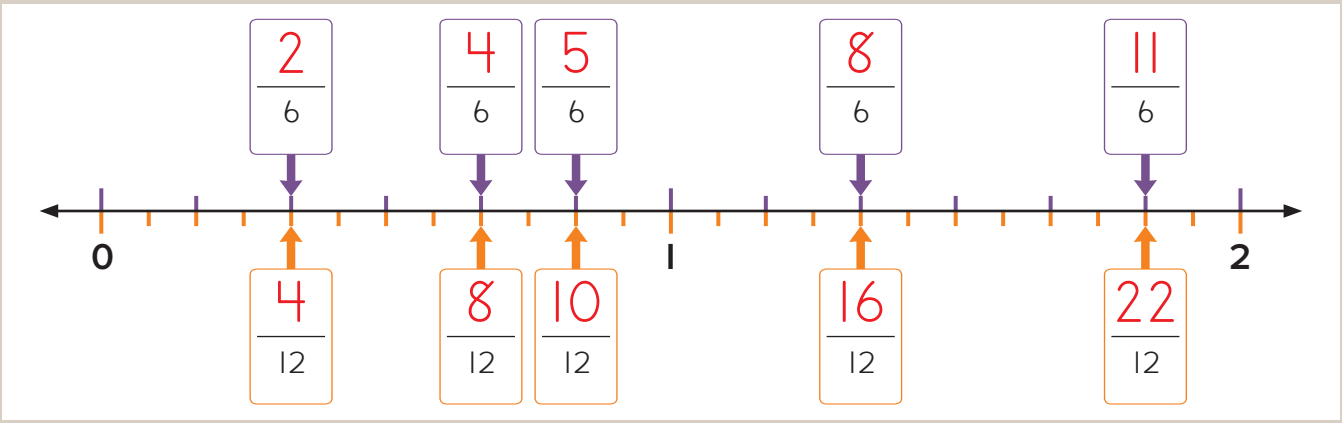

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c. $\frac{7}{4} = \frac{14}{8}$

d. $\frac{22}{8} = \frac{11}{4}$

e. $\frac{1}{1} = \frac{8}{8}$

f. $\frac{9}{4} = \frac{18}{8}$

g. $\frac{12}{8} = \frac{6}{4}$

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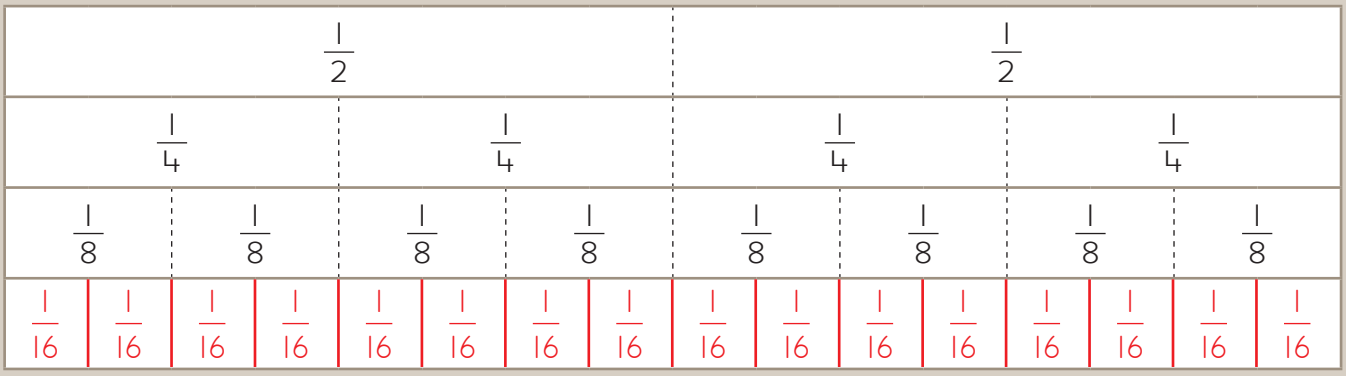
Step Ahead

Draw lines to divide the last strip into **sixteenths**. Then complete two different equations involving sixteenths.



a. $\frac{1}{4} = \frac{2}{8} = \frac{4}{16}$

b. $\frac{1}{2} = \frac{2}{4} = \frac{8}{16}$

Answers will vary. This is one example.

4.16 Maintaining concepts and skills

a. ____ = 5 × 10 **b.** 9 × 3 = ____ **c.** 5 − 3 = ____ **d.** 6 × ____ = 36

e. 12 ÷ 2 = ____ **f.** 5 × ____ = 30 **g.** 7 × 8 = ____ **h.** 9 + 3 = ____

i. ____ = 6 × 8 **j.** ____ = 9 + 4 **k.** 5 × 7 = ____ **l.** 8 ÷ 1 = ____

m. 5 + ____ = 12 **n.** 8 × ____ = 56 **o.** 8 × 1 = ____ **p.** 10 − 8 = ____

q. 1 + 3 = ____ **r.** ____ = 7 × 8 **s.** 50 ÷ 5 = ____ **t.** 1 × ____ = 5

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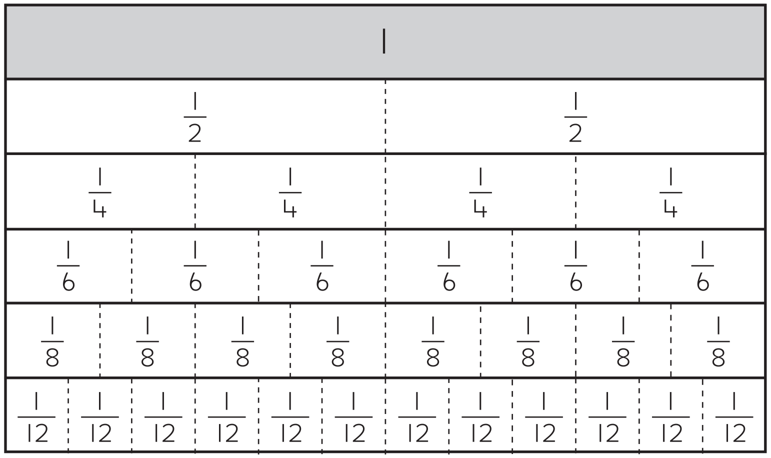
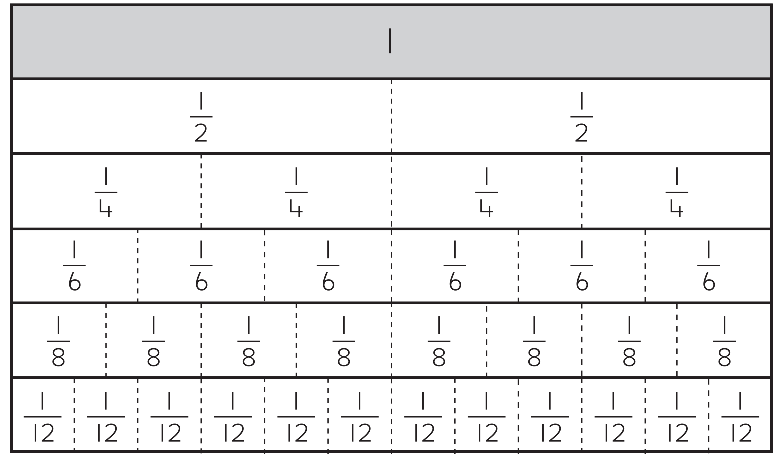
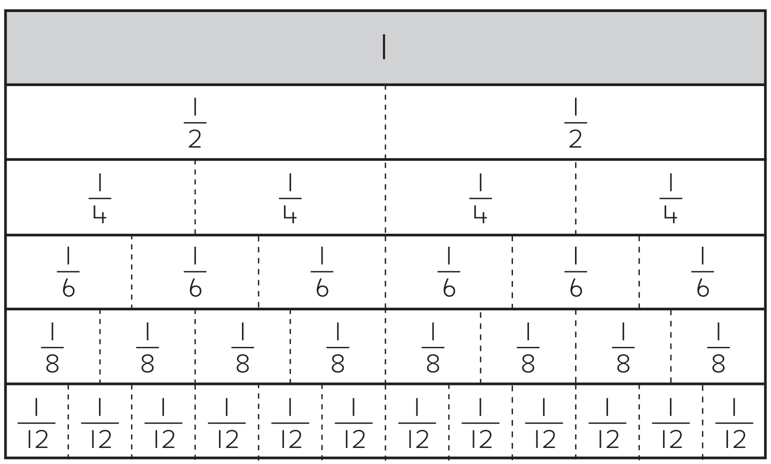
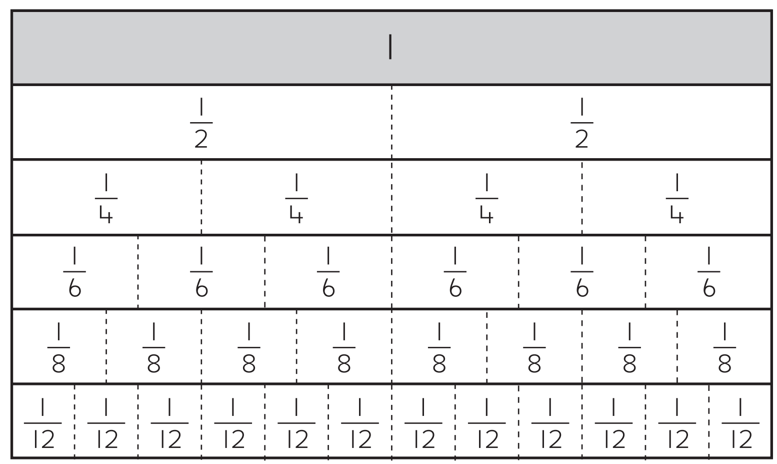
Game board 4.17





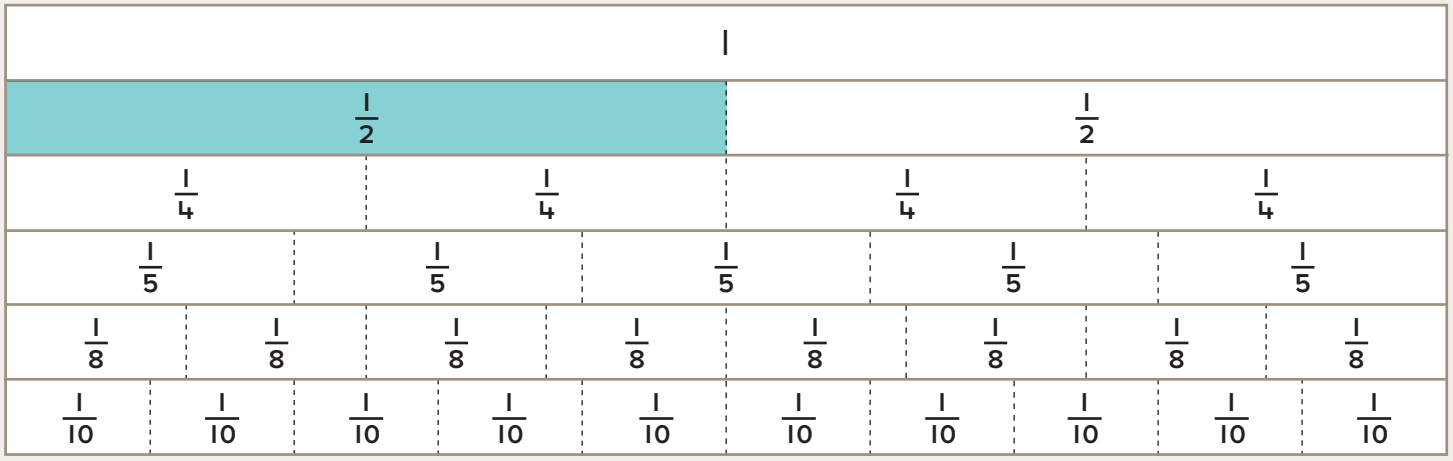




4.9 Fracciones comunes: Repasando fracciones equivalentes

Conoce

Observa esta tabla de fracciones. La tira de arriba es un entero.



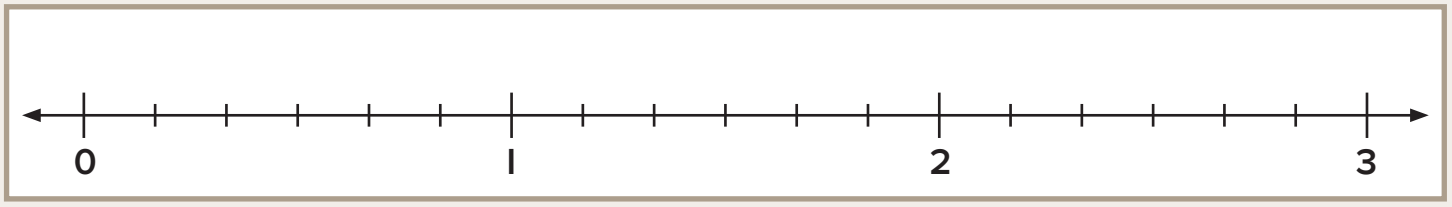
Señala la tira que está dividida en dos partes. ¿Qué fracción de esa tira está coloreada?

¿Qué partes de otras tiras podrías colorear para indicar la misma fracción? ¿Cómo lo sabes?

Escribe las fracciones para completar este enunciado.

____ es equivalente a ____ es equivalente a ____ es equivalente a ____

¿Qué fracciones podrías indicar en esta recta numérica?



¿Cómo puedes saber si dos fracciones son equivalentes en una recta numérica?

¿Qué fracciones equivalentes podrías indicar en esta recta numérica?

Intensifica

1. Utiliza la tabla de fracciones de arriba como ayuda para escribir fracciones equivalentes.

a. $\frac{1}{5} = \frac{\quad}{\quad}$

b. $\frac{1}{4} = \frac{\quad}{\quad}$

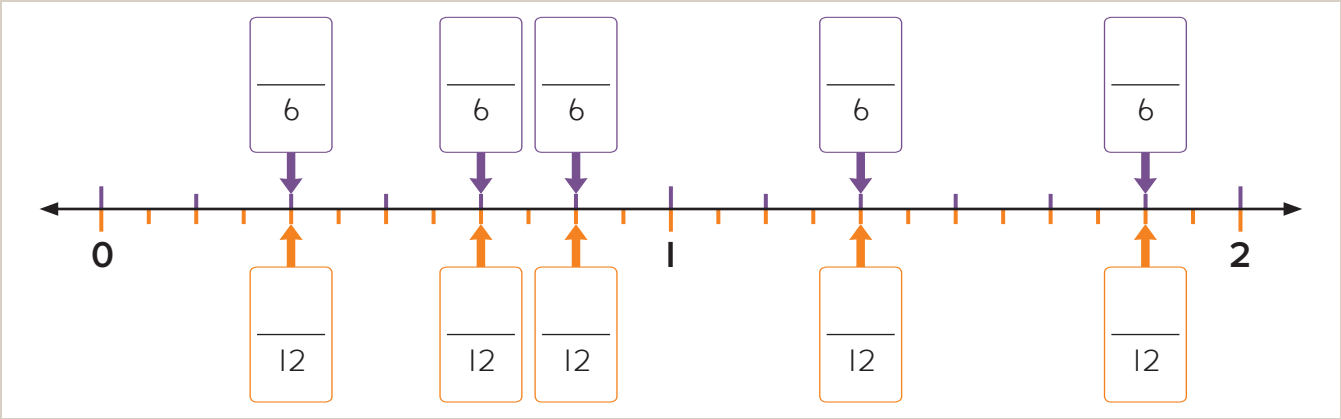
c. $\frac{8}{10} = \frac{\quad}{\quad}$

d. $\frac{3}{5} = \frac{\quad}{\quad}$

e. $\frac{4}{10} = \frac{\quad}{\quad}$

En cada recta numérica de abajo la distancia de 0 a 1 es un entero.

2. Escribe las fracciones a las que apuntan las flechas.



3. Utiliza esta recta numérica como ayuda para escribir fracciones equivalentes.

a. $\frac{1}{4} = \square$

b. $\frac{10}{8} = \square$

c. $\frac{7}{4} = \square$

d. $\frac{22}{8} = \square$

e. $\frac{1}{1} = \square$

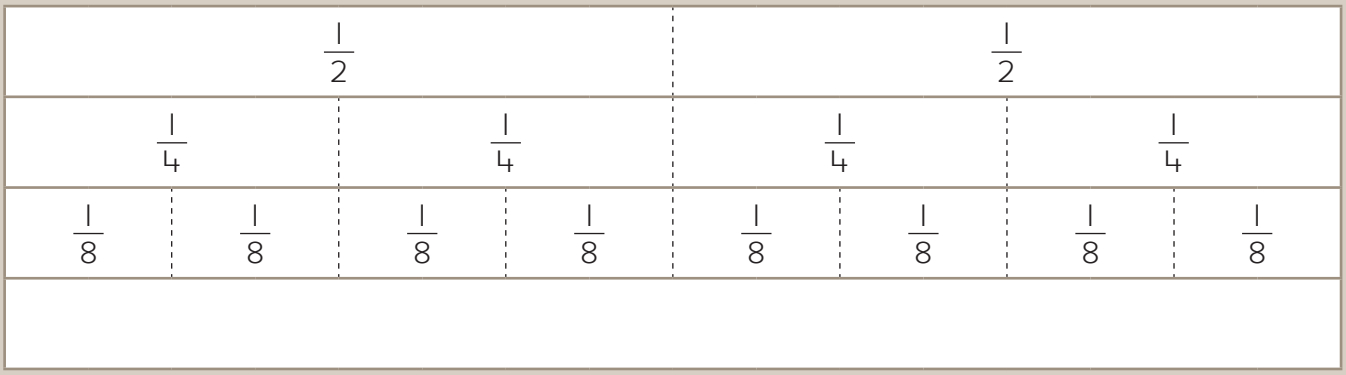
f. $\frac{9}{4} = \square$

g. $\frac{12}{8} = \square$

h. $\frac{2}{1} = \square$

Avanza

Traza líneas para dividir la última tira en **dieciseisavos**. Luego completa dos ecuaciones diferentes que involucren dieciseisavos.



a. $\square = \square = \square$

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4.9 Fracciones comunes: Repasando fracciones equivalentes

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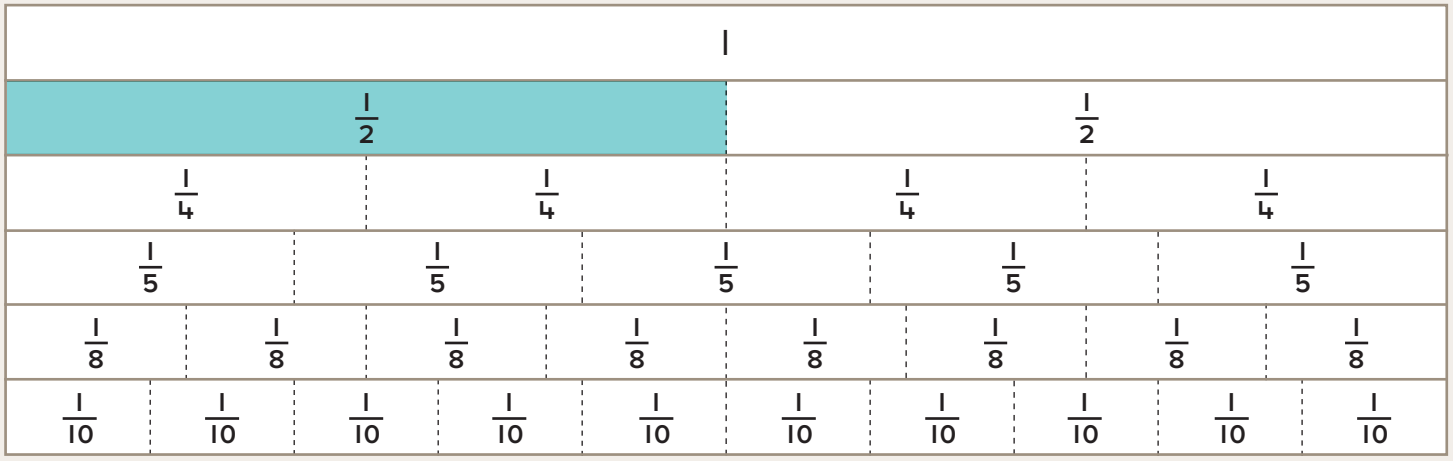
Observa esta tabla de fracciones. La tira de arriba es un entero.



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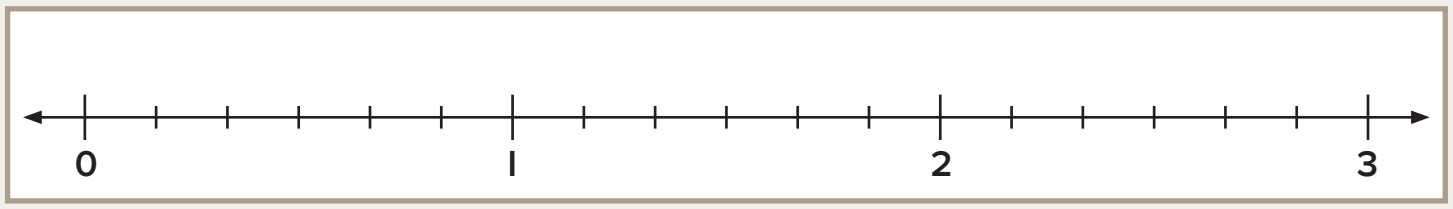
¿Qué partes de otras tiras podrías colorear para indicar la misma fracción? ¿Cómo lo sabes?

Escribe las fracciones para completar este enunciado.

$\frac{1}{2}$ **es equivalente a** $\frac{2}{4}$ **es equivalente a** $\frac{4}{8}$ **es equivalente a** $\frac{5}{10}$

¿Qué fracciones podrías indicar en esta recta numérica?



¿Cómo puedes saber si dos fracciones son equivalentes en una recta numérica?

¿Qué fracciones equivalentes podrías indicar en esta recta numérica?

Intensifica

1. Utiliza la tabla de fracciones de arriba como ayuda para escribir fracciones equivalentes.

a. $\frac{1}{5} = \frac{2}{10}$

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

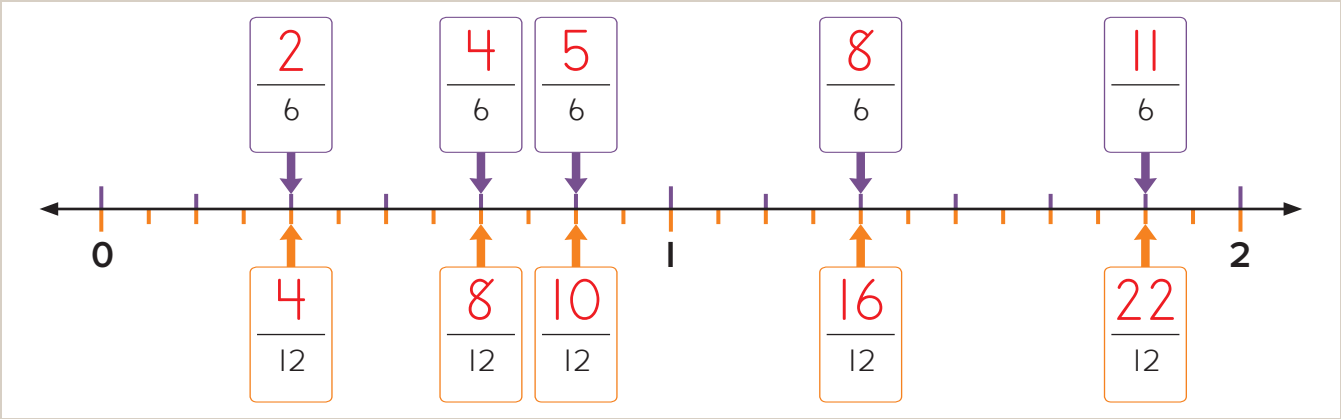
c. $\frac{8}{10} = \frac{4}{5}$

d. $\frac{3}{5} = \frac{6}{10}$

e. $\frac{4}{10} = \frac{2}{5}$

En cada recta numérica de abajo la distancia de 0 a 1 es un entero.

2. Escribe las fracciones a las que apuntan las flechas.



✻ **3.** Utiliza esta recta numérica como ayuda para escribir fracciones equivalentes.

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

b. $\frac{10}{8} = \frac{5}{4}$

c. $\frac{7}{4} = \frac{14}{8}$

d. $\frac{22}{8} = \frac{11}{4}$

e. $\frac{1}{1} = \frac{8}{8}$

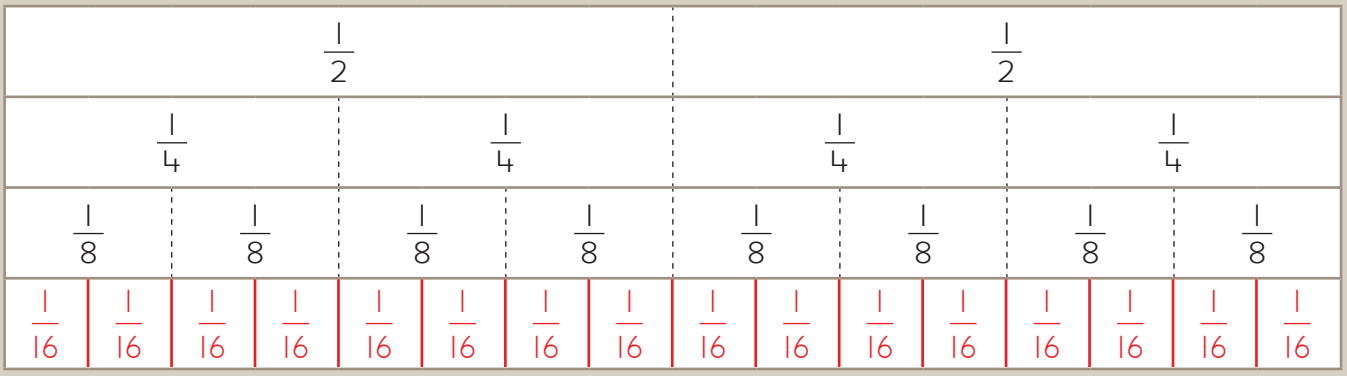
f. $\frac{9}{4} = \frac{18}{8}$

g. $\frac{12}{8} = \frac{6}{4}$

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

Avanza

Traza líneas para dividir la última tira en **dieciseisavos**. Luego completa dos ecuaciones diferentes que involucren dieciseisavos.



a. ✻ $\frac{1}{4} = \frac{2}{8} = \frac{4}{16}$

b. ✻ $\frac{1}{2} = \frac{2}{4} = \frac{8}{16}$

✻ Las respuestas pueden variar. Este es un ejemplo.