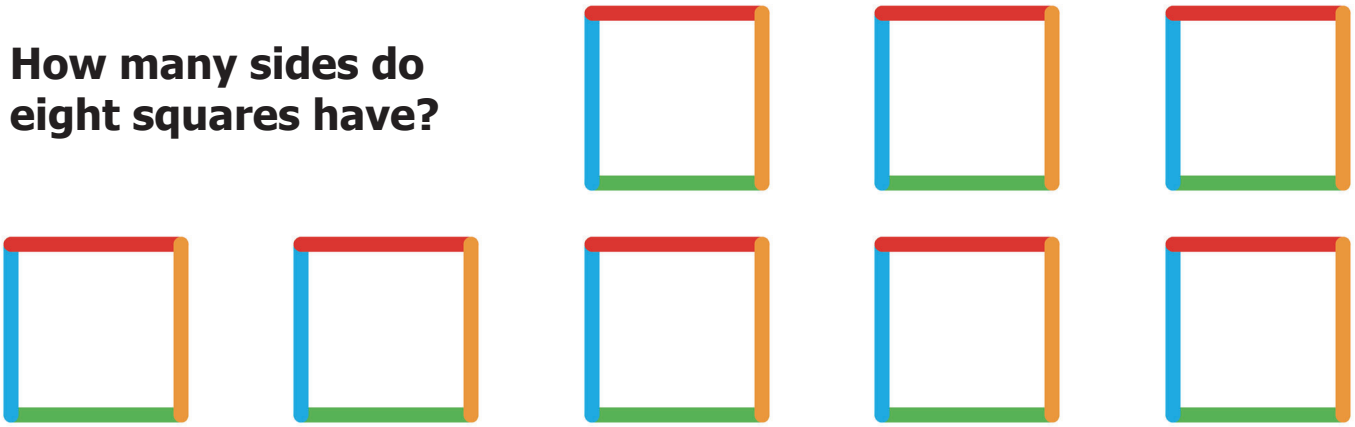
Dividing Whole Numbers by Unit Fractions

How many sides do eight squares have?



$$8 \div \frac{1}{4} = ?$$

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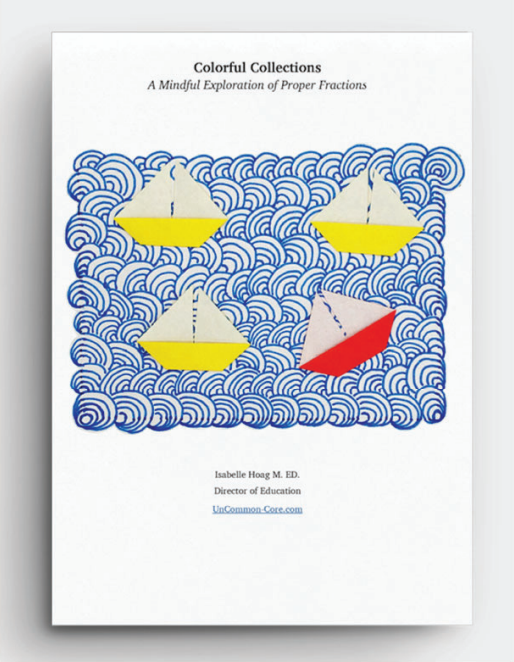
Hello Teachers,

Thank you for downloading this handout. After decades of teaching, now I am sharing some of the activities I designed for my students and some new ones as well.

Please, check out the self-paced teacher education courses on UnCommon-Core.com.



While you are there, sign up for your free copy of **Colorful Collections:** *A Mindful Exploration of Proper Fractions.*

Also, visit my Teachers Pay Teachers store UnCommon-Core dot com.

Thank you again. All the best,

Isabelle

Isabelle Hoag M.Ed.
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Dividing Whole Numbers by Unit Fractions

Division answers questions such as:

- How many of these can fit into that?
- How many times can this amount be subtracted from that amount?
- How many this size groups, can be made from that?
- If we start with this much, and share equally between this number of groups, how much will each group receive?
- In this amount of time, how often does a periodic event occur?

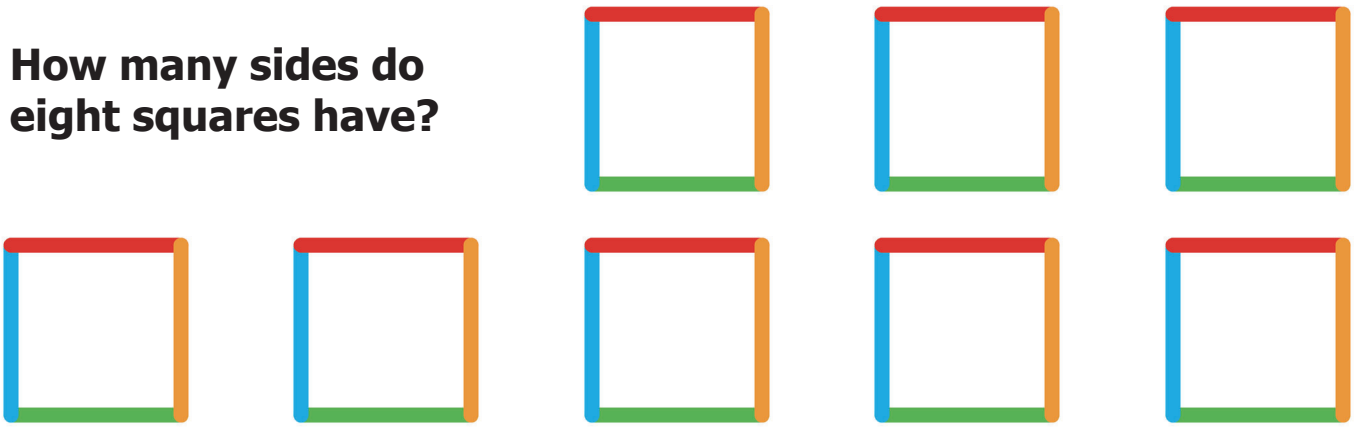
These questions use division - repeated subtraction - to find an answer. It's the same when the divisor, dividend, or quotient are fractions.

When dividing Whole Numbers by unit fractions students struggle with:

- Visualizing problems.
- Restating the question.
- Understanding what each number references.
- Making sense of the magnitude of the answer.

These issues can be addressed with: direct teaching, working on story problems, using manipulatives to solve fraction division problems (including linear, area, set, and volumetric models), discussing student questions, focusing on vocabulary, and giving students reflection time.

How many sides do eight squares have?



Modeling Fractions

Linear Models

	Measure People	Measure the Room
yarn rulers string ribbons yardsticks tape measures edges of shapes Cuisenaire Rods	Set up stations where students can measure the lengths of feet, stride, shoulder width, hands*, and cubits*. Consider inviting specialist teachers and administration so students can measure adults. Compare adult and student sizes. *Let your students research these ancient measurements first.	Give teams of students a clip board and a measuring tape. Let them measure and record the height and width of straight lines in the room: door jams, wall tiles, floor tiles, desks, chairs, windows, books. Compare and discuss. Variation: give teams different units of measurement

Area Models

	Measure Shadows	Measure Geometric Shapes
rulers grid paper unit squares tangrams origami pattern blocks tesselations	Give teams of students chalk, a clip board, rulers, cardboard squares, and some objects like balls, books. Take them outside on a sunny day. Let them trace and measure the shadows of each object. They can make a grid with the cardboard square, rulers, and chalk. Variation: give teams different units of measurement and different sizes of cardboard squares	Give students handouts with squares, triangles, and circles, along with a grid printed on a transparency. Let them use the transparency as an overlay, count and record the number of squares for each shape. Compare and discuss. Variation: give teams different units of measurement

Volumetric Models

	Measure Geometric Solids	How Many 1/4 cups in ?
cups tablespoons boxes unit cubes play dough, slime, or Oobleck rulers geometric solids with triangular or rectangular sides sand or snow toys	Have student teams measure and find the volume of the prisms or pyramids by using the formula. Add water to a clear measuring cup. Submerge the solid. Record the water level before and after the solid was submerged. Recalculate the volume, discuss, and compare.	Gather sets of measuring cups. Let students collect and measure clean sand, snow, water, or dry beans. Have them record how many unit fractions are needed to fill various numbers of cups. Compare and discuss. Variation: ask how many 1/2, or 1/3 cups in ?

Modeling Fractions

Set Models

buttons
bottle tops
paper clips
pebbles
centimeter cubes
dry beans
novelty toys
mini erasers

Unit Fractions of Office Supplies

Give each team a boxed set of office supplies ~ 144 paperclips, 24 crayons, 12 markers, six pack of tape, or a box of batteries. Alternatively, print and share ads for boxes of office supplies.

Let the groups use a calculator if needed. Have them record how many items in half a box, a third of a box and so on.

Unit Fractions of a Dozen

Give each group a collection of a dozen items. Let them record how many halves, thirds, fourths, and so on are in that set.

Variation: count how many unit fractions in groups of other sizes~ a pair, trio, quartet, months/seasons in a decade

Durational Models

clocks
digital timers
sand timers
stop watch
windup toys or
pull back racers
music
rhythm
timing activities
jump ropes
heart beats
seasons of the year

Sand Timers

Give teams of students a set of sand timers and paper to record their results. If needed tape over the decimal marking and write the fractions on each timer.

Let each team record the number of flips needed in order to measure a minute. Make sure they count the first flip! Do three or four trials for each sand timer. Compare results.

How Many 1/2 Inches in a Minute?

Gather the class to take notes on some unusual races. Set yardsticks on the floor next to the 'race track'. Appoint someone to time the race. Wind up some cute toys and cheer quietly as they move along the track. Measure and compare the speed of each toy. Make Posters

Variation: mix up the units of measurement - include how many thirds of a foot or tenths of a meter.

Linguistic Models

everyday language
story problems
asking questions
second languages
vocabulary lists
dictionaries
glossaries
math journals
class discussions
writing about math
reading about math

Student Authors

Invite each student to write a story problem about a given equation. Let them create a colorful display of several different ways to model the story problem.

Share and compare the diverse results considering that everyone had the same starting point.

Vocabulary IS Content

Listen to your students discuss division, whole numbers, and unit fractions.

Do they own the essential academic vocabulary? Listen to their questions, their peer to peer conversations. Read their reflections and explanations.

Have they 'just met' each word or are they good friends?

Modeling Fractions

Graphic Models

doodles
images
pictures
cartoons
diagrams
blue prints
maps
illustrations

Doodles

Encourage students to make quick abstract doodles to help them 'think on paper' while dividing whole numbers by unit fractions.

Perhaps they could show the whole numbers with rectangles and then mark off 5 segments when dividing by fifths. Doodles are not accurate or to scale, they simply show basic information.

Concrete to Abstract

Give story problems to teams. Have them make three illustrations of their story problem ~ one like a photo, precise with lots of detail, one like a quick sketch of the photo, and the last like an abstract design of the photo. All three illustrations should contain enough information to solve the problem.

Display the graphics with the story problems and the solutions.

Angular Models

degrees
protractor
angles
square corners
straight lines
fractions of circles
sets
stencils
compass

Young students can easily tell when a circle is complete or whole. This is one reason that fractions of circles are a fantastic starting point for introducing rational numbers.

Angular models measure distance around the circle's center. This also corresponds to fractions of the circle's area.

When your students are ready to measure angles, then you can separate angular models from area models. Until then, it makes sense to consider them area fractions.

Symbolic Models

Mathematical Notation

Math text

base 10 number system

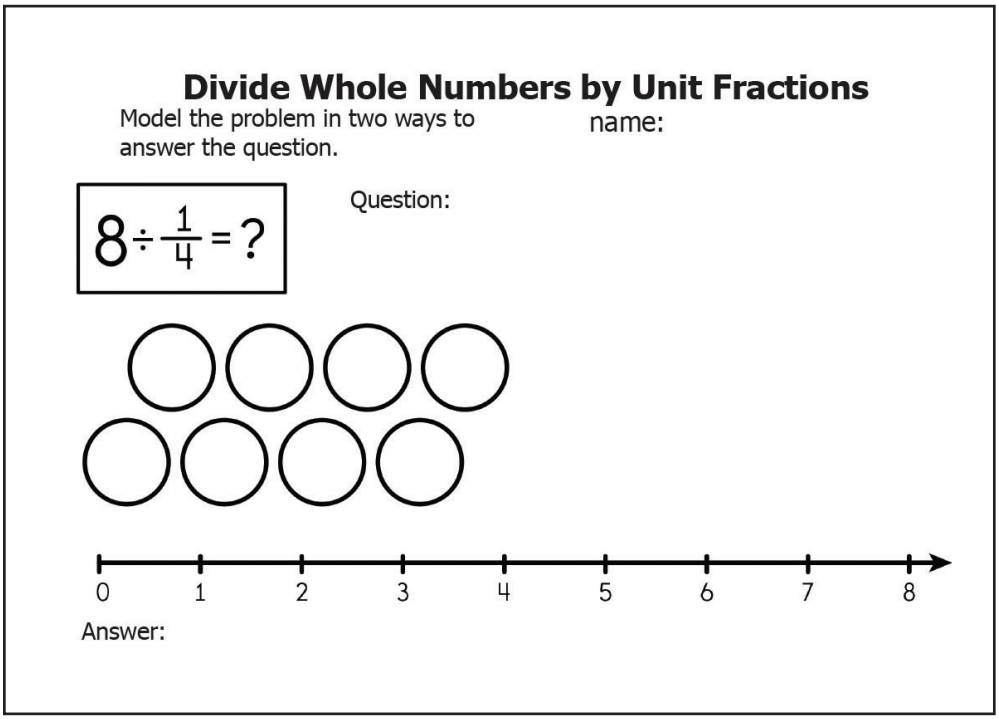
Roman, Egyptian or Babylonian number systems

Students will be expected to understand mathematical notation fluently. The ultimate goal is for students to use mathematical notation to model and solve math problems.

Fluency includes being able to translate equations from mathematical symbols into a variety of models, and back into mathematical notation accurately.

Eventually this will make it possible for advanced students to translate displays of data into equations and math text, or to create data displays based on math texts or mathematical notations.

Introducing Whole Numbers Divided by Unit Fractions Worksheets



Read the instructions.

Explain that some times there will be circles to help get them started with an area model. Other times the page will have blank space for them to choose which kind of model to use.

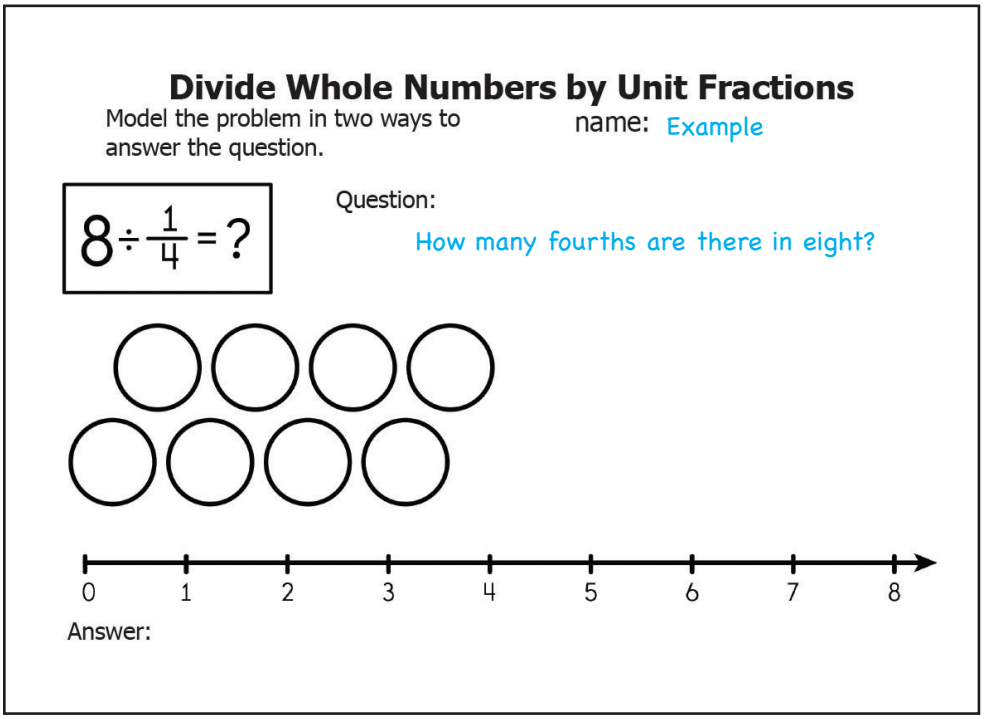
There will always be a linear model. Some times numbers will already be marked off and other times, students will get to segment the line on their own. Let them know how precise you would like them to be.

Read the equation and write out the question.

First, 'translate' the equation into English. It says, "What is eight divided by one-fourth?"

Next, invite students to restate the question. Answers might include: 'How many 1/4 size pieces will fit inside eight whole numbers?' or 'How often can 1/4 be subtracted from eight?'

Show the students where to write the question.



Make sure students understand what the number one-fourth references.

Ask, 'One-fourth of what?'

Some students might answer, 'One-fourth of eight.' However, one-fourth of eight is two. Have them restate the question in more detail; 'how many one-fourth pieces of a circle can fit inside eight circles.'

Explain that the dividend and the divisor refer to the same whole circles. Answer, 'One-fourth of a whole number.'

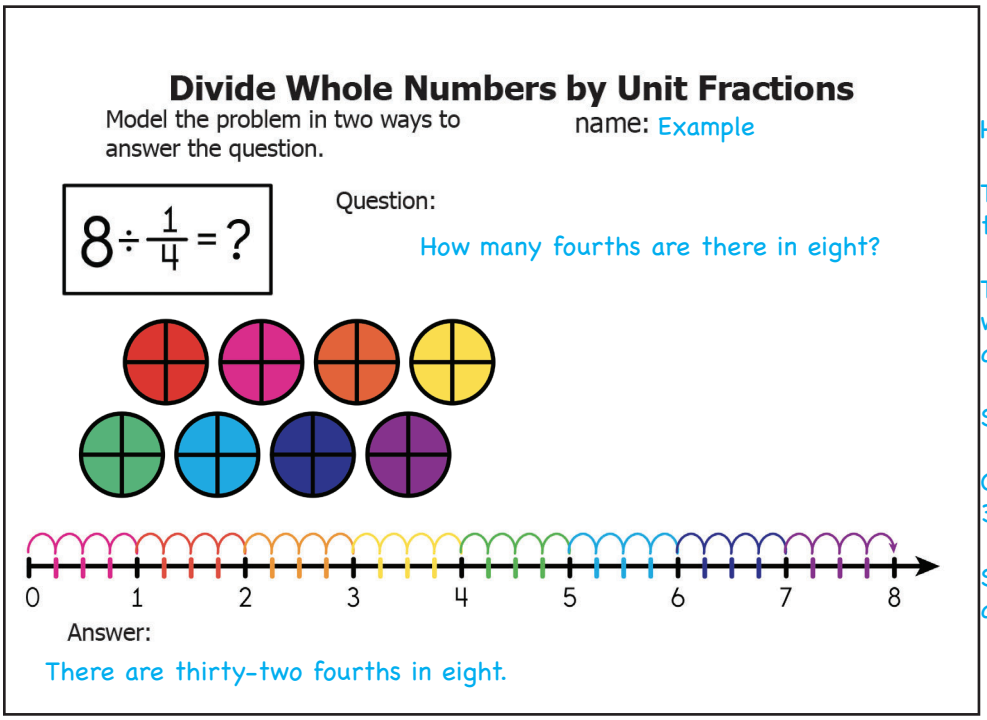
Remind your students that each circle is a whole number and that the question is how many fourths fit in eight circles. Let them decide what to do next.

Once they have drawn and counted the fourths, ask, 'How many fourths fit inside eight?'

Students answer, 'Thirty-two.'

'Thirty-two? That's so many! Usually division gives a smaller answer.
How can the quotient be larger than the dividend or the divisor?'

Let your students explain, 'That's what happens when dividing by a unit fraction. Unit fractions are smaller than whole numbers so more of them fit inside.'



Student Reasoning

How many fourths are there in eight?

There are four fourths per circle times eight circles, 4x8 is 32.

There are four hops between each whole number, times 8 whole numbers, again, 32.

So 8÷¼=32

Check division with multiplication: 32x¼=32÷4=8

So, I'm convinced this is the right answer.

Use a different way to model the same question: How many fourths fit between zero and eight on the number line?

Ensure your students know that the answer, '32' references the number of fourths. In this case, each one-fourth piece counts as 1.

Have them check their answer by multiplying 32 times 1/4 or adding 1/4 together 32 times.

For students who need more support, walk through another problem with them, or ask a similar question in a different format.

How many sides are there on four octagons?

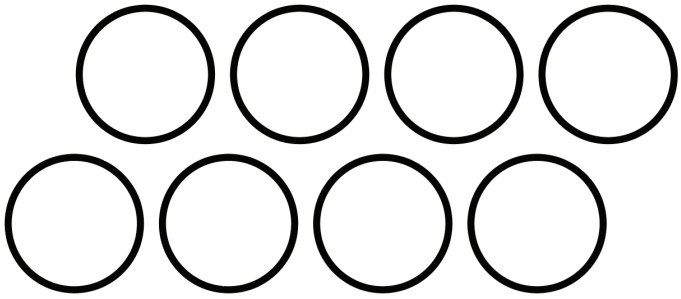
Whole Numbers Divided by Unit Fractions

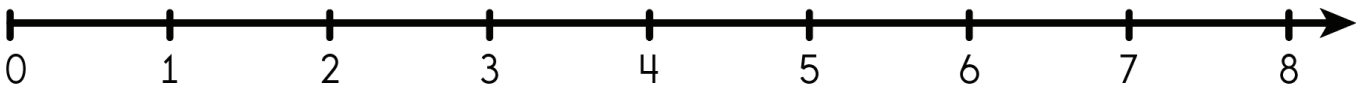
Model the problem in two ways to answer the question.

name:

$8 \div \frac{1}{4} = ?$

Question:

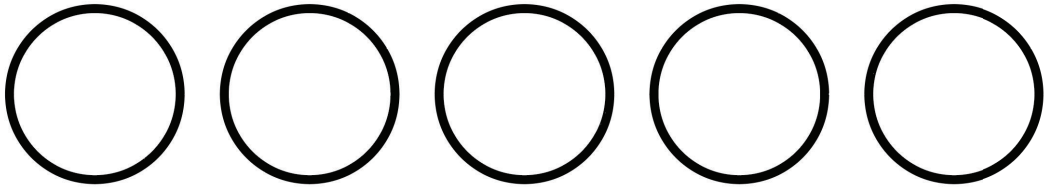




Answer:

$5 \div \frac{1}{3} = ?$

Question:



Answer:

Whole Numbers Divided by Unit Fractions

$6 \div \frac{1}{8} = ?$

Question:

Answer:

$1 \div \frac{1}{3} = ?$

Question:

Answer:

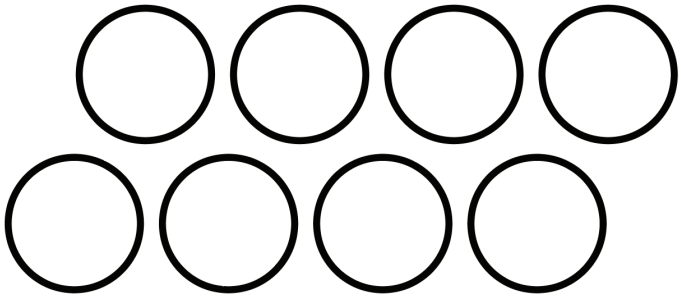
Whole Numbers Divided by Unit Fractions

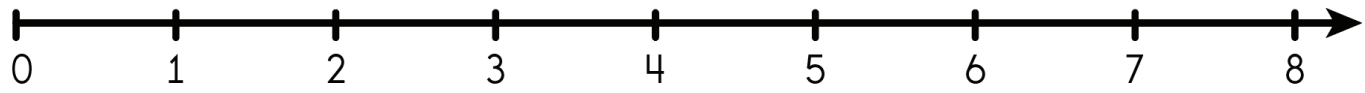
Model the problem in two ways to answer the question.

name:

$8 \div \frac{1}{2} = ?$

Question:

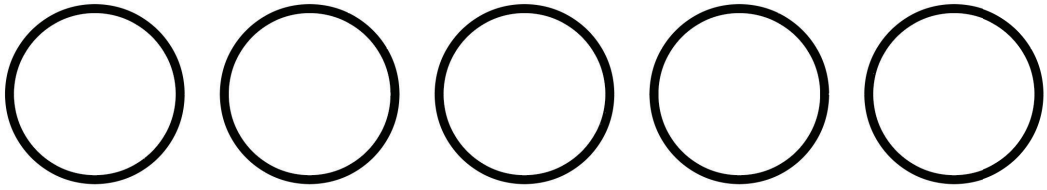




Answer:

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

Question:



Answer:

Whole Numbers Divided by Unit Fractions

$1 \div \frac{1}{6} = ?$

Question:

Answer:

$0 \div \frac{1}{3} = ?$

Question:

Answer:

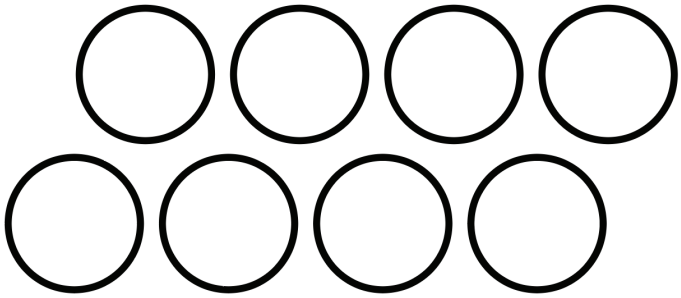
Whole Numbers Divided by Unit Fractions

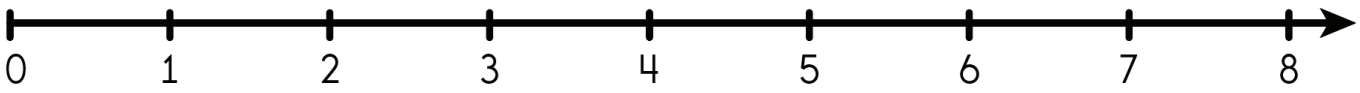
Model the problem in two ways to answer the question.

name:

$8 \div \frac{1}{10} = ?$

Question:

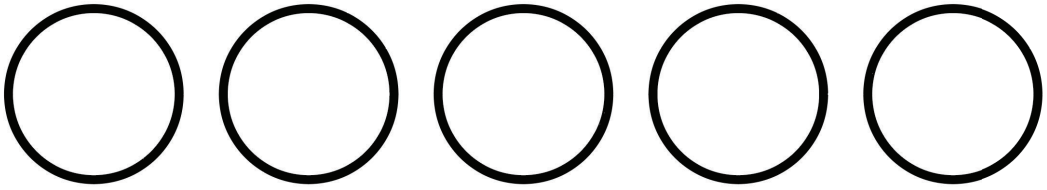




Answer:

$5 \div \frac{1}{7} = ?$

Question:



Answer:

Whole Numbers Divided by Unit Fractions

$9 \div \frac{1}{3} = ?$

Question:

Answer:

$2 \div \frac{1}{10} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Model the problem in two ways to answer the question.

name:

Question:

Answer:

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Question:

Answer:

Question:

Answer:

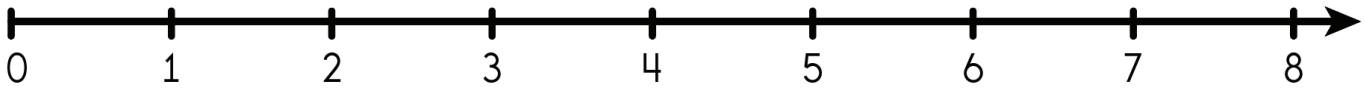
Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name:

$8 \div \frac{1}{4} = ?$

Question:



Answer:

$5 \div \frac{1}{3} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$2 \div \frac{1}{6} = ?$

Question:

Answer:

$4 \div \frac{1}{3} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name:

$10 \div \frac{1}{3} = ?$

Question:

Answer:

$4 \div \frac{1}{5} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$5 \div \frac{1}{4} = ?$

Question:

Answer:

$4 \div \frac{1}{10} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name:

$6 \div \frac{1}{2} = ?$

Question:

Answer:

$5 \div \frac{1}{5} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$0 \div \frac{1}{10} = ?$

Question:

Answer:

$2 \div \frac{1}{8} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name:

$3 \div \frac{1}{4} = ?$

Question:

Answer:

$9 \div \frac{1}{2} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$3 \div \frac{1}{5} = ?$

Question:

Answer:

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

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name:

Question:

Answer:

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Question:

Answer:

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation and the Multiplicative Identity Property of One

name:

$8 \div \frac{1}{4} = ?$

Question:

Answer:

$5 \div \frac{1}{3} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$2 \div \frac{1}{3} = ?$

Question:

Answer:

$11 \div \frac{1}{2} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation and the Multiplicative Identity Property of One

name:

$0 \div \frac{1}{4} = ?$

Question:

Answer:

$12 \div \frac{1}{4} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$7 \div \frac{1}{4} = ?$

Question:

Answer:

$7 \div \frac{1}{2} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation and the Multiplicative Identity Property of One

name:

$4 \div \frac{1}{2} = ?$

Question:

Answer:

$3 \div \frac{1}{6} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

$7 \div \frac{1}{3} = ?$

Question:

Answer:

$2 \div \frac{1}{2} = ?$

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation
and the Multiplicative Identity Property of One

name:

Question:

Answer:

Question:

Answer:

Whole Numbers Divided by Unit Fractions

Question:

Answer:

Question:

Answer:

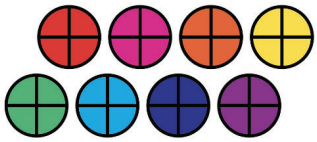
Whole Numbers Divided by Unit Fractions

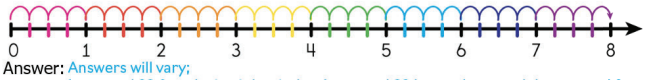
Model the problem in two ways to answer the question.

name: Answer Key

$8 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-forth size pieces in eight?
How often can one-fourth be subtracted from eight?

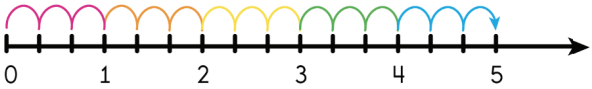




Answer: Answers will vary;
I counted 32 fourths in eight circles. I counted 32 hops where each hop moved forward by one-fourth of a whole number between zero and eight on the number line.
There are 32 fourths in eight.

$5 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in five?
How often can one-third be subtracted from five?



Answer: Answers will vary;
I counted 15 thirds in five circles. I counted 15 hops where each hop moved forward by one-third of a whole number between zero and five on the number line.
There are 15 thirds in five.

Whole Numbers Divided by Unit Fractions

$6 \div \frac{1}{8} = ?$

Question: Answers will vary;
How many one-eighths in six?
How often can one-eighth be subtracted from six?

Answers will vary;

Area models will have 6 shapes each divided into 8 equal pieces.

Linear models will show 6 whole numbers with 8 equal length hops between whole numbers.

Answer: There are 48 eights in six.

$1 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in one?
How often can one-third be subtracted from one?

Answers will vary;

Area models will have 1 shape divided into 3 equal pieces.

Linear models will show 3 equal length hops between zero and one.

Answer: There are 3 thirds in one. Three-thirds is an equivalent fraction of one.

Whole Numbers Divided by Unit Fractions

Model the problem in two ways to answer the question.

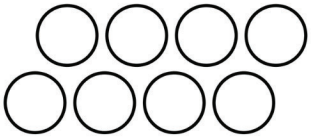
name: Answer Key

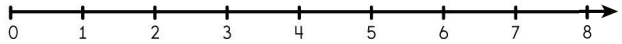
$8 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-halves in eight?
How often can one-half be subtracted from eight?

Each circle will be divided into two equal pieces.

There will be 16 one-half length hops between zero and eight on the number line.

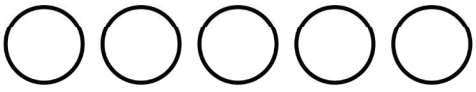




Answer: There are 16 halves in eight.

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

Question: Answers will vary;
How many one-half size pieces in five?
How often can one-half be subtracted from five?



Answer: Each circle will be divided into two equal pieces.

There will be 10 one-half length hops between zero and five on the number line.

There are 10 halves in five.

Whole Numbers Divided by Unit Fractions

$1 \div \frac{1}{6} = ?$

Question: Answers will vary;
How many one-sixth size pieces in one?
How often can one-sixth be subtracted from one?

Answers will vary;

Area models will have 1 shapes each divided into 6 equal pieces.

Linear models will show 6 equal length hops between zero and one.

Answer: There are 6 sixths in one.

$0 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in zero?
How often can one-third be subtracted from zero?

Answers will vary; In this question zero represents the number of whole shapes or whole numbers.

Area models will have 0 shapes.

Linear models will show 0 equal length hops.

Answer: There are 0 thirds in zero.

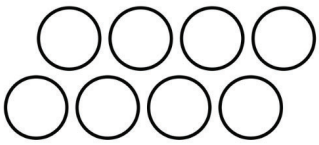
Whole Numbers Divided by Unit Fractions

Model the problem in two ways to answer the question.

name: Answer Key

$8 \div \frac{1}{10} = ?$

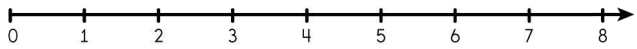
Question: Answers will vary;
How many one-tenth size pieces in eight?
How often can one-tenth be subtracted from eight?



Each circle will be divided into 10 equal pieces.

Each whole number on the number line will have 10 equidistant hops between them. There will be 80 hops between zero and 8.

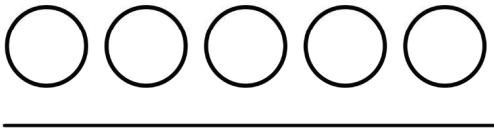
These will be difficult to draw, encourage your students to find acceptable solutions to show the tenths.



Answer: There are 80 tenths in 8.

$5 \div \frac{1}{7} = ?$

Question: Answers will vary;
How many one-sevenths in five?
How often can one-seventh be subtracted from five?



Answer:

Each of the five circles will be divided into seven equal parts.

On the number line there will be 7 equidistant hops between whole numbers. There will be 35 hops from zero to five.

There are 35 sevenths in five.

Whole Numbers Divided by Unit Fractions

$9 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in nine?
How often can one-third be subtracted from nine?

Answers will vary;

Area models will have 9 shapes each divided into 3 equal pieces.

Linear models will show 3 equal length hops between whole numbers. There will be 27 equal hops between zero and nine.

Answer: There are 27 thirds in nine.

$2 \div \frac{1}{10} = ?$

Question: Answers will vary;
How many one-tenths are there in two?
How often can one-tenth be subtracted from two?

Answers will vary;

Area models will have 2 shapes each divided into 10 equal pieces.

Linear models will show 10 equal length hops between whole numbers. There will be 20 equal hops between zero and two.

Answer: There are 20 tenths in two.

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

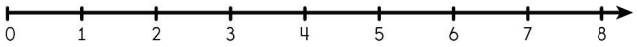
name: Answer Key

$8 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-forth size pieces in eight?
How often can one-fourth be subtracted from eight?

$\frac{8}{1} \div \frac{1}{4} = \frac{8 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{32 \div 1}{4 \div 4} = \frac{32}{1} = 32$

Linear models will show 4 equal length hops between zero and eight.



Answer: 8÷¼=32

$5 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in five?
How often can one-third be subtracted from five?

$\frac{5}{1} \div \frac{1}{3} = \frac{5 \times 3}{1 \times 3} \div \frac{1}{3} = \frac{15 \div 1}{3 \div 3} = \frac{15}{1} = 15$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

$2 \div \frac{1}{6} = ?$

Question: Answers will vary;
How many one-sixths in two?
How often can one-sixth be subtracted from two?

$\frac{2}{1} \div \frac{1}{6} = \frac{2 \times 6}{1 \times 6} \div \frac{1}{6} = \frac{12 \div 1}{6 \div 6} = \frac{12}{1} = 12$

Linear models will show 4 equal length hops between zero and eight.

Answer:

$4 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in four?
How often can one-third be subtracted from four?

$\frac{4}{1} \div \frac{1}{3} = \frac{4 \times 3}{1 \times 3} \div \frac{1}{3} = \frac{12 \div 1}{3 \div 3} = \frac{12}{1} = 12$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name: Answer Key

$10 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in ten?
How often can one-third be subtracted from ten?

$\frac{10}{1} \div \frac{1}{3} = \frac{10 \times 3}{1 \times 3} \div \frac{1}{3} = \frac{30 \div 1}{3 \div 3} = \frac{30}{1} = 30$

Linear models will show 4 equal length hops between zero and eight.

Answer:

$4 \div \frac{1}{5} = ?$

Question: Answers will vary;
How many one-fifth size pieces in four?
How often can one-fifth be subtracted from four?

$\frac{4}{1} \div \frac{1}{5} = \frac{4 \times 5}{1 \times 5} \div \frac{1}{5} = \frac{20 \div 1}{5 \div 5} = \frac{20}{1} = 20$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

$5 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-forth size pieces in five?
How often can one-fourth be subtracted from five?

$\frac{5}{1} \div \frac{1}{4} = \frac{5 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{20 \div 1}{4 \div 4} = \frac{20}{1} = 20$

Linear models will show 4 equal length hops between zero and eight.

Answer:

$4 \div \frac{1}{10} = ?$

Question: Answers will vary;
How many one-tenth size pieces in four?
How often can one-tenth be subtracted from four?

$\frac{4}{1} \div \frac{1}{10} = \frac{4 \times 10}{1 \times 10} \div \frac{1}{10} = \frac{40 \div 1}{10 \div 10} = \frac{40}{1} = 40$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name: Answer Key

$6 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-halves are there in six?
How often can one-half be subtracted from six?

$\frac{6}{1} \div \frac{1}{2} = \frac{6 \times 2}{1 \times 2} \div \frac{1}{2} = \frac{12 \div 1}{2 \div 2} = \frac{12}{1} = 12$

Linear models will show 4 equal length hops between zero and eight.

Answer:

$5 \div \frac{1}{5} = ?$

Question: Answers will vary;
How many one-fifth size pieces in five?
How often can one-fifth be subtracted from five?

$\frac{5}{1} \div \frac{1}{5} = \frac{5 \times 5}{1 \times 5} \div \frac{1}{5} = \frac{25 \div 1}{5 \div 5} = \frac{25}{1} = 25$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

$0 \div \frac{1}{10} = ?$

Question: Answers will vary;
How many one-tenth size pieces in zero?
How often can one-tenth be subtracted from zero?

$\frac{0}{1} \div \frac{1}{10} = \frac{0 \times 10}{1 \times 10} \div \frac{1}{10} = \frac{0 \div 1}{10 \div 10} = \frac{0}{1} = 0$

Linear models will show 4 equal length hops between zero and eight.

Answer:

$2 \div \frac{1}{8} = ?$

Question: Answers will vary;
How many one-eighth size pieces in two?
How often can one-eighth be subtracted from two?

$\frac{2}{1} \div \frac{1}{8} = \frac{2 \times 8}{1 \times 8} \div \frac{1}{8} = \frac{16 \div 1}{8 \div 8} = \frac{16}{1} = 16$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

Use mathematical notation, the multiplicative identity property of one, and a number line to solve.

name: Answer Key

$3 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-forth size pieces in three?
How often can one-fourth be subtracted from three?

$\frac{3}{1} \div \frac{1}{4} = \frac{3 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{12 \div 1}{4 \div 4} = \frac{12}{1} = 12$

Linear models will show 4 equal length hops between zero and eight.

Answer:

$9 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-half size pieces in nine?
How often can one-half be subtracted from nine?

$\frac{9}{1} \div \frac{1}{2} = \frac{9 \times 2}{1 \times 2} \div \frac{1}{2} = \frac{18 \div 1}{2 \div 2} = \frac{18}{1} = 18$

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

$3 \div \frac{1}{5} = ?$

Question: Answers will vary;
How many one-fifth size pieces in three?
How often can one-fifth be subtracted from three?

$\frac{3}{1} \div \frac{1}{5} = \frac{3 \times 5}{1 \times 5} \div \frac{1}{5} = \frac{15 \div 1}{5 \div 5} = \frac{15}{1} = 15$

Answers will vary;
I counted 32 fourths in eight circles. I counted 32 hops where each hop moved forward by one-fourth of a whole number between zero and eight on the number line.
There are 32 fourths in eight.

Linear models will show 4 equal length hops between zero and eight.

Answer:

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

Question: Answers will vary;
How many one-fifth size pieces in two?
How often can one-fifth be subtracted from two?

$\frac{2}{1} \div \frac{1}{5} = \frac{2 \times 5}{1 \times 5} \div \frac{1}{5} = \frac{10 \div 1}{5 \div 5} = \frac{10}{1} = 10$

Answers will vary;
I counted 15 thirds in five circles. I counted 15 hops where each hop moved forward by one-third of a whole number between zero and five on the number line.
There are 15 thirds in five.

Linear models will show 4 equal length hops between zero and eight.

Answer:

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation and the Multiplicative Identity Property of One

name: Answer Key

$8 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-forth size pieces in eight?
How often can one-fourth be subtracted from eight?

$\frac{8}{1} \div \frac{1}{4} = \frac{8 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{32 \div 1}{4 \div 4} = \frac{32}{1} = 32$

Explanations will vary;
Eight has a denominator of one, because it is a whole number. Eight over one is divided by four over four to create a fraction equivalent to 8 with a denominator of 4. When the fraction equivalent to 8 is divided by one-fourth, the denominator will be 4÷4 which is one.

Use multiplication to check: 32-fourths in simplest form is 8.

$\frac{32 \div 4}{4 \div 4} = \frac{8}{1} = 8$

Answer: 32 fourths

$5 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in five?
How often can one-third be subtracted from five?

$\frac{5}{1} \div \frac{1}{3} = \frac{5 \times 3}{1 \times 3} \div \frac{1}{3} = \frac{15 \div 1}{3 \div 3} = \frac{15}{1} = 15$

Answer: 15 thirds

Explanations will vary.

Whole Numbers Divided by Unit Fractions

$2 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in two?
How often can one-third be subtracted from two?

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

Answer: 6 thirds

Explanations will vary.

$11 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-half size pieces in eleven?
How often can one-half be subtracted from eleven?

$\frac{11}{1} \div \frac{1}{2} = \frac{11 \times 2}{1 \times 2} \div \frac{1}{2} = \frac{22 \div 1}{2 \div 2} = \frac{22}{1} = 22$

Answer: 22 halves

Explanations will vary.

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation and the Multiplicative Identity Property of One

name: Answer Key

$0 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-fourth size pieces in zero?
How often can one-fourth be subtracted from zero?

$\frac{0}{1} \div \frac{1}{4} = \frac{0 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{0 \div 1}{4 \div 4} = \frac{0}{1} = 0$

Answer: zero fourths

Explanations will vary.

$12 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-fourths are there in twelve?
How often can one-fourth be subtracted from twelve?

$\frac{12}{1} \div \frac{1}{4} = \frac{12 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{48 \div 1}{4 \div 4} = \frac{48}{1} = 48$

Answer: 48 fourths

Explanations will vary.

Whole Numbers Divided by Unit Fractions

$7 \div \frac{1}{4} = ?$

Question: Answers will vary;
How many one-forth size pieces in seven?
How often can one-fourth be subtracted from seven?

$\frac{7}{1} \div \frac{1}{4} = \frac{7 \times 4}{1 \times 4} \div \frac{1}{4} = \frac{28 \div 1}{4 \div 4} = \frac{28}{1} = 28$

Answer: 28 fourths

Explanations will vary.

$7 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-half size pieces in seven?
How often can one-half be subtracted from seven?

$\frac{7}{1} \div \frac{1}{2} = \frac{7 \times 2}{1 \times 2} \div \frac{1}{2} = \frac{14 \div 1}{2 \div 2} = \frac{14}{1} = 14$

Answer: 14 halves

Explanations will vary.

Whole Numbers Divided by Unit Fractions

Find the answer using Mathematical notation and the Multiplicative Identity Property of One

name: Answer Key

$4 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-half size pieces in four?
How often can one-half be subtracted from four?

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

Answer: 8 halves

Explanations will vary.

$3 \div \frac{1}{6} = ?$

Question: Answers will vary;
How many one-six size pieces in three?
How often can one-six be subtracted from three?

$\frac{3}{1} \div \frac{1}{6} = \frac{3 \times 6}{1 \times 6} \div \frac{1}{6} = \frac{18 \div 1}{6 \div 6} = \frac{18}{1} = 18$

Answer: 18 sixths

Explanations will vary.

Whole Numbers Divided by Unit Fractions

$7 \div \frac{1}{3} = ?$

Question: Answers will vary;
How many one-third size pieces in seven?
How often can one-third be subtracted from seven?

$\frac{7}{1} \div \frac{1}{3} = \frac{7 \times 3}{1 \times 3} \div \frac{1}{3} = \frac{21 \div 1}{3 \div 3} = \frac{21}{1} = 21$

Answer: 21 thirds

Explanations will vary.

$2 \div \frac{1}{2} = ?$

Question: Answers will vary;
How many one-half size pieces in two?
How often can one-half be subtracted from two?

$\frac{2}{1} \div \frac{1}{2} = \frac{2 \times 2}{1 \times 2} \div \frac{1}{2} = \frac{4 \div 1}{2 \div 2} = \frac{4}{1} = 4$

Answer: 4 halves

Explanations will vary.

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