

Homework & Practice 12-1

Divide Regions into Equal Parts

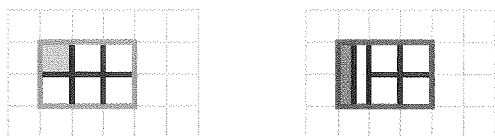
Another Look!

Divide these shapes into 6 equal parts.



You can draw lines to divide the shapes into equal parts.

Equal parts do not need to be the same shape, but they must be equal in area.

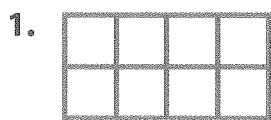


Both shapes are divided into six equal parts, or sixths.
 Each part is one sixth of the area of the shape.
 Each part can be written as $\frac{1}{6}$.

Be precise. You can divide shapes into equal parts and name them using a fraction.

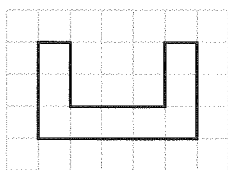


In 1–3, tell if each shows equal or unequal parts. If the parts are equal, label one of the parts using a unit fraction.

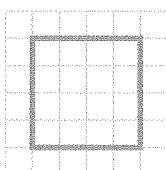


In 4–6, draw lines to divide the shape into the given number of equal parts. Then write the fraction that represents one equal part.

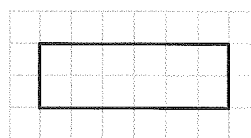
4. 3 equal parts



5. 4 equal parts



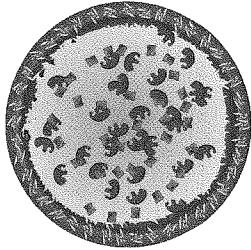
6. 6 equal parts



In 7–9, use the pictures shown below.

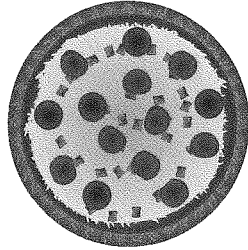
7. Mr. Yung orders 3 pizzas. He cuts the pizzas into the number of equal parts shown. Draw lines to show how Mr. Yung could have cut the pizzas.

2 equal parts



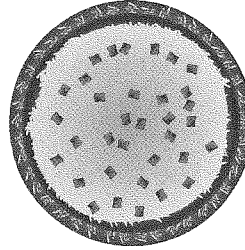
Mushroom

8 equal parts



Pepperoni

4 equal parts



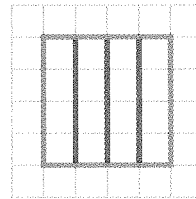
Cheese

8. Mr. Yung puts onions on the mushroom pizza. He puts only onions on $\frac{1}{2}$ of that pizza. Shade the amount of pizza that has onions.
9. **MP.6 Be Precise** Rose eats one equal part of one of the pizzas. She has eaten $\frac{1}{8}$ of the whole pizza. Which pizza did Rose eat?

10. **MP.2 Reasoning** Ellen is drawing two polygons. One of the polygons has 3 more angles than the other. What shapes could she be drawing?

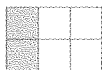
11. **Vocabulary** Fill in the blanks. In the fraction $\frac{4}{7}$, 4 is the _____ and 7 is the _____.

12. **Higher Order Thinking** Draw one line to divide this square into 8 equal parts. What fraction of the square was 1 part before you drew your line? After you drew your line?



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13. Richard divided the rectangle into equal parts. He shaded one of those parts and labeled it using a unit fraction. Do you agree with Richard? Explain why or why not.



$\frac{1}{6}$

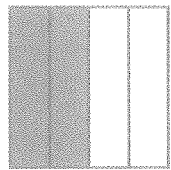
Homework & Practice 12-2

Fractions and Regions

Another Look!

A fraction can be used to name part of a whole.

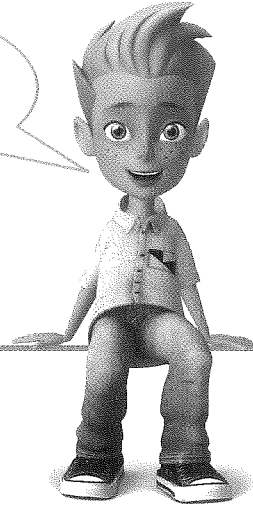
The denominator shows the total number of equal parts in a whole. The numerator shows how many equal parts are described.



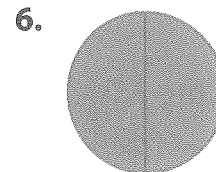
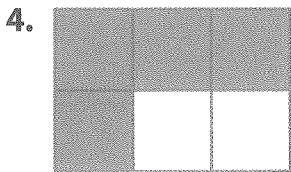
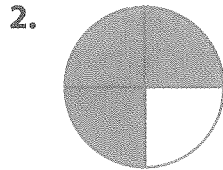
Number of $\frac{1}{4}$ -parts shaded
Total number of equal parts

\longrightarrow 2 \longleftarrow Numerator
 \longrightarrow 4 \longleftarrow Denominator

2 copies of $\frac{1}{4}$ is $\frac{2}{4}$.
 $\frac{2}{4}$ of the rectangle is shaded green.



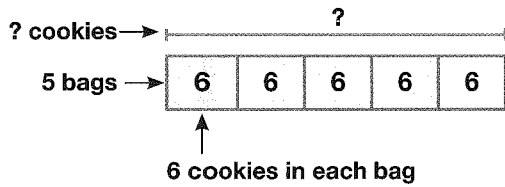
In 1–6, write the unit fraction that represents each part of the whole. Next write the number of shaded parts. Then write the fraction of the whole that is shaded.



7. Draw a rectangle that shows 2 equal parts. Shade $\frac{1}{2}$ of the rectangle.

8. Draw a circle that shows 8 equal parts. Shade $\frac{2}{8}$ of the circle.

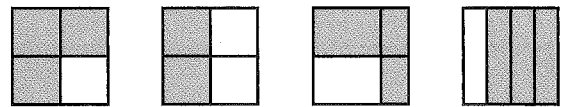
9. © MP.4 Model with Math There are 6 cookies in 1 bag. How many cookies are in 5 bags? Use the bar diagram to write and solve an equation.



10. A banner is made of 8 equal parts. Five of the parts are green. Three of the parts are yellow. Draw and color the banner.

11. © MP.1 Make Sense and Persevere Three friends go bowling. Artie's score is 52 points greater than Matthew's score. Matthew's score is 60 points less than Greg's score. If Greg's score is 122, what is Artie's score?

12. Circle all the figures that show $\frac{3}{4}$.



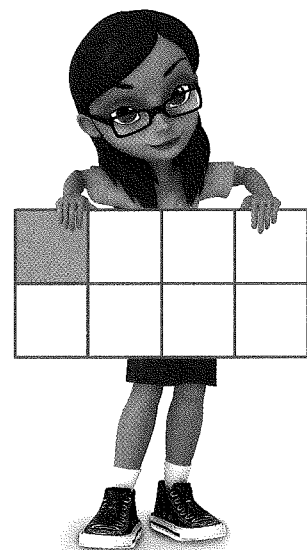
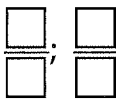
13. Higher Order Thinking Rashad draws a figure and divides it into equal parts. Two of the parts are red. The other 4 parts are blue. Rashad says that $\frac{2}{4}$ of the figure is red. What error is he making? Explain. Then write the correct fraction of the figure that is red.

You can draw a picture to help you solve this problem.



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14. Write the unit fraction that represents one purple square. What fraction represents the whole? Explain how you know.



Homework & Practice 12-3

Understand the Whole

Another Look!

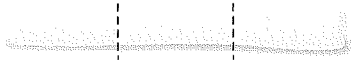
This is $\frac{3}{4}$ of a string cheese snack. How long is the whole string cheese snack?

$$\frac{3}{4}$$



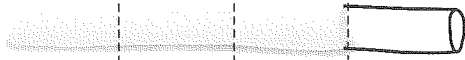
$\frac{3}{4}$ is 3 lengths of $\frac{1}{4}$. Divide the snack into 3 equal lengths.

$$\frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4}$$



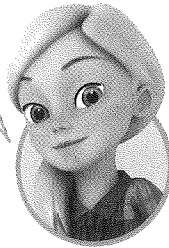
4 lengths of $\frac{1}{4}$ make $\frac{4}{4}$, or 1 whole. Draw one more fourth. The drawing shows the length of the whole string cheese.

$$\frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4}$$



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

The denominator of the fraction tells you how many lengths you need to make the whole.



In 1–4, draw a picture and write a fraction to represent the whole.

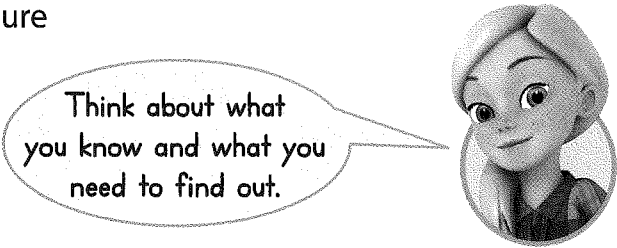
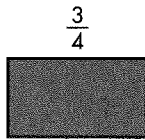
1. $\frac{1}{3}$

2. $\frac{1}{6}$

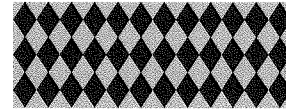
3. $\frac{2}{4}$

4. $\frac{3}{8}$

5. © MP.2 Reasoning If the part shown is $\frac{3}{4}$ of a flag, what could the whole flag look like? Draw a picture and write a fraction to represent the whole.



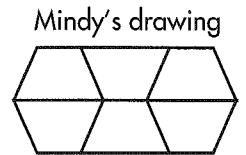
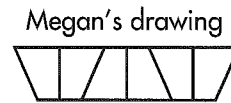
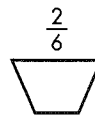
6. © MP.2 Reasoning Jorge has $\frac{4}{8}$ of the fabric he needs to make a costume for the party. His fabric is shown. Draw a picture and write a fraction to represent the whole.



7. Jen's garden is 4 feet wide and 4 feet long. What is the area of Jen's garden?

8. Gary has 63 counters. He puts them in an array with 9 columns. How many rows are there?

9. Higher Order Thinking Megan and Mindy saw a plan for $\frac{2}{6}$ of a playground. They each drew a picture of the whole playground. Which drawing is **NOT** correct? Tell how you know.



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10. The picture shows $\frac{3}{4}$ of the distance Pedro lives from school.



Which shows the whole distance?

- (A)
- (B)
- (C)
- (D)

11. Each of these parts is $\frac{1}{8}$ of a different whole. Which is part of the largest whole?





Help

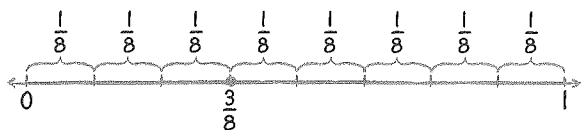
Practice
Buddy

Tools

Games

**Homework
& Practice 12-4****Number Line:
Fractions Less Than 1****Another Look!**Show $\frac{3}{8}$ on a number line.

Start by drawing a number line from 0 to 1. Put tick marks at the ends. Label the tick marks 0 and 1.

Divide the number line into 8 equal lengths. Each length is $\frac{1}{8}$ of the whole.Start at 0. Go to the right until you come to the third tick mark. That mark represents $\frac{3}{8}$. Draw a point at $\frac{3}{8}$ on the line. Label the point $\frac{3}{8}$.

Be precise! You can use a number line to show fractions. The denominator tells you the number of equal parts on the number line.



In **1** and **2**, divide the number line into the given number of equal lengths. Then mark and label the given fraction on the number line.

1. 3 equal lengths; $\frac{2}{3}$ 2. 6 equal lengths; $\frac{5}{6}$ 

In **3–6**, draw a number line. Divide the number line into equal lengths for the given fraction. Then mark and label the fraction on the number line.

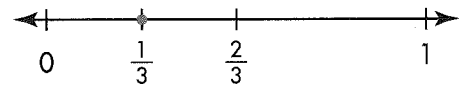
3. $\frac{3}{4}$ 4. $\frac{4}{8}$ 5. $\frac{1}{6}$ 6. $\frac{7}{8}$

7. **Algebra** Ted writes the following equation. Write the number that makes the equation correct.

$$824 = 20 + ? + 4$$

$$? = \underline{\hspace{2cm}}$$

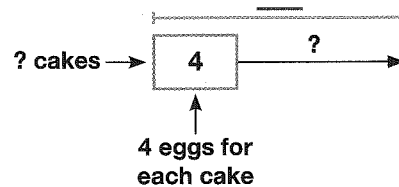
8. **MP.3 Critique Reasoning** Craig says that this number line shows $\frac{1}{3}$. Do you agree with Craig? Explain why or why not.



9. **Higher Order Thinking** Eddie is walking on a line that is painted on the sidewalk. It takes Eddie 8 equal-size steps to get from one end of the line to the other. After Eddie has taken 5 steps, what fraction of the line is behind him? What fraction of the line is still in front of him?

10. **Math and Science** Fossilized footprints have been found within the Hawaii Volcanoes National Park. Hawaii Volcanoes Wilderness is an area within the park. This wilderness area covers about $\frac{1}{2}$ of the park. Draw a number line. Then mark and label $\frac{1}{2}$ on it.

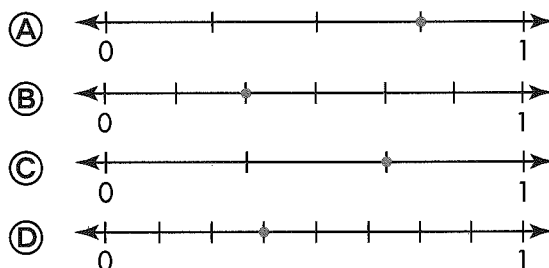
11. **MP.4 Model with Math** Marty has 1 dozen eggs. He needs 4 eggs to bake a cake. How many cakes can he bake? Complete the bar diagram and write an equation to represent and solve the problem.



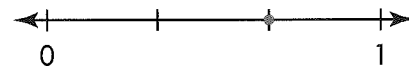
1 dozen = 12.

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12. James put a point at $\frac{3}{8}$ on a number line. Which number line shows $\frac{3}{8}$?



13. What fraction does the point on this number line represent?



- (A) $\frac{1}{3}$
 (B) $\frac{1}{4}$
 (C) $\frac{2}{2}$
 (D) $\frac{2}{3}$

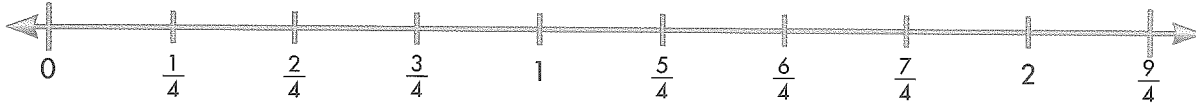
Homework & Practice 12-5

Number Line: Fractions Greater Than 1

Another Look!

A point on a number line can be named using a fraction.

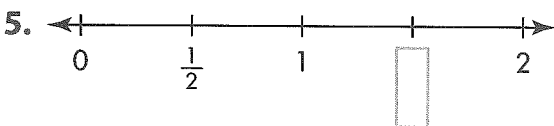
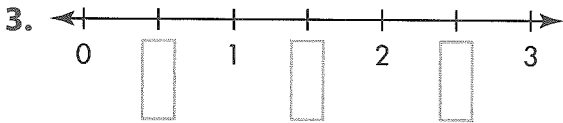
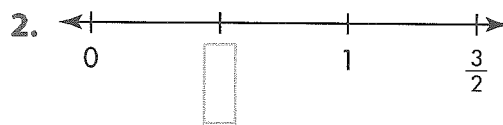
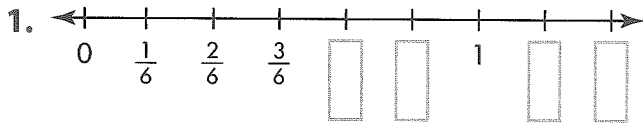
In the fractions below, the denominator shows the number of equal lengths that are between 0 and 1. The numerator shows the number of copies of the unit fraction.



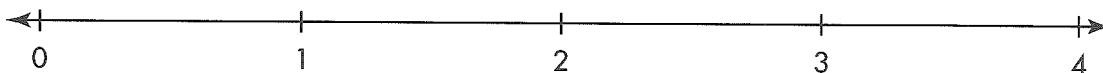
The numerator increases by 1 at each point. That's because each point means there is 1 more copy of the unit fraction!



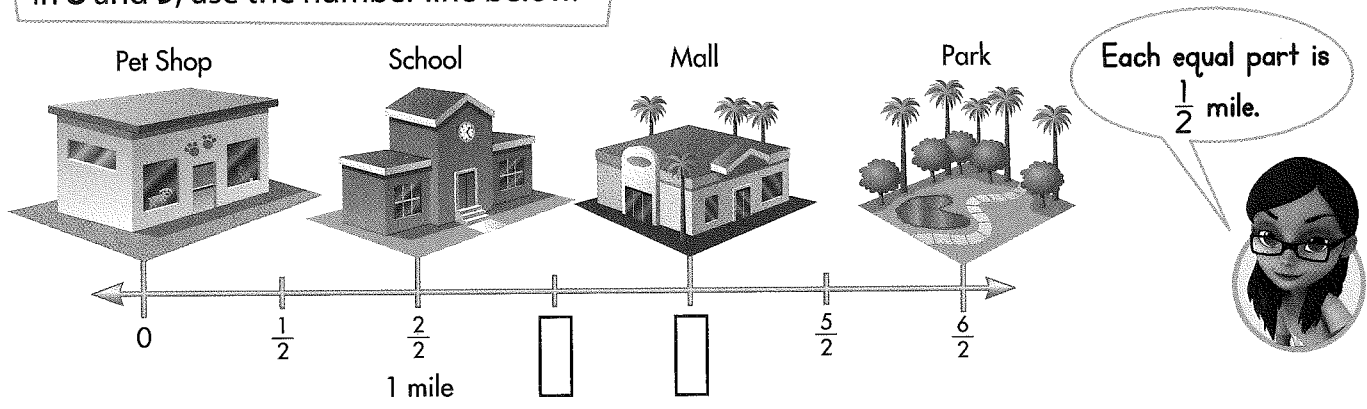
In 1-6, each number line has equal lengths marked. Write the missing fractions.



7. Divide the number line into thirds. Label each point.



In 8 and 9, use the number line below.



8. © MP.6 Be Precise How far is the mall from the pet shop? Explain how you know.

9. Higher Order Thinking Ken lives at the point between the school and the pet shop. How far away is Ken's house from the park?

10. Draw a triangle in which all the sides are different lengths.

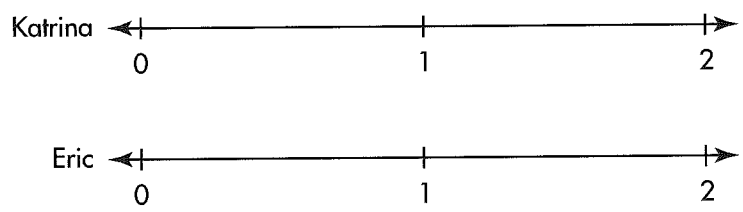
11. © MP.3 Critique Reasoning Jan said that 2 is between 0 and $\frac{3}{4}$ on a number line. Do you agree? Why or why not?

12. Lee marks sixths on a number line. He writes $\frac{5}{6}$ just before 1. What fraction does he write on the first mark to the right of 1?

13. Algebra Which factor makes these equations correct?
 $6 \times ? = 54$ $? \times 9 = 81$

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14. Divide Katrina's number line into eighths. Divide Eric's number line into fourths. Show a point on Katrina's number line that is less than 1. Show a point on Eric's number line that is greater than 1. Write fractions to label the points you picked.

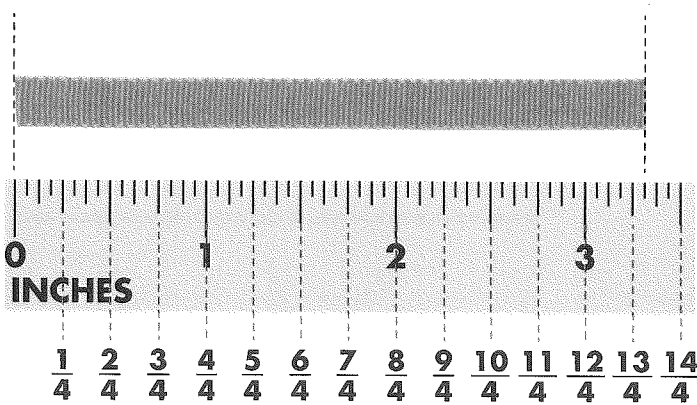


Homework & Practice 12-6

Line Plots and Length

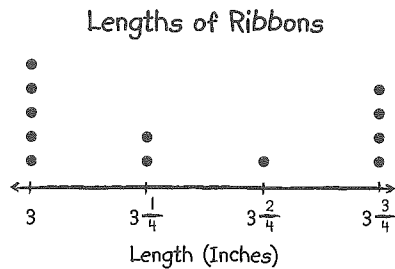
Another Look!

The blue marks on this ruler show fourth-inch marks. Serena used the ruler to measure a ribbon to the nearest fourth inch.



To the nearest fourth inch: the length of the ribbon is $3\frac{1}{4}$ inches.

Serena recorded the measurements of all the ribbons she has. Then she made a line plot.

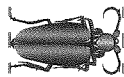


A ruler can help you be precise when measuring. A line plot can organize the data.



- Toby's toy insects are shown at the right. Use a ruler to measure each insect to the nearest fourth inch. Record each measurement.

6 beetles



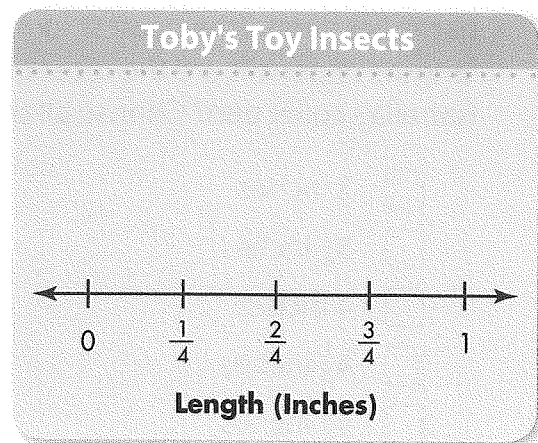
7 ladybugs



5 butterflies



- How many dots, or data points, should be on the line plot to show all of Toby's toy insects?
- Complete the line plot to show the data.
- How many more dots did you draw for beetles than for butterflies?



In **5–7**, use the table at the right. The table shows the lengths to the nearest fourth inch of fish that scientists studied.

5. Make a line plot to show the data.

Fish Lengths					
$9\frac{1}{4}$ in.	$9\frac{3}{4}$ in.	11 in.	$9\frac{3}{4}$ in.	$8\frac{3}{4}$ in.	10 in.
$8\frac{3}{4}$ in.	$9\frac{2}{4}$ in.	$10\frac{2}{4}$ in.	$8\frac{2}{4}$ in.	$9\frac{3}{4}$ in.	11 in.
$10\frac{1}{4}$ in.	9 in.	10 in.	$8\frac{3}{4}$ in.	$10\frac{3}{4}$ in.	$9\frac{3}{4}$ in.

6. © **MP.2 Reasoning** How many dots do you show for $9\frac{3}{4}$ inches? What do these dots represent?

7. **Higher Order Thinking** What is the difference in length between the greatest length and the least length?

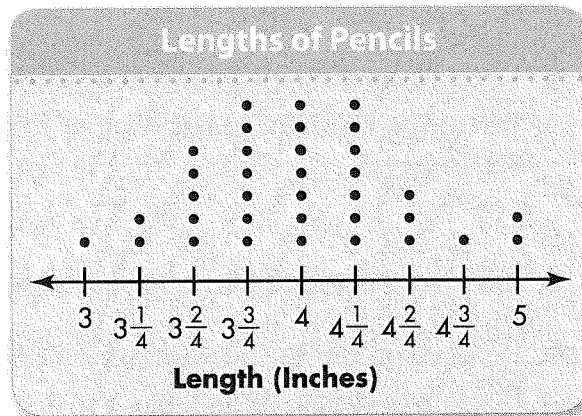
8. Owen arranges 48 beads into an array. There are 6 rows of beads. How many columns are there?

9. © **MP.1 Make Sense and Persevere**
On Wednesday, Connor spent \$65. On Thursday, he spent \$130. Connor has \$311 left. How much money did Connor have to start?

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10. Isabella recorded the lengths of the pencils in her collection to the nearest fourth inch. Which lengths of pencils are the most common in Isabella's collection? Choose all that apply.

- 3 inches
- $3\frac{3}{4}$ inches
- 4 inches
- $4\frac{1}{4}$ inches
- $4\frac{2}{4}$ inches

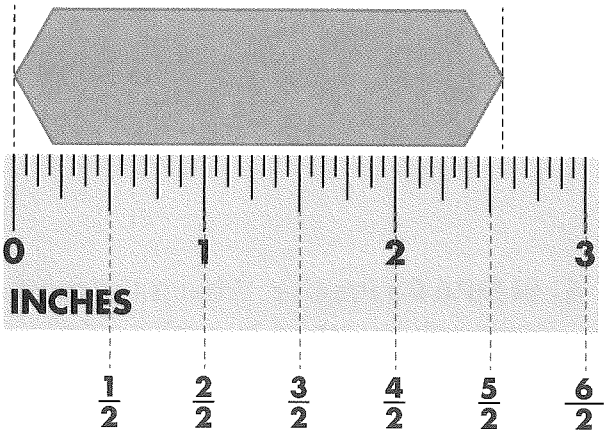


Homework & Practice 12-7

More Line Plots and Length

Another Look!

The red marks on this ruler show half-inch marks. Franco used the ruler to measure a hexagon to the nearest half inch.

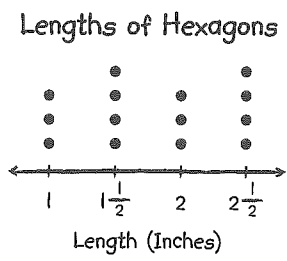


You can use a line plot to compare data.

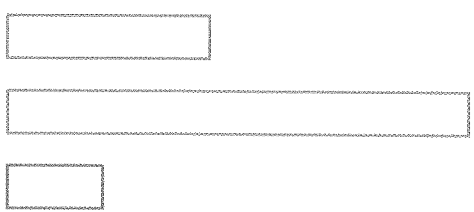


To the nearest half inch: the length of the hexagon is $2\frac{1}{2}$ inches.

Franco recorded the lengths of other hexagons he measured. Then he made a line plot. The most common lengths were $1\frac{1}{2}$ inches and $2\frac{1}{2}$ inches.

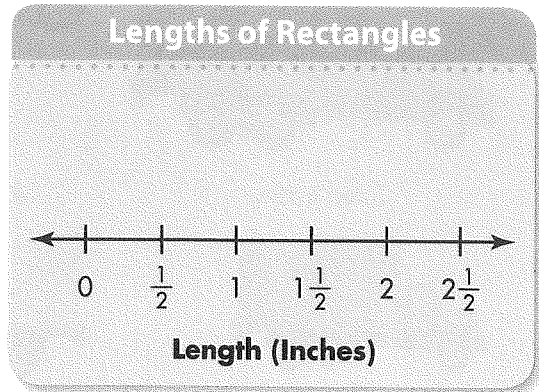


1. Measure the length of each rectangle to the nearest half inch.



2. Jamal drew 5 of the green rectangles, 3 of the orange rectangles, and 4 of the purple rectangles. How many dots, or data points, should be on the line plot?

3. Complete the line plot to show the data.



4. Japera measured the lengths of her books to the nearest fourth inch and listed their lengths. Make a line plot that displays the lengths of Japera's books.

$8\frac{1}{2}$ in., $9\frac{1}{2}$ in., $8\frac{1}{2}$ in., $9\frac{1}{2}$ in., 10 in.,
 $9\frac{1}{2}$ in., $8\frac{1}{2}$ in., 9 in., $9\frac{1}{2}$ in.

5. Eli has double the number of books that Japera has. How many books does Eli have?

6. © MP.6 Be Precise What is the most common length of Japera's books?

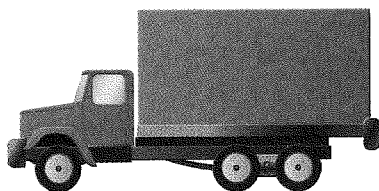
7. © MP.4 Model with Math Peter bought 8 sets of paint. He gives half of his sets to his sister. Each set has 5 bottles. How many bottles does Peter's sister have? Write equations and solve.

8. Higher Order Thinking Dan measures an object to the nearest fourth inch. He records the length as $4\frac{1}{4}$ inches. Geri measures the same object to the nearest half inch. Could Dan and Geri get the same measurement? Explain.

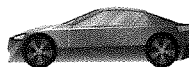
© Common Core Assessment

9. Robert measured the cars and trucks in his toy collection to the nearest half inch. Find the measurements of each type. Then complete the line plot to show the data.

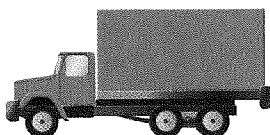
4 blue trucks



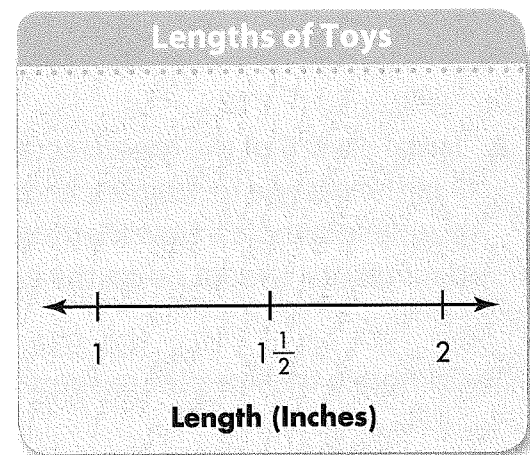
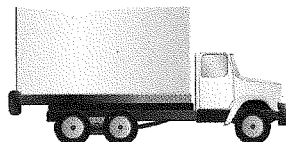
8 green cars



3 red trucks



4 yellow trucks



Homework & Practice 12-8

Make Sense and Persevere

Another Look!

Becky divides a rectangle into 8 equal parts. She colors 4 parts yellow. The rectangle has 4 sides and 4 vertices. Becky colors 1 part red and the rest blue. What fraction of the rectangle did Becky color blue?

Tell how to make sense of the problem.

- I can identify the quantities given.
- I can understand which quantities are needed to solve the problem.

Make sense of the information in the problem by identifying the quantities. Then use what you know to solve the problem.

Use what you know to solve the problem.

The rectangle has 4 sides and 4 vertices is extra information. There are 8 equal parts. So, each part is $\frac{1}{8}$. There are 3 parts left to color blue. 3 copies of $\frac{1}{8}$ is $\frac{3}{8}$. So, $\frac{3}{8}$ are blue.

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$



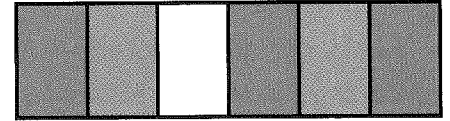
© MP.1 Make Sense and Persevere

Three friends get to a party at 2 o'clock. They cut a pizza into 4 pieces. The friends eat one slice of pizza each. What fraction of the pizza is left?

1. Tell how to make sense of the problem.
2. Is there any missing or extra information? Explain.
3. Solve the problem. If information you need is missing, make up some reasonable information for the problem. You can draw a picture to help.

School Banner

Four students are making the banner shown at the right. They have 1 week to finish the banner. Anja makes the green parts. Michael makes the white part. Adeeba makes the same number of parts as Lee.



4. **MP.1 Make Sense and Persevere** The teacher wants to know what fraction of the banner Lee makes. Is there any extra or missing information?

5. **MP.2 Reasoning** What fraction of the banner does Anja make?

6. **MP.2 Reasoning** What fraction of the banner does Michael make?

7. **MP.6 Be Precise** Explain how you know the fraction of the banner that is **not** made by either Anja or Michael.

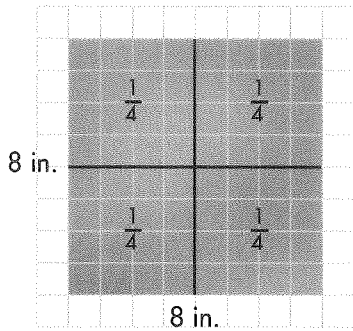
8. **MP.3 Construct Arguments** What fraction of the banner does Lee make? Explain.

If you are stuck, you can persevere. Think: Can I try different numbers?



Set A pages 609–614

This is one way to divide a whole into fourths.



Since each of the 4 parts has the same area, each part is one fourth of the whole shape.

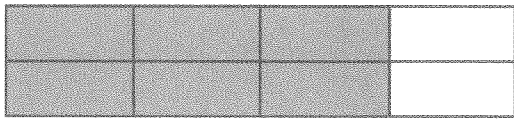
You can write this fraction as $\frac{1}{4}$.

A unit fraction represents one of the equal parts. $\frac{1}{4}$ is a unit fraction.

$$\frac{\text{numerator}}{\text{denominator}} = \frac{\text{number of parts the fraction represents}}{\text{total number of equal parts}} = \frac{1}{4}$$

Set B pages 615–620

What fraction of this rectangle is shaded?



The rectangle is divided into 8 equal parts. So, the unit fraction of the rectangle is $\frac{1}{8}$.

In the whole rectangle there are 8 parts of $\frac{1}{8}$.

8 copies of $\frac{1}{8}$ is $\frac{8}{8}$.

For the shaded part there are 6 parts of $\frac{1}{8}$.

6 copies of $\frac{1}{8}$ is $\frac{6}{8}$.

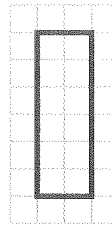
So, $\frac{6}{8}$ of the rectangle is shaded.

Remember that fractions can name equal parts of a whole.

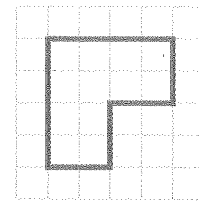
Reteaching

In 1 and 2, draw lines to divide the shape into the given number of equal parts. Then write the fraction that represents one part.

1. 6 equal parts



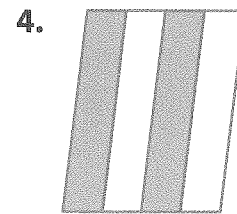
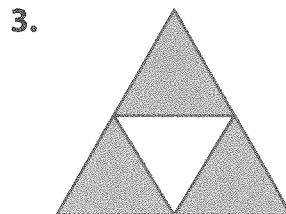
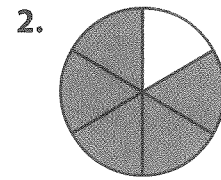
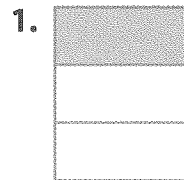
2. 2 equal parts



3. Martin divides a shape into 3 equal parts. What unit fraction can he write to represent 1 part?

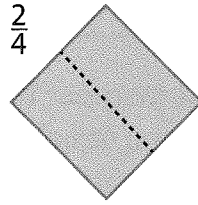
Remember that you need to think about how many parts there are in all and how many parts are shaded.

In 1–4, write the unit fraction that represents each part of the whole. Next write the number of shaded parts. Then write the fraction of the whole that is shaded.



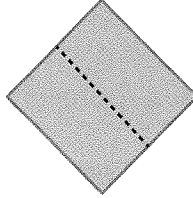
Set C pages 621–626

This shape is $\frac{2}{4}$ of a fabric Tina used in a quilt. You can draw a picture and write a fraction to represent the whole quilt.

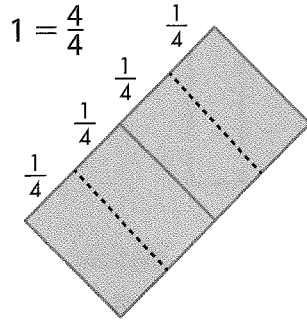


$\frac{2}{4}$ is 2 copies of $\frac{1}{4}$.

Divide the fabric into 2 equal parts.



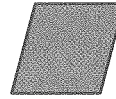
4 copies of $\frac{1}{4}$ makes $\frac{4}{4}$, or 1 whole.



Remember that the denominator shows the total number of equal parts in a whole.

In **1** and **2**, draw a picture and write a fraction to represent the whole.

1. $\frac{1}{4}$



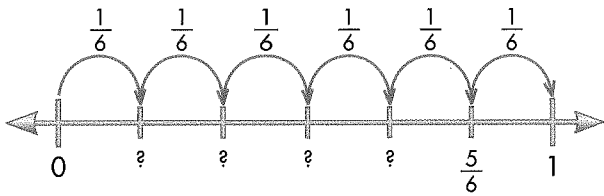
2. $\frac{3}{8}$



Set D pages 627–632

You can show fractions on a number line.

The fraction $\frac{5}{6}$ is labeled. What are the missing fractions?



First, find the unit fraction. The line is divided into six equal lengths. So, the number line shows sixths.

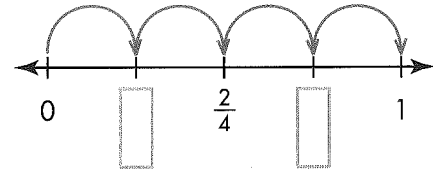
Each jump represents $\frac{1}{6}$. So, the first tick mark is labeled $\frac{1}{6}$. The second tick mark is labeled $\frac{2}{6}$, and so on.

The missing fractions on the number line are $\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, and $\frac{4}{6}$.

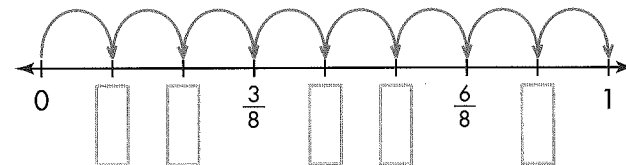
Remember to start by deciding what unit fraction is shown on each number line.

In **1** and **2**, write the missing fractions on each number line.

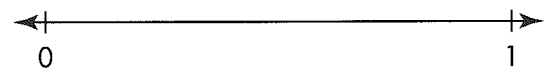
1.



2.



3. Divide the number line below into 3 equal parts and mark $\frac{2}{3}$ on the line.

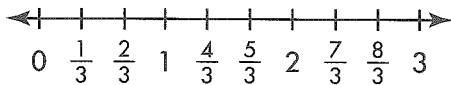


Set E pages 633–638

Number lines can have fractions greater than 1.

The number line below is divided into thirds.

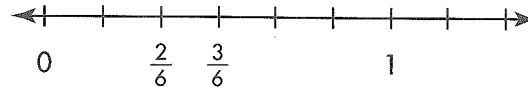
The denominator is 3 because the unit fraction is $\frac{1}{3}$. The numerator shows how many copies of the unit fraction each point is.



Remember that the numerator increases by 1 because each part of the number line is 1 more copy of the unit fraction.

Reteaching
Continued

1. The number line has equal lengths marked. Write the missing fractions.



2. Divide the number line into fourths. Label each point.



Set F pages 639–644

You can use a line plot to show data, such as lengths measured to the nearest half inch.

Steps to make a line plot:

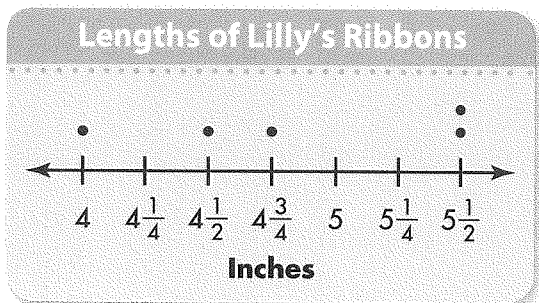
- Draw a number line and choose a scale.
- The scale should show data values from the least to greatest.
- Write a title for the line plot.
- Mark a dot for each value.

Remember to mark a dot for each length. Check your completed line plot against the data in the chart.

Lengths of Lilly's Ribbons				
5 $\frac{1}{2}$ in.	4 in.	5 $\frac{1}{2}$ in.	4 $\frac{1}{2}$ in.	4 $\frac{3}{4}$ in.

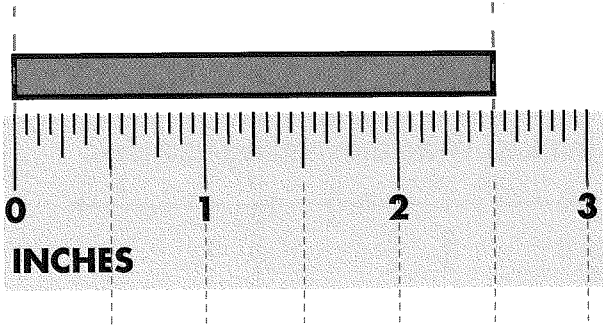
Lengths of Carl's Strings				
3 in.	2 $\frac{3}{4}$ in.	2 $\frac{1}{2}$ in.	2 $\frac{1}{2}$ in.	4 in.
2 $\frac{1}{2}$ in.	3 $\frac{1}{4}$ in.	3 $\frac{3}{4}$ in.	3 $\frac{3}{4}$ in.	3 in.

1. Draw a line plot to show the data.
2. How many strings does Carl have in all?
3. Draw a line that is the same length as the most common string length.



You can measure to different lengths, such as the nearest half inch.

The closest half-inch mark to the right of the rectangle is the $2\frac{1}{2}$ -inch mark.

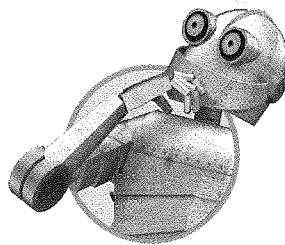


The lengths can be shown on a line plot.

Think about these questions to help you **make sense and persevere** in solving problems.

Thinking Habits

- What do I need to find?
- What do I know?
- What's my plan for solving the problem?
- What else can I try if I get stuck?
- How can I check that my solution makes sense?



Remember to think about the scale of the line plot. It needs to include the least and greatest values.

1. Measure and record the lengths of 5 classroom objects to the nearest half inch. Use objects that are between 1 and 3 inches long.
2. Draw a line plot to show your data.

Remember to make sense of the problem by identifying the quantities. Then use what you know to solve.

Gavin divided his notebook into 8 equal parts. He plans to use 3 parts to take notes for math and 2 parts for reading. He has school from 8:30 A.M. to 3:30 P.M. What fraction of his notebook does he have left?

1. Is there any missing or extra information? Explain.
2. Solve the problem. If information you need is missing, make up some reasonable information for the problem. You can draw a picture to help.