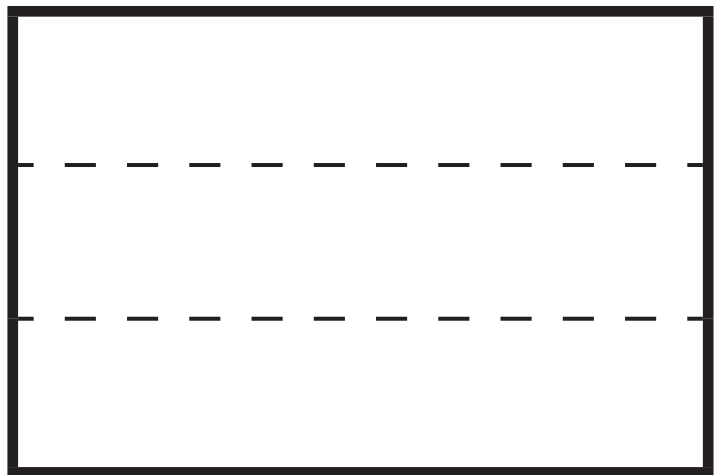
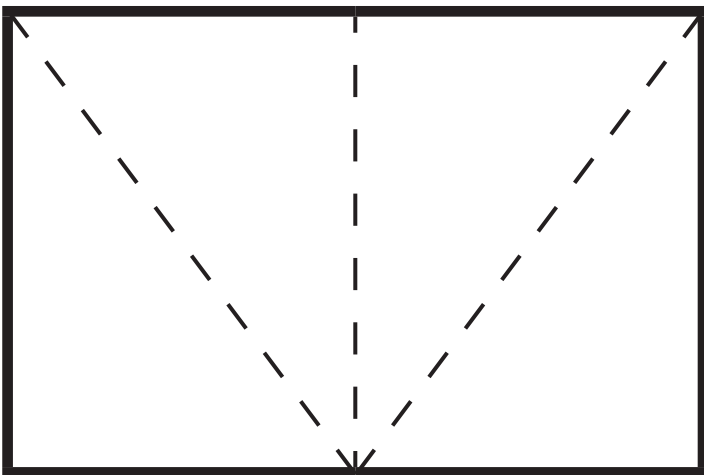
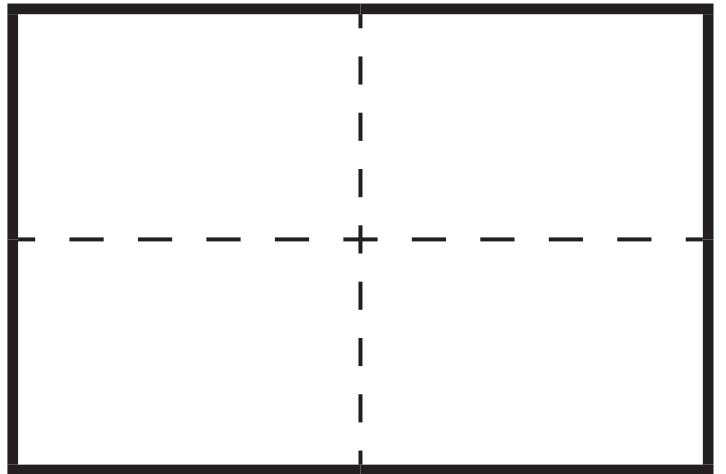
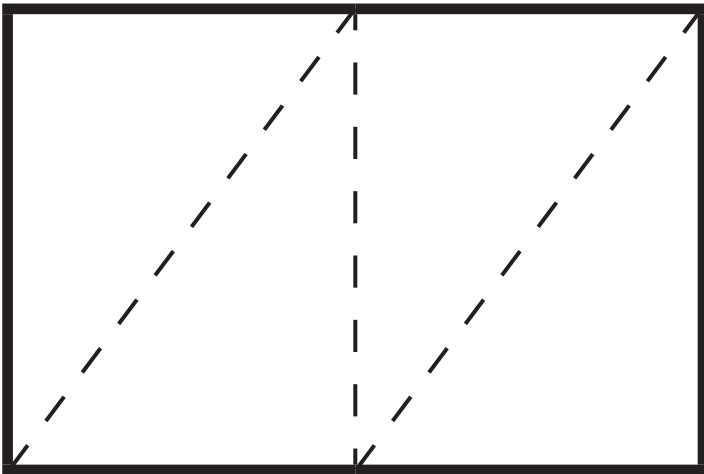
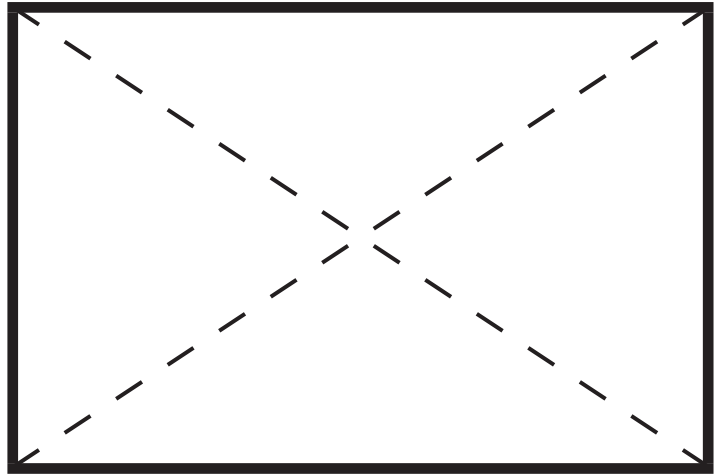
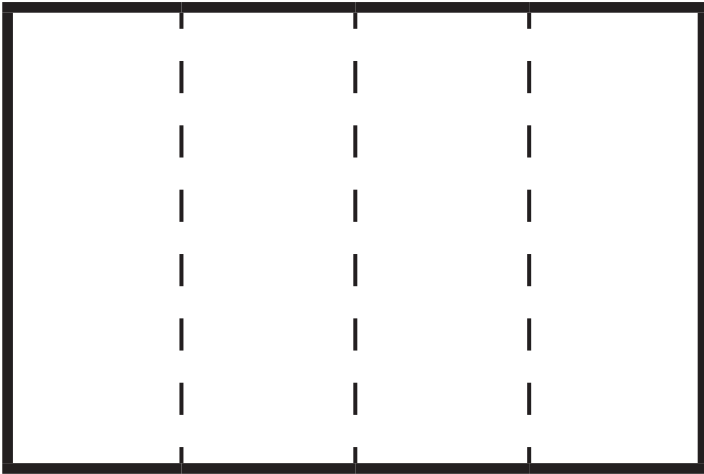




Fraction (or Fractured?) Understanding

Debi DePaul
CAMT 2019

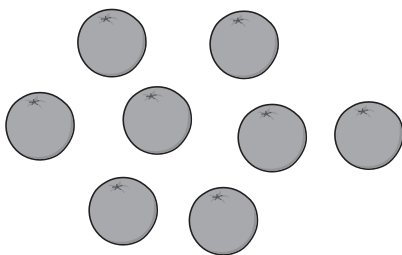


Show $\frac{1}{4}$ in each of these models.

For each model, consider the following questions:

- What is the whole?
- What does equal-sized mean?
- What does the fraction indicate?
- What attribute is the focus?

Set Model:



Area Model:



Length Model:



Number Line Model:



Representing Fractions

Teachers and students need to consider the following:

- The type of quantity (continuous or discrete?) that the model is intended to represent.
- How the whole is defined.
- What equal-sized means in the model.
- What the fraction indicates.



Representing Fractions

Set Model



The number – a discrete (countable) quantity

The whole is determined by a defined **count** of a collection or set.

The **same number** of items represents equal-sized parts.

The fraction indicates the count of objects in the subset compared to the defined set of objects.



Representing Fractions

Area Model



The area – a continuous (measurable) quantity

The whole is determined by the defined **area** or region.

The **same area** represents equal-sized parts.

The fraction indicates the area of the part compared to the area of the whole.



Representing Fractions

Length Model



The length – a continuous (measurable) quantity

The whole is determined by a defined **length**.

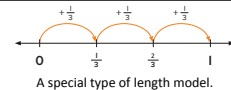
The **same length** represents equal-sized parts.

The fraction indicates the length of the part compared to the length of the whole.



Representing Fractions

Number Line Model



The distance – a continuous (measurable) quantity

The whole is determined by a unit of **distance** from 0 to 1.

The **same distance** represents equal-sized parts.

The fraction indicates the location of a point in relation to the distance from 0 with regard to the defined unit.



Representing Fractions

| Type of Model | Type of Quantity | Whole | Meaning of Equal-Sized Parts | What the Fraction Indicates |
|-------------------|------------------|--|------------------------------|--|
| Set model | discrete | determined by a defined count of a collection or set | same number of items | the count of objects in the subset compared to the defined set of objects |
| Area model | continuous | determined by a defined area or region | same area | the area of the indicated part compared to the area of the indicated whole |
| Length model | continuous | determined by a defined length | same length | the length of the indicated part compared to the length of the indicated whole |
| Number line model | continuous | unit of distance from 0 to 1 | same distance | the location of a point in relation to the distance from 0 with regard to the defined unit |

Step Up

- I. Complete these to show how you would solve each problem. Draw lines and color parts to show each share.

- a. Two slices of banana bread are shared equally by 3 people. How much of one whole slice will be in each share?

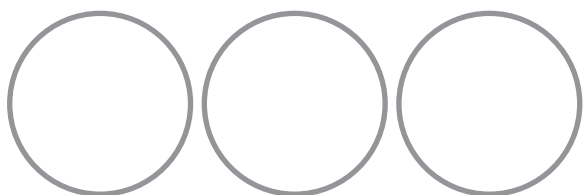


slices shared by

people

$$2 \div \boxed{\quad} = \boxed{\quad}$$

- b. Three pies are shared equally by 8 people. How much of one whole pie will be in each share?



pies shared by

people

$$\boxed{\quad} \div \boxed{\quad} = \boxed{\quad}$$

2. Each large rectangle below is one whole. Complete the sentence, draw lines, and color parts to show each share.

- a. $\frac{3}{5}$ is the same as

divided by



- b. $\frac{4}{7}$ is the same as

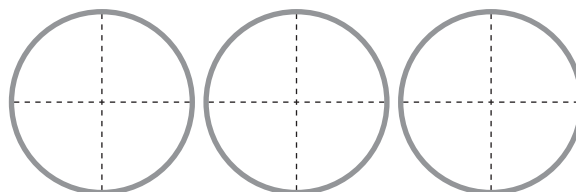
divided by



Step Ahead

Complete the sentences so that the quotient in the division sentence is the same as the product in the multiplication sentence. Then use the diagram to show why they are the same.

$$3 \div 4 = \boxed{\quad} \quad 3 \times \boxed{\quad} = \boxed{\quad}$$



Interpreting Fractions

| Fractions as... | Numerator | Denominator | Meaning of $\frac{3}{4}$ |
|----------------------------|---|---|--|
| Part of a Whole | number of equal-sized parts indicated | number of equal-sized parts in the whole | 3 parts out of 4 equal-sized parts |
| Numbers or Measures | number or count of equal-sized parts (unit fractions) | number of equal-sized parts (unit fractions) needed to create the whole | <ul style="list-style-type: none"> • 3 counts (repetitions) of the unit fraction $\frac{1}{4}$ • $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ |
| Quotients | number of items in the whole | number of shares or equal-sized parts | <ul style="list-style-type: none"> • $3 \div 4$ • the result when divided or shared |