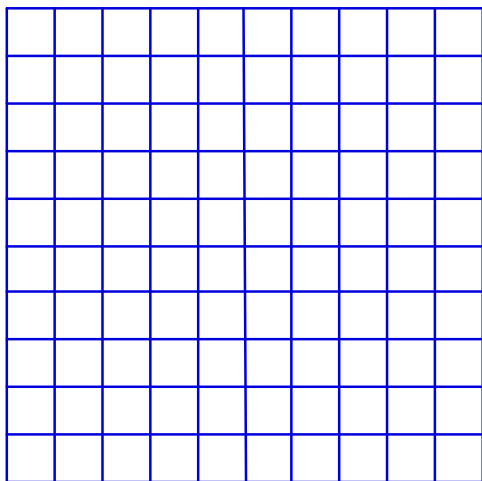
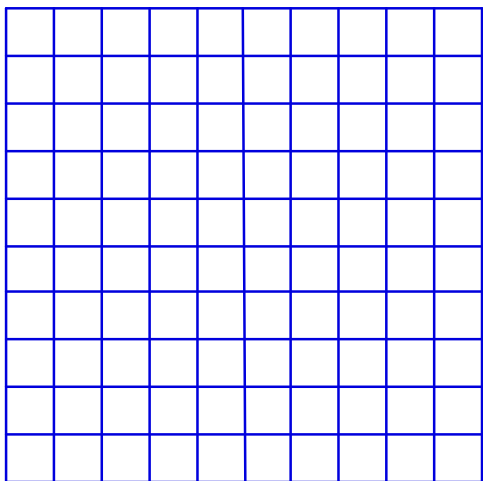
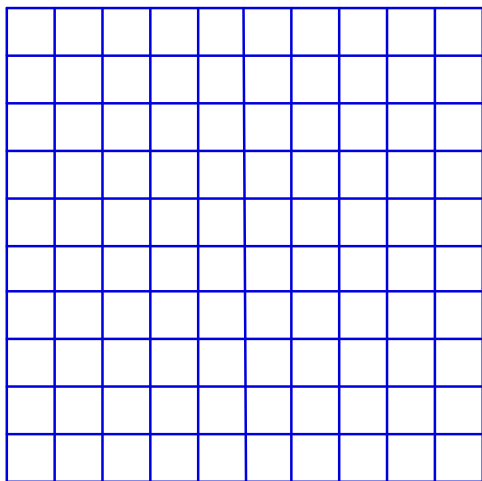
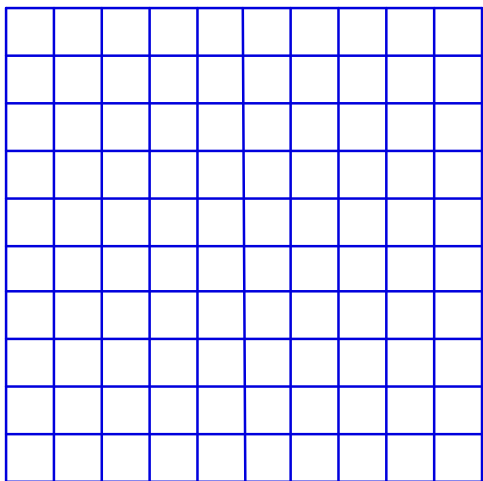
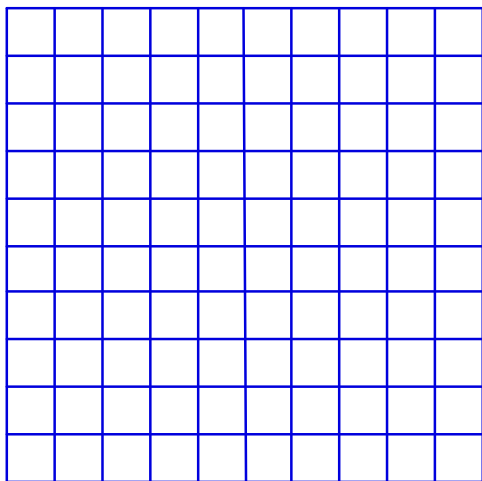
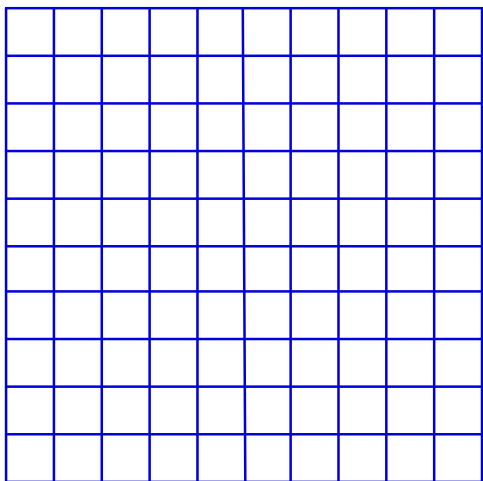
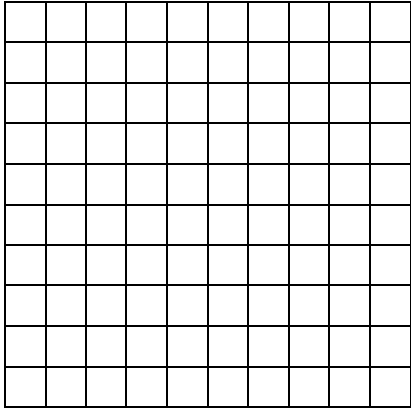


Name _____

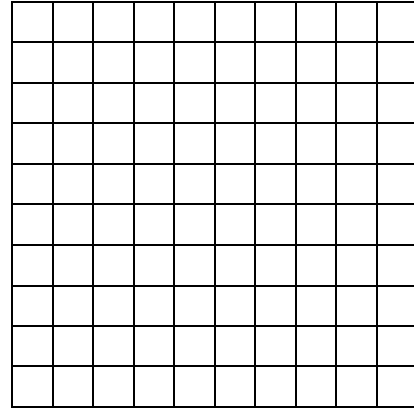


Naming Tenths and Hundredths on a 10 x 10 Grid

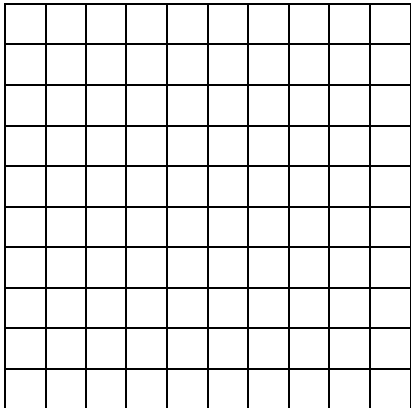
Shade in the amount of the grid noted in each problem.



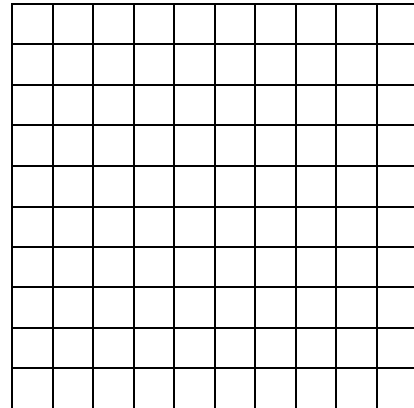
34 – hundredths



$\frac{47}{100}$



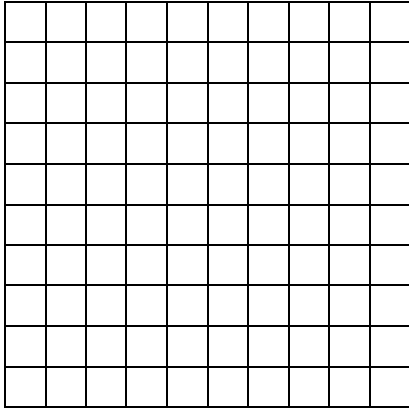
9-tenths and 8 hundredths



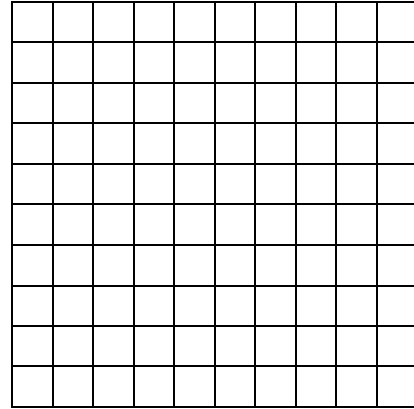
$\frac{5}{10} + \frac{3}{100}$

Naming Tenths and Hundredths on a 10 x 10 Grid

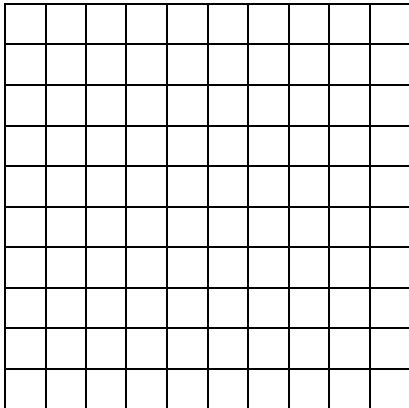
Shade in the amount of the grid noted in each problem.



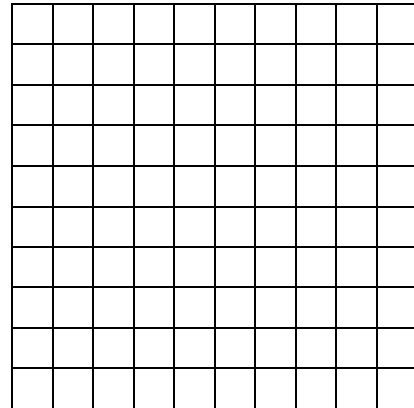
50 – hundredths



$\frac{9}{100}$



1-tenth and 2 hundredths



$\frac{4}{10} + \frac{9}{100}$

Imagine each decimal on a 10 x 10 grid.
Describe each decimal. Then order each set
from greatest to least:

2.32 3.082 2.157

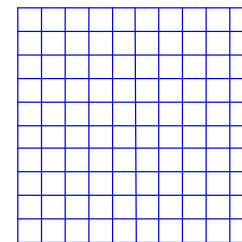
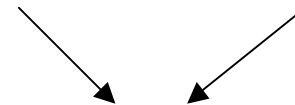
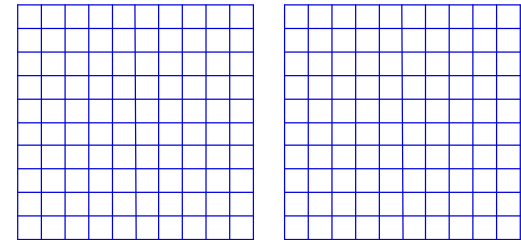
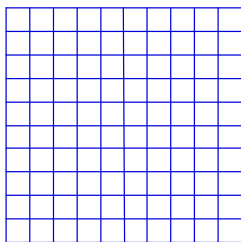
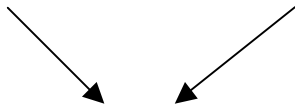
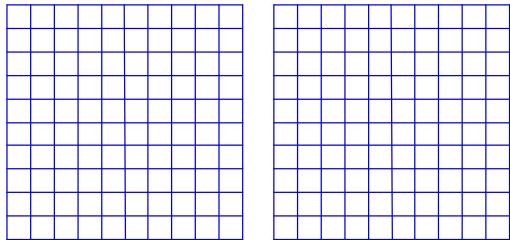
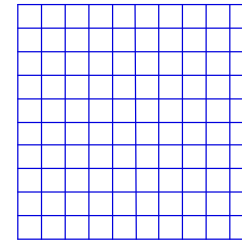
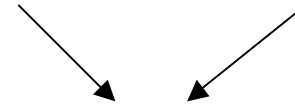
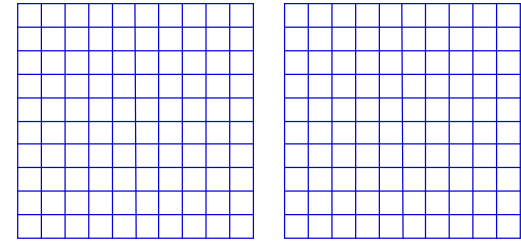
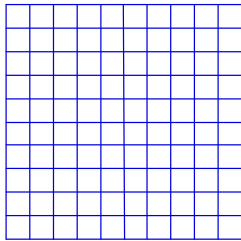
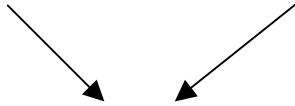
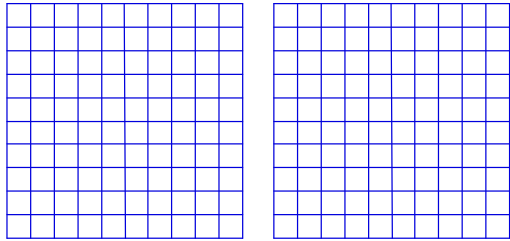
Name three decimals less than one but
greater than $\frac{1}{2}$. Describe what they would
look like on a 10 x 10 grid. How do you
know that they are greater than $\frac{1}{2}$?

Imagine each decimal on a 10 x 10 grid.
Describe each decimal. Which number is the
smallest? How do you know?

0.625
0.25
0.675
0.8

Name three decimals equal to $\frac{1}{2}$. Describe
what they would look like on a 10 x 10 grid
How do you know that they are equal to $\frac{1}{2}$?

Addition/Subtraction Boards



Problems 12A - 12D

Copy and Cut out problems
Organize into envelopes for each group

Problem 12A

Show how you can use decimal equivalents for each fraction to order the fractions from smallest to largest. Use your 10 x 10 grids in your solution.

$$\frac{4}{5} \quad \frac{5}{10} \quad \frac{19}{20} \quad \frac{3}{4}$$

Problem 12B

Raven's tomato plant measured 15.035 cm when she planted it in May. By August it was 85.16 cm tall. How much did her plant grow from May to August?

- Draw a sketch showing the plant in May and in August.
- Estimate the plant growth. Did it grow more or less than 50 cm? More or less than 100 cm? Explain why.
- Show with symbols how to find the exact answer.

Problem 12C

Chee's sunflower plant grew 120.54 cm over the summer. When he planted it in May it measured 12.009 cm in height. How tall was his sunflower plant at the end of the summer?

- Draw a sketch showing the plant in May and at the end of the summer.
- Estimate the plant height. Was it more than 150 cm or less than 150 cm by the end of the summer? Explain why.
- Show with symbols how to find the exact answer.

Problem 12D

Use 10 x 10 grids to show how to order these decimals.

.005 .50 .05 .495 .062 .5

Problems 12E - 12G

Copy and Cut out problems
Organize into envelopes for each group

Problem 12E

Estimate each answer before finding the exact answer. Explain your thinking. Then show how to rewrite the problems so finding the exact answer is easy to do. Find the exact answers.

$$4.7 + 3.94 + .034 =$$

Estimate: Is the answer greater than 10 or less than 10? Is it greater than 400 or less than 400? Is it greater than 6 or less than 6?

$$16.75 - 8.974 =$$

Estimate: Is it greater than 25 or less than 25? Is the answer greater than 10 or less than 10? Is it greater than 6 or less than 6?

$$53 - 4.95 =$$

Estimate: Is the answer greater than 10 or less than 10? Is it greater than 25 or less than 25? Is it greater than 50 or less than 50?

Problem 12F

Imagine a 10 x 10 grid. Picture each decimal below given in words on this grid. Describe what you see in your mind.

Now write each decimal in symbols.

- 12-tenths
- 105-hundredths
- 33-tenths
- 1002-thousandths

Problem 12 G

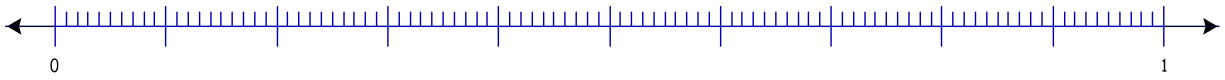
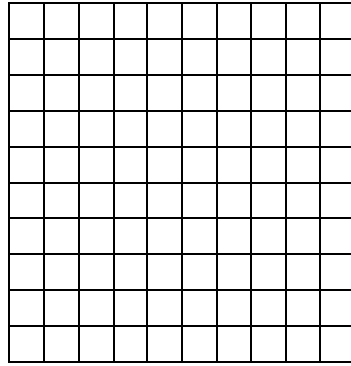
Show this number in multiple ways (fraction, decimal, grid, words, as a sum of two or more decimals or fractions...)

0.327

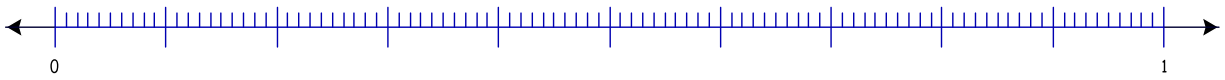
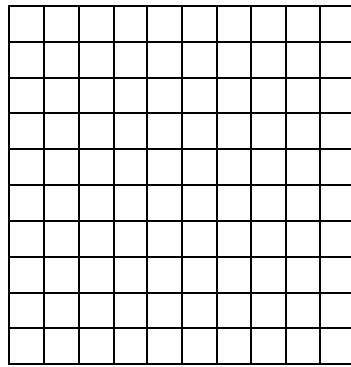
Name _____

Represent each decimal amount on the 10 by 10 grid and on the number line.

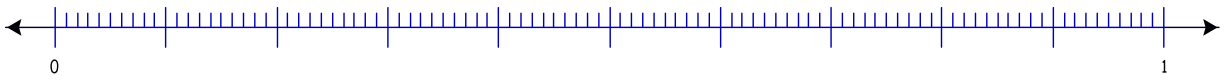
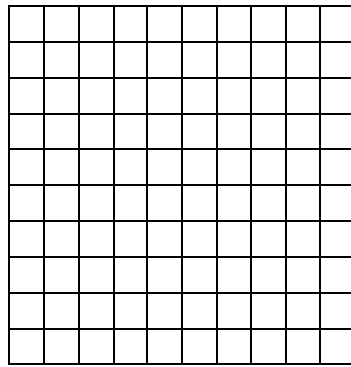
0.09

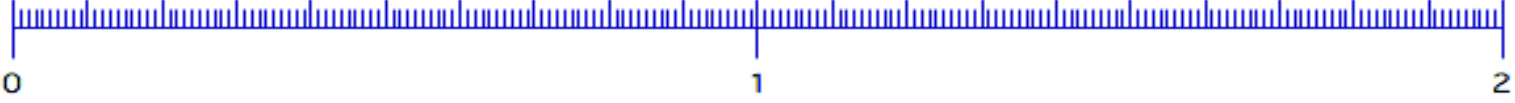
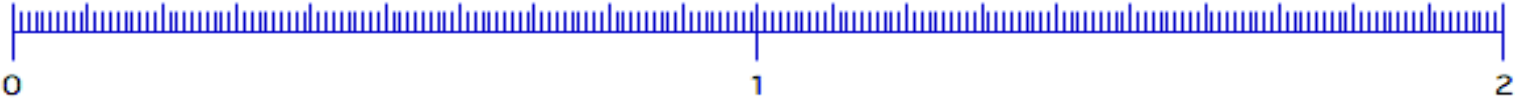
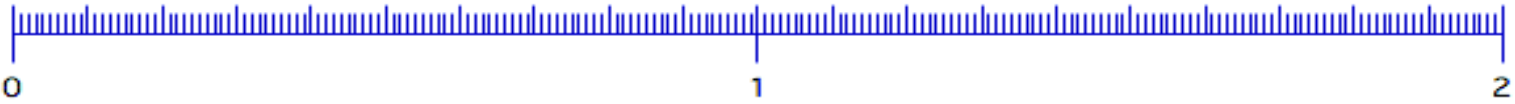


0.46



0.12





Teaching Actions

Ask: How are these number lines alike and different?

4. Present this story problem: Jacob ran $\frac{2}{3}$ of a mile and stopped to tie his shoelaces. He then ran another $\frac{1}{2}$ of a mile. Did he run more or less than one mile?
5. Estimate: Is the amount $>$ or $<$ 1? Greater or less than 2? More or less than $1\frac{1}{2}$?
6. Show the ribbons cut into $\frac{2}{3}$ length and $\frac{1}{2}$ length. Place the ribbons on the first number line (no fractional amounts shown). Mark the spot on the number line that shows the length of the two ribbons combined.
7. Comment on their estimate. Ask: What is the exact amount? You know how to do this with fraction circles. You know how to do this with symbols. Now you need to figure out how to model this on the number line.
8. Ask: Which number line might be the best one to show how much Jacob ran in all? Try their suggestions. Ask students to explain their reasoning.
9. Move the ribbons to the number line partitioned into sixths. Ask: $\frac{2}{3}$ is equal to how many 6ths? $\frac{1}{2}$ is equal to how many 6ths? What is the total number of miles that Jacob ran?
10. Ask: Why is the 6ths number line better for solving this problem than the number line showing 3rds? (Both fractions can be easily modeled on the number line showing 6ths).
11. Ask: How might you use symbols to show what you did on the number line?

Comments

equal parts.

Prepare 2 lengths of ribbon. One is $\frac{2}{3}$ the length of the unit of the number line you drew on the board. The other is $\frac{1}{2}$ the length of the unit.

You may want at this point to step back and let students try to do this on their own as opposed to guiding them through the steps.

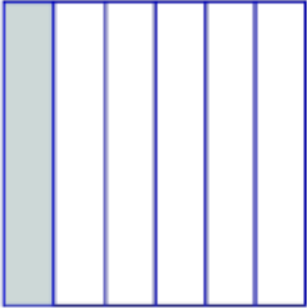
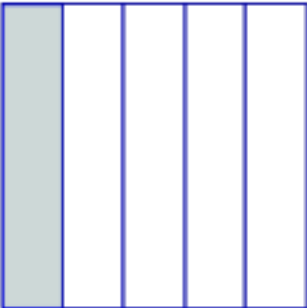
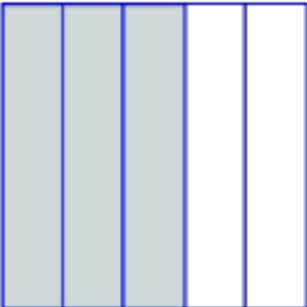
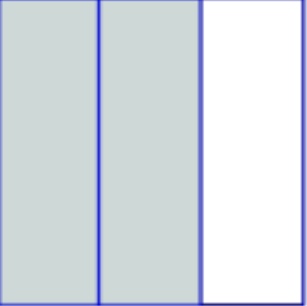
The idea is for students to build on their prior experience with equivalence and operating with fractions and symbols to see that the number line representing the common denominator is the best choice. For example a student working on $\frac{3}{4} + \frac{1}{3} =$ explained that he would use the "12 number line because they both go into it."

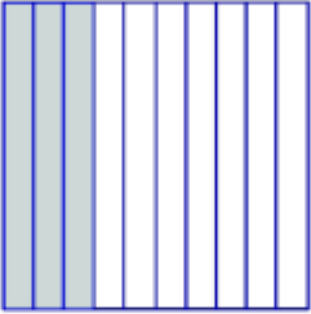
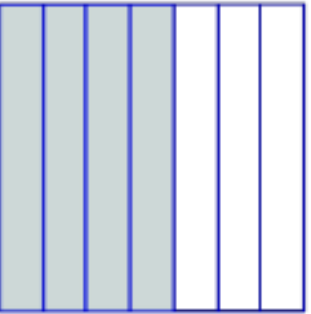
Number line for $\frac{2}{3} + \frac{1}{2}$



Multiplying Fractions

1. Fill in the table below.

Multiplication Problem	Picture	$\frac{\text{\# of darkly shaded pieces}}{\text{\# of total pieces in square}}$	Fraction of the square shaded dark
$\frac{3}{4} \times \frac{1}{6}$		-----	
$\frac{2}{3} \times \frac{1}{5}$		-----	
$\frac{1}{4} \times \frac{3}{5}$		-----	
$\frac{2}{3} \times \frac{2}{3}$		-----	

$\frac{2}{5} \times \frac{3}{10}$		<p>-----</p>	
$\frac{3}{5} \times \frac{4}{7}$		<p>-----</p>	

2. Look for patterns in each row. Explain the patterns you see.

3. Use the pattern you describe in question 2 to the answers to the problems below.

a) $\frac{5}{7} \times \frac{4}{11} =$

b) $\frac{7}{10} \times \frac{3}{17} =$

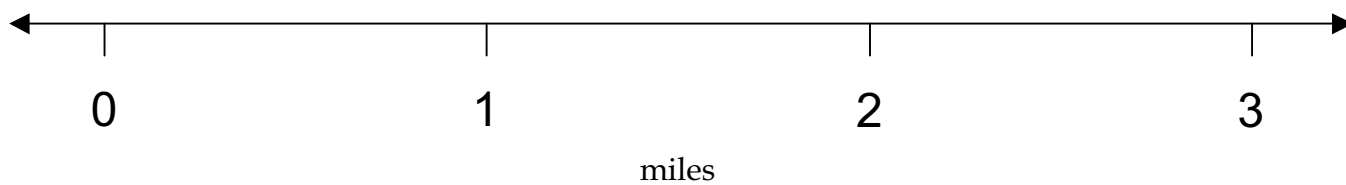
4. Rewrite the pattern you used as a rule for multiplying fractions. Explain why your rule works.

Multiplying Fractions on Number Lines

(fraction \times unit fraction)

1. Molly runs down Colfax Avenue. Each block is $\frac{1}{3}$ of a mile long. She runs 4 blocks before she gets tired and stops.

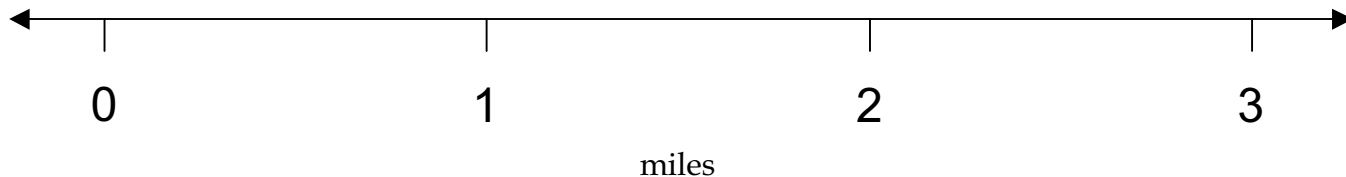
a) Find the exact length of her run using the number line.



b) Write a multiplication sentence that shows how you can find out how far Molly ran. Explain the meaning of each factor.

2. Molly runs down Colfax Avenue again. Each block is $\frac{1}{3}$ of a mile long. She runs $\frac{1}{4}$ of a block before she gets tired and stops.

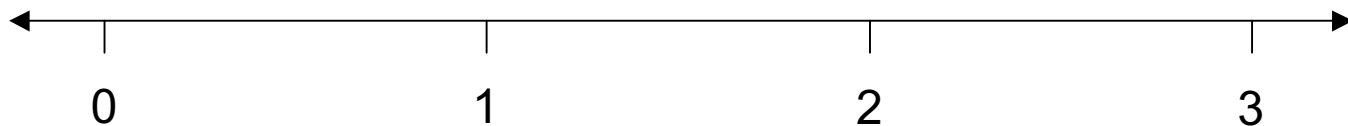
a) Find the exact length of her run using the number line.



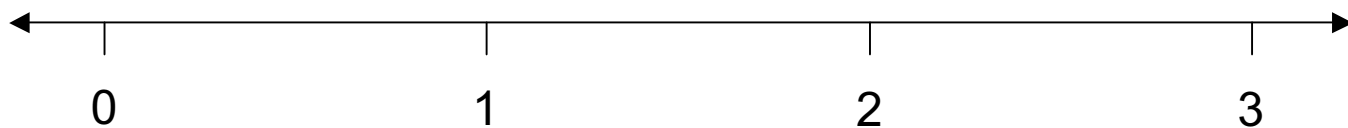
b) Multiplication Sentence:

Find the product of these multiplication problems using the algorithm and the number line.

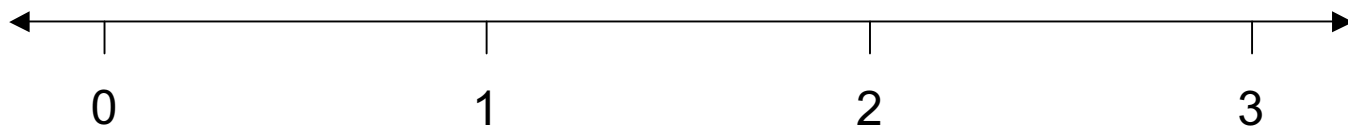
4. $\frac{3}{4} \times \frac{1}{2} = \underline{\hspace{2cm}}$



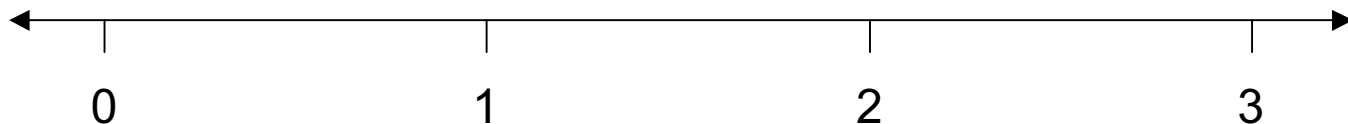
5. $3 \times \frac{2}{5} = \underline{\hspace{2cm}}$



6. $\frac{2}{3} \times \frac{3}{4} = \underline{\hspace{2cm}}$

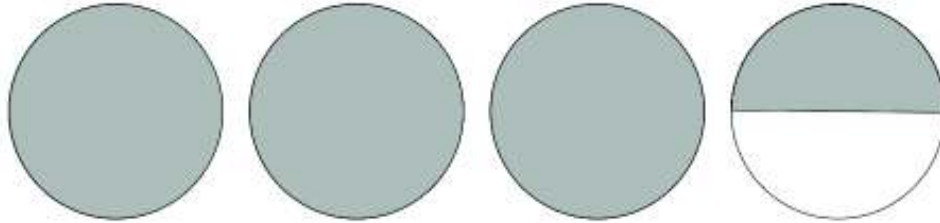


7. $\frac{2}{5} \times \frac{4}{3} = \underline{\hspace{2cm}}$



Dividing Fractions

- 1) A scoop holds $\frac{3}{4}$ cup. How many scoops of birdseed are needed to fill a bird feeder that holds $3\frac{1}{2}$ cups of birdseed? Use fraction circles or the drawing below to solve this problem.

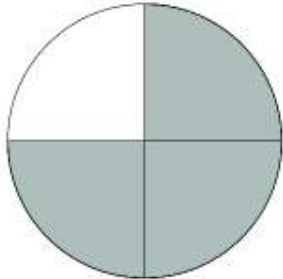


- 2) You bought $2\frac{1}{6}$ pints of ice cream from Ben and Jerry's for your party. You plan on serving each friend about $\frac{2}{6}$ of a pint. How many full servings can you dish out? What part of a serving is left? Draw a picture of your solution below. Explain your solution in words.

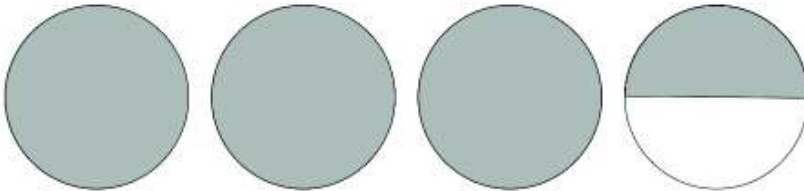


- 3) Use the pictures to solve each problem. Write a number sentence for each one.

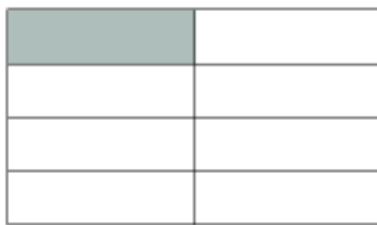
How many $\frac{1}{2}$'s are there in $\frac{3}{4}$ of a circle?



- 4) How many groups of $\frac{3}{4}$ are there in $3\frac{1}{2}$ circles?



- 5) You have $1\frac{1}{8}$ cups of m & m candies. You package them into $\frac{1}{4}$ cup baggies. How many baggies can you make? Include fraction of a package in your answer.



Challenge: You have ribbon $\frac{1}{2}$ yard long. You want to cut the ribbon into pieces $\frac{1}{3}$ yard long. How many pieces can you cut? Is there any extra? Describe that amount?