Grade 6

The Number System
(Multi-digit Whole Numbers, Fractions, Decimals)
6.NS.1-3

Student Pages

Complete the chart.

Expression	Fraction	Ratio	Decimal	Percent (%)	Representation	Verbal
$100 \div 200 =$	½	7songs:14minutes	0.5	50%	■■■ ○○○	*I can download one song every two minutes or ½ of a song every minute.*
			0.25			
						3 people 1/2 lb of chocolate equally.
						Two and two thirds of Mr. Ed's Algebra classes took the test.
						Two-thirds of Ms. Ramos' class was split evenly between Mr. Scott and Ms. Hall.
½ ÷ ¼						
						The number of 3/4-cup servings in 2/3 of a cup of yogurt
						Width of a rectangular strip of land with a length 3/4 mi and an area 1/2 square mi

Journal Question
How can inverse operations be used to check your final answer?
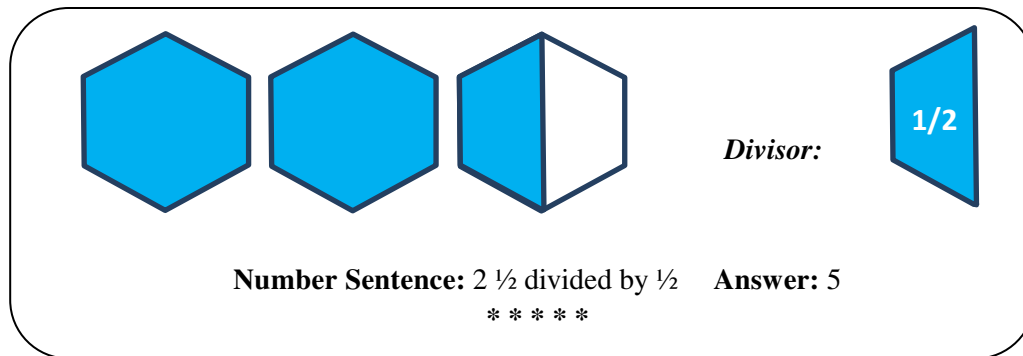
Name: _____   Date: _____

Models can be used to help solve problems involving the division of fractions by fractions.

Divisor:

1/2

Number Sentence: 2 ½ divided by ½   **Answer:** 5

* * * * *

Tonya and Chrissy are trying to understand the following story problem for 1 ÷ 2/3.

One serving of rice is 2/3 of a cup. I ate 1 cup of rice. How many servings of rice did I eat? To solve the problem, Tonya and Chrissy draw a diagram divided into three equal pieces, and shade two of those pieces.
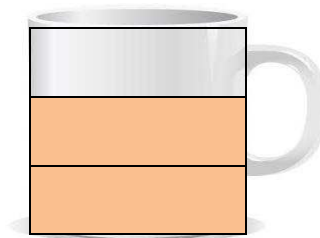
Tonya says, *"There is one 2/3-cup serving of rice in 1 cup, and there is 1/3-cup of rice left over, so the answer should be 11/3."*

Chrissy says, *"The answer is supposed to be 3/2 =1 1/2. Did we do something wrong?"*

- Who is right, Tonya or Chrissy? Explain your reasoning using the diagram.
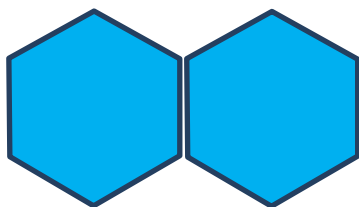
Name: _____   Date: _____

Write the number sentence that expresses the model then find the answer.

Divisor: **1/3**

Number Sentence: _____   **Answer:** _____

Divisor: **2/3**

Number Sentence: _____   **Answer:** _____

Divisor
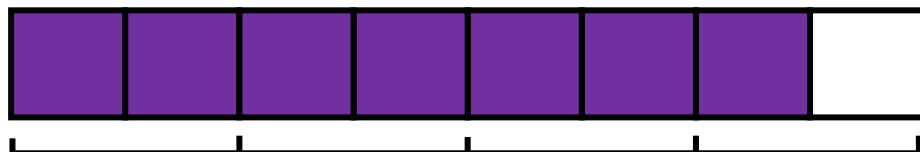
Number Sentence: _____   **Answer:** _____

Journal Question

Divisor

Number Sentence: _____   **Answer:** _____

Name: _____   Date: _____

1. Create a model to prove that 2 ½ divided by ½ equals 5.

2. Andy wants to buy 3 1/3 cups of cashews. There are 5/6 cup of cashews in each package. How many packages of cashews should Andy buy?

3. Vincent uses $2\frac{1}{2}$ cups of flour for every 12 muffins that he makes. What is the total number of cups of flour Vincent will use to make 6 muffins?

4. Draw the mathematical model that fits the scenario below:
   If 1/2 cup of water fills 2/3 of a plastic container, how many containers will 1 cup fill?

5. 3 people share $\frac{1}{2}$ pound of chocolate. How much of a pound of chocolate does each person get?

6. What is the quotient of 3/4 divided by 3/5?

7. Represent $\frac{1}{2} \div \frac{2}{3}$ in a problem context and draw a model to show your solution.

TRAFFIC JAM

You are stuck in a big traffic jam on the freeway and you are wondering how long it will take to get to the next exit which is 1 $\frac{1}{2}$ miles away. You are timing your progress and find that you can travel 2/3 of a mile in one hour. If you continue to make progress at this rate, how long will it be until you reach the exit? Solve the problem with a diagram and explain your answer.

NEXT EXIT

Journal Question

Using only one cut, how would you divide 7 pieces of licorice among 5 people so that each person gets the exact same amount of licorice without bending the licorice?

• Show your work using drawings, numbers and words
• Explain your strategy for solving the problem
• Verify your answer another way

Name: _____   Date: _____

1. Manny has $\frac{1}{2}$ yard of fabric to make book covers. Each book is made from $\frac{1}{8}$ yard of fabric. How many book covers can Manny make?

2. One mug of hot chocolate uses 2/3 cup of cocoa powder. How many mugs can Nelli make with 3 cups of cocoa powder?
    a. Solve the problem by drawing a picture.

    b. Explain how you can see the answer to the problem in your picture.

    c. Which of the following multiplication or divisions equations represents this situation? Explain your reasoning.

    $3 \times 2/3 = \square$ $3 \div 2/3 = \square$ $2/3 \div 3 = \square$

    d. Solve the arithmetic problem you chose in part (c) and verify that you get the same answer as you did with your picture.

3. A recipe for hot chocolate calls for 3 cups of milk. What fraction of the recipe can Nelli make with 2/3 cups of milk?

   a. Solve the problem by drawing a picture.

   b. Explain how you can see the answer to the problem in your picture.

   c. Which of the following multiplication or divisions equations represents this situation? Explain your reasoning.

   $$3\times2/3 = \Box \qquad 3\div2/3 = \Box \qquad 2/3 \div3= \Box$$

   d. Solve the arithmetic problem you chose in part (c) and verify that you get the same answer as you did with your picture.

4. A sixth-grade class will clean a beach that is 3 ½ miles long.

   - The class will divide into 4 groups.
   - Each group will clean an equal length of beach.

   What is the length of beach each group will clean?

Name: _____   Date: _____

1. It requires 1/4 of a credit to play a video game for one minute.

   - Emma has 7/8 credits. Can she play for more or less than one minute? Explain how you know.

   - How long can Emma play the video game with her 7/8 credits?

2. Tamia has to finish reading the last 22 ¾ pages the book of The Giver for homework. If it take her 2 ½ minutes to read one page, how long will it take her to finish the book?

3. Alice, Raul, and Maria are baking cookies together. They need $\frac{3}{4}$ cup of flour and $\frac{1}{3}$ cup of butter to make a dozen cookies. They each brought the ingredients they had at home.

> Alice brought 2 cups of flour and 1/4 cup of butter, Dave brought 1 cup of flour and 1/2 cup of butter, and Maria brought $1\frac{1}{4}$ cups of flour and $\frac{3}{4}$ cup of butter.

If the students have plenty of the other ingredients they need (sugar, salt, baking soda, etc.), how many whole batches of a dozen cookies each can they make?

4. The shaded part below is one-fourth of some rectangle. Draw the rectangle.
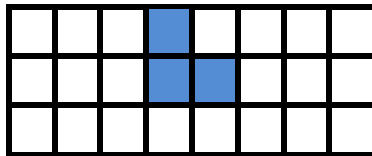
Name: _____   Date: _____

1. Dan observes that

$$6/10 \div 2/10 = 6 \div 2$$

   He says, "*I think that if we are dividing a fraction by a fraction with the same denominator, then we can just divide the numerators.*" Is Dan's conjecture true for all fractions? Explain how you know.

2. Rosa ran 1/3 of the way from her home to school. She ran 1/4 mile. How far is it between her home and school?

3. A yard is equal to 36" and 12" make a foot. A half foot is what fraction of a yard?

4. The highest mountain on the moon is Mount Huygens. It is about 5 ½ kilometers in height. Mount Everest, the highest mountain on earth, is about 8 4/5 kilometers in height. How many times taller Mount Everest than Mount Huygens?

5. ½ of a gallon of milk is being poured in to smaller containers that each hold 1/3 of a gallon of milk. How many small containers can be filled?

Skills Practice:

a. If you can find $\frac{7}{8} \div \frac{1}{2}$, how do you find $3 \, \frac{7}{8} \div \frac{1}{2}$?

b. If you can find $\frac{7}{9} \div \frac{1}{3}$, how do you find $\frac{7}{9} \div \frac{2}{3}$?

c. If you can find $1 \div \frac{1}{3}$, how do you find $2 \div \frac{1}{3}$?

Use the computation shown below to find the products below:

$$
\begin{array}{r}
189 \\
16{\overline{\smash{)}}3024} \\
\underline{16} \\
142 \\
\underline{128} \\
144 \\
\underline{144} \\
0
\end{array}
$$

a. 189×16

b. 80×16

c. 9×16

Journal Question

Explain how multiplication and division are related.

Name: _____   Date: _____

1. A student's incorrect work is shown below. Explain the mistake that the student made.

$$
\begin{array}{r}
32 \\
14 \overline{)4214} \\
\underline{42} \\
14 \\
\underline{14} \\
0
\end{array}
$$

2. How many sets of 32 are in the number 2144?

3. 122 students were split into groups to go on vans for a class trip. If each van held 14 students then how many vans were needed? Was each van full? Give a graphic example of your answer.

4. At a rally for Earth Day there were 43 buses that carried an average of 82 passengers each. How many passengers made the rally from the buses?

Skills Practice

a. $1566 \div 58$

b. $6622 \div 77$

c. $3225 \div 43$

d. $2838 \div 66$

e. $1488 \div 28$

Name: _____   Date: _____

1. Joan has 688 bananas stored in boxes. If there are 86 boxes, how many bananas must go in each box?

2. Elizabeth wants to split a collection of cards into groups of 75. Elizabeth has 4,650 cards. How many groups will be created?

3. Jerry has 3,572 Skittles stored in boxes. If there are 38 boxes, how many Skittles must go in each box?

4. Phillip has 1,425 tickets. If he shares them among 57 friends, how many tickets does each friend get?

5. Atomic fireballs come in packages of 5. Craig ate 77 Atomic Fireballs. How many whole boxes did he eat and how many Atomic Fireballs does he have left?

6. Ms. Beltran wrote the equation below on a chalkboard.

$$\blacksquare \div 42 = 21$$

If the equation Ms. Beltran wrote is true, which of the following equations must also be true?
A. $\blacksquare = 21 \div 42$
B. $\blacksquare = 21 \times 42$
C. $\blacksquare = 42 \div 21$
D. $\blacksquare = 21 + 42$.

Explain how you know

Skills Practice

a. $4352 \div 64$

b. $2145 \div 39$

c. $320 \div 96$

d. $81815 \div 91$

e. $18468 \div 57$

Name: _____   Date: _____

1. Christina has 1,840 blocks. If she shares them among 23 friends, how many blocks does each friend get?

2. Alice wants to split a collection of stickers into groups of 70. Alice has 6,440 stickers. How many groups will be created?

3. The school is planning a field trip. There are 774 students and 43 seats on each school bus. How many buses are needed to take the trip?

4. 8,456 divided by 32 is equal to what value?

Skills Practice

a. $10791 \div 56$ b. $8778 \div 85$ c. $343 \div 49$ d. $13755 \div 35$ e. $156 \div 72$

1. Sandra has 6 grandchildren, and she gave each of them $24.50. How much money did she give to her grandchildren altogether?

2. Nita gave each of her grandchildren $42.50. If she gave a total of $340, how many grandchildren does Nita have?

3. Helen gave each of her 7 grandchildren an equal amount of money. If she gave a total of $227.50, how much did each grandchild get?

4. Bernie is using a jug containing 1.6-gallon of water to fill paper cups for the fans at a Baseball game. Complete the table below to determine *how much of the jug* will be used to fill a paper cup that holds 0.05 gallons of water.

Bottles	1					
Gallons of Water	1.6	0.8	0.4	0.2	0.1	0.05

Journal Question

How does one decimal place relate to the one next to it? How can this help us to multiply or divide numbers?

Name: _____   Date: _____

1. Sophia's dad paid $43.25 for 12.5 gallons of gas. What is the cost of one gallon of gas?

2. Jayden has $20.56. He buys an apple for 79 cents and a granola bar for $1.76.

    a. How much money did Jayden spend?

    b. How much money does Jayden have now?

3. In a competition, each student is able to run the 100-meter twice. Each student below beat their first time. Which student had the greatest difference between their 1st and 2nd trials?

Student	1st Trial (seconds)	2nd trial (seconds)
Paulie	15.2	14.76
Vickie	16.1	15.5
Bruce	16.7	15.8
Herrera	18.23	18.0

4. A large bottle of Gold Peak iced tea holds 0.8 of a liter. How much iced tea is in 31 large bottles?

5. A large loaf of bread weighs 60 ounces. Show how much 0.25 of a large loaf weighs, 0.50 of a large loaf weighs, and 0.75 of a large loaf weighs.

6. A string is 18 inches. Domenic cut 2.45 inches from the string. What is the length of the remaining string?

Name: _____   Date: _____

1. To make cherry flavored ice, Adrienne uses a 0.6-gallon bottle of cherry soda to fill ice cube trays. If each cube holds 0.03 gallons of cherry soda, how many ice cubes will she make using one bottle of the soda?

2. Jane's mom needs to buy enough gas to fill up her car's tank. She will need 15 gallons. There is a Shell station 3 blocks from her home that sales the gas for $1.19/gallon. There is a Speedway station one mile away that sales the gas for $1.07/gallon. How much money will it cost her to buy gas at each station? How much will she save by going to Speedway?

3. Use the chart below to answer the following questions:

Hundreds	Tens	Ones	Tenths	Hundredths
●●●●	●●	●●●●●		●●●●● ●●●

- What is the value represented in the place value chart?

- Create a chart similar to the one above to generate a number that is 10 times the number represented in problem 3.

- Create a chart similar to the one above to generate a number that is 0.1 times the number represented in problem 3.

- Create a chart similar to the one above to generate a number that is 0.25 times the number represented in problem 3.

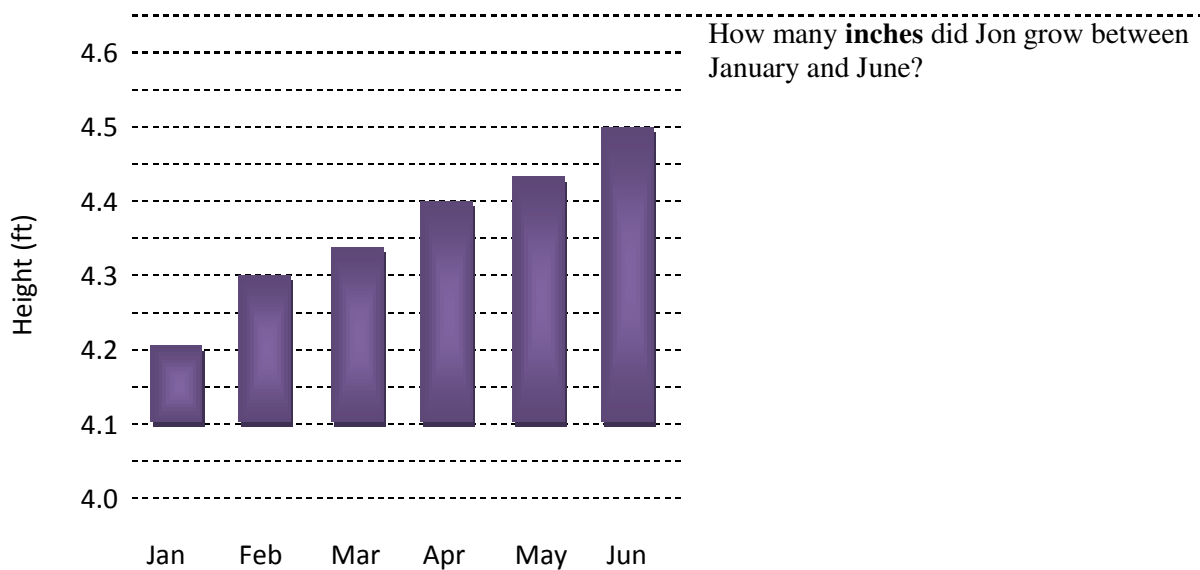| Hundreds	Tens	Ones	Tenths	Hundredths

Name: _____   Date: _____

1. Mila parked her car at a lot that charges $0.25 per every half hour. She parked at 10:30AM . How much will she owe at 1PM?

2. Jon began marking his height in January 2012. Each month, he'd mark his new height.

How many **inches** did Jon grow between January and June?

Height (ft)

4.6
4.5
4.4
4.3
4.2
4.1
4.0

Jan   Feb   Mar   Apr   May   Jun

3. 5.02 ÷ ☐ = .0502 Which choice completes this equation? How do you know?

    a. 10,000
    b. 1,000
    c. 100
    d. 10

4. Phylisha made three cookie dough batches. Their weights were 14.7 oz, 15 oz, and 14.68 oz. What was the total weight of all of the cookie dough?

Name: _____   Date: _____

Taylor and Anya live 67.5 miles apart. Taylor is a very consistent bike rider - she finds that her speed is always very close to 12.5 miles per hour. Anya rides more slowly than Taylor, but she is working out and so she is becoming a faster rider as the weeks go by.

1. How long would it take Taylor to ride the 67.5 miles?

2. If Anya rides at 5 miles per hour, how long will it take her to cover the same distance?

3. Sometimes on a Saturday, they ride their bikes toward each other's houses and meet somewhere in between. Make a table showing how far apart the two friends are after zero hours, one hour, two hours, three hours, and four hours.

4. After riding for 30 minutes, how far apart will the girls be from each other?

5. If the girls both start out at 8AM, at approximately what time will the two friends meet? Explain your thinking?