

MSP

Grade 6 Module 2

Lesson Refreshers

&

Homework Starters

Problem Set

Find the value of each of the following in its simplest form.

1.

a. $\frac{1}{3} \div 4$

b. $\frac{2}{5} \div 4$

c. $\frac{4}{7} \div 4$

2.

a. $\frac{2}{5} \div 3$

b. $\frac{5}{6} \div 5$

c. $\frac{5}{8} \div 10$

3.

a. $\frac{6}{7} \div 3$

b. $\frac{10}{8} \div 5$

c. $\frac{20}{6} \div 2$

4. 4 loads of stone weigh $\frac{2}{3}$ ton. Find the weight of 1 load of stone.

5. What is the width of a rectangle with an area of $\frac{5}{8}$ in² and a length of 10 inches?

6. Lenox ironed $\frac{1}{4}$ of the shirts over the weekend. She plans to split the remainder of the work equally over the next 5 evenings.

- a. What fraction of the shirts will Lenox iron each day after school?
- b. If Lenox has 40 shirts, how many shirts will she need to iron on Thursday and Friday?

7. Bo paid bills with $\frac{1}{2}$ of his paycheck and put $\frac{1}{5}$ of the remainder in savings. The rest of his paycheck he divided equally among the college accounts of his 3 children.

- a. What fraction of his paycheck went into each child's account?
- b. If Bo deposited \$400 in each child's account, how much money was in Bo's original paycheck?

SC

Handwritten work for problem 7:

$\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$
 $+\frac{1}{10} \times \frac{1}{1} = \frac{1}{10}$
 $\frac{5}{10} + \frac{1}{10} = \frac{6}{10} = \frac{3}{5}$

* $\frac{3}{5}$ of Bo's paycheck goes to bills and savings. This leaves $\frac{2}{5}$ of his paycheck for college accounts.

$\frac{2}{3} \div 3 = \frac{2}{9}$

$\frac{2}{15}$ of Bo's paycheck in each child's account.

Problem Set

Rewrite each problem as a multiplication question. Model your answer.

1. Nicole used $\frac{3}{8}$ of her ribbon to wrap a present. If she used 6 feet of ribbon for the present, how much ribbon did Nicole have at first?
2. A Boy Scout has 3 meters of rope. He cuts the rope into cords $\frac{3}{5}$ m long. How many cords will he make?
3. 12 gallons of water fill a tank to $\frac{3}{4}$ capacity.
 - a. What is the capacity of the tank?
 - b. If the tank is then filled to capacity, how many half-gallon bottles can be filled with the water in the tank?
4. Hunter spent $\frac{2}{3}$ of his money on a video game before spending half of his remaining money on lunch. If his lunch costs \$10, how much money did he have at first?
5. Students were surveyed about their favorite colors. $\frac{1}{4}$ of the students preferred red, $\frac{1}{8}$ of the students preferred blue, and $\frac{3}{5}$ of the remaining students preferred green. If 15 students preferred green, how many students were surveyed?
6. Mr. Scruggs got some money for his birthday. He spent $\frac{1}{5}$ of it on dog treats. Then, he divided the remainder equally among his 3 favorite charities.
 - a. What fraction of his money did each charity receive?
 - b. If he donated \$60 to each charity, how much money did he receive for his birthday?

(50) a) $\frac{4}{5} \div 3 = \frac{1}{3} \times \frac{4}{5} = \frac{4}{15}$

Each charity received $\frac{4}{15}$ of Mr. Scruggs's birthday money.

b) $60 \div \frac{4}{15}$



4 units = \$60

1 unit = \$60 $\div 4 = 15$

15 \times \$15 = \$225

Mr. Scruggs got \$225
engage ny **S.11**

for his birthday

Lesson Summary

When dividing a fraction by a fraction with the same denominator, we can use the general rule $\frac{a}{c} \div \frac{b}{c} = \frac{a}{b}$.

Problem Set

For the following exercises, rewrite the division expression in unit form. Then, find the quotient. Draw a model to support your answer.

1. $\frac{4}{5} \div \frac{1}{5}$

2. $\frac{8}{9} \div \frac{4}{9}$

3. $\frac{15}{4} \div \frac{3}{4}$

4. $\frac{13}{5} \div \frac{4}{5}$

Rewrite the expression in unit form, and find the quotient.

5. $\frac{10}{3} \div \frac{2}{3}$

6. $\frac{8}{5} \div \frac{3}{5}$

7. $\frac{12}{7} \div \frac{12}{7}$

Represent the division expression using unit form. Find the quotient. Show all necessary work.

8. A runner is $\frac{7}{8}$ mile from the finish line. If she can travel $\frac{3}{8}$ mile per minute, how long will it take her to finish the race?

9. An electrician has 4.1 meters of wire.

- a. How many strips $\frac{7}{10}$ m long can he cut?
- b. How much wire will he have left over?

10. Saeed bought $21\frac{1}{2}$ lb. of ground beef. He used $\frac{1}{4}$ of the beef to make tacos and $\frac{2}{3}$ of the remainder to make quarter-pound burgers. How many burgers did he make?

11. A baker bought some flour. He used $\frac{2}{5}$ of the flour to make bread and used the rest to make batches of muffins.

If he used 16 lb. of flour making bread and $\frac{2}{3}$ lb. for each batch of muffins, how many batches of muffins did he make?

Handwritten work for problem 11:
 16 is $\frac{2}{5}$ of what size?
 2 units = 16
 1 unit = $16 \div 2 = 8$
 3 units = $3 \times 8 = 24$
 24 lbs of flour
 $24 \div \frac{2}{3} = 36$
 72 thirds \div 2-thirds = 36

(50)

** Baker made 36 batches of muffins*

Problem Set

Calculate the quotient. If needed, draw a model.

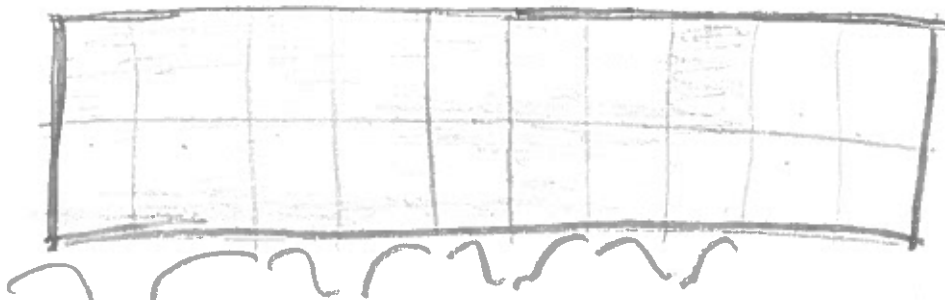
1. $\frac{8}{9} \div \frac{4}{9}$

2. $\frac{9}{10} \div \frac{4}{10}$

3. $\frac{3}{5} \div \frac{1}{3}$

4. $\frac{3}{4} \div \frac{1}{5}$

cf) $\frac{15}{20} \div \frac{4}{20} = 15 \text{ twentieths} \div 4 \text{ twentieths} = \frac{15}{4}$



$1 + 1 + 1 + \frac{3}{4} = 3\frac{3}{4}$

$\frac{4}{4} + \frac{4}{4} + \frac{4}{4} + \frac{3}{4} = \frac{15}{4}$

9. An athlete plans to run 3 miles. Each lap around the school yard is $\frac{3}{7}$ mile. How many laps will the athlete run?

10. Parks spent $\frac{1}{3}$ of his money on a sweater. He spent $\frac{3}{5}$ of the remainder on a pair of jeans. If he has \$36 left, how much did the sweater cost?

$$\frac{2}{3} \times \frac{2}{3} = \frac{6}{15}$$

$$\frac{1}{3} + \frac{6}{15} = \frac{11}{15}$$

$\frac{4}{15}$ of Park's money is left over.

\$36 is $\frac{4}{15}$ of what number?

$$4 \text{ units} = 36$$

$$1 \text{ unit} = 36 \div 4 = 9$$

$$5 \text{ units} = 5 \times 9 = 45$$

The sweater cost \$45.

Problem Set

Solve.

1. $\frac{15}{16}$ is 1 sixteenth groups of what size?
2. $\frac{7}{8}$ teaspoons is $\frac{1}{4}$ groups of what size?
3. A 4-cup container of food is $\frac{2}{3}$ groups of what size?
4. Write a partitive division story problem for $6 \div \frac{3}{4}$.
5. Write a partitive division story problem for $\frac{5}{12} \div \frac{1}{6}$.
6. Fill in the blank to complete the equation. Then, find the quotient, and draw a model to support your solution.
 - a. $\frac{1}{4} \div 7 = \frac{1}{\square} \text{ of } \frac{1}{4}$
 - b. $\frac{5}{6} \div 4 = \frac{1}{\square} \text{ of } \frac{5}{6}$
7. There is $\frac{3}{5}$ of a pie left. If 4 friends wanted to share the pie equally, how much would each friend receive?
8. In two hours, Holden completed $\frac{3}{4}$ of his race. How long will it take Holden to complete the entire race?
9. Sam cleaned $\frac{1}{3}$ of his house in 50 minutes. How many hours will it take him to clean his entire house?
10. It took Mario 10 months to beat $\frac{5}{8}$ of the levels on his new video game. How many years will it take for Mario to beat all the levels?
11. A recipe calls for $1\frac{1}{2}$ cups of sugar. Marley only has measuring cups that measure $\frac{1}{4}$ cup. How many times will Marley have to fill the measuring cup?

Sc

$$1\frac{1}{2} + \frac{1}{4} = \frac{3}{2} - \frac{1}{4} = \frac{6}{4} + \frac{1}{4} = \frac{7}{4} = 1\frac{3}{4}$$

Marley will have to use the measuring cup 6 times.

Lesson Summary

Connecting models of fraction division to multiplication through the use of reciprocals helps in understanding the *invert and multiply* rule. That is, given two fractions $\frac{a}{b}$ and $\frac{c}{d}$, we have the following:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$$

Problem Set

Invert and multiply to divide.

1.

a. $\frac{2}{3} \div \frac{1}{4}$

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

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

2.

a. $\frac{1}{3} \div \frac{1}{4}$

b. $\frac{1}{8} \div \frac{3}{4}$

c. $\frac{9}{4} \div \frac{6}{5}$

3.

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

b. $\frac{3}{5} \div \frac{3}{2}$

c. $\frac{22}{4} \div \frac{2}{5}$

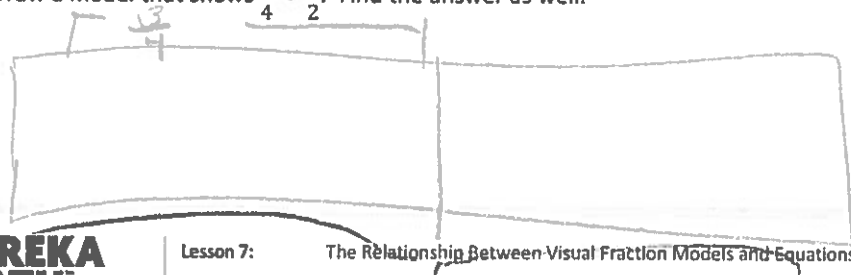
4. Summer used $\frac{2}{5}$ of her ground beef to make burgers. If she used $\frac{3}{4}$ pounds of beef, how much beef did she have at first?

5. Alistair has 5 half-pound chocolate bars. It takes $1\frac{1}{2}$ pounds of chocolate, broken into chunks, to make a batch of cookies. How many batches can Alistair make with the chocolate he has on hand?

6. Draw a model that shows $\frac{2}{5} \div \frac{1}{3}$. Find the answer as well.

7. Draw a model that shows $\frac{3}{4} \div \frac{1}{2}$. Find the answer as well.

Sc



$$\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \times \frac{2}{1} = \frac{6}{4} = 1\frac{1}{2}$$

Problem Set

Calculate each quotient.

1. $\frac{2}{5} \div 3\frac{1}{10}$

2. $4\frac{1}{3} \div \frac{4}{7}$

3. $3\frac{1}{6} \div \frac{9}{10}$

4. $\frac{5}{8} \div 2\frac{7}{12}$

SC

$$\frac{5}{8} \div \frac{31}{12}$$

$$\frac{5}{8} \times \frac{12}{31} = \frac{60}{248} = \frac{15}{62}$$

Lesson 9: Sums and Differences of Decimals

Classwork

Example 1

$$25\frac{3}{10} + 376\frac{77}{100}$$

change mixed numbers to decimals

$$25.3 + 376.77$$

line up the decimals

$$\begin{array}{r} 25.3 \\ + 376.77 \\ \hline 402.07 \rightarrow \text{sum} \end{array}$$

Example 2

$$426\frac{1}{5} - 275\frac{1}{2}$$

change mixed numbers to decimals

$$426.2 - 275.5$$

line up the decimals

$$\begin{array}{r} 3426.2 \\ - 275.5 \\ \hline 150.7 \rightarrow \text{difference} \end{array}$$

N. Fiorella

Problem Set

Calculate the product using partial products.

1. 400×45.2

2. 14.9×100

3. 200×38.4

4. 900×20.7

5. 76.2×200

① Separate the decimals and put into parenthesis next to each whole number

$$400(45) \quad 400(0.2)$$

② multiply each part

$$18,000 \quad 80$$

③ Add both parts

$$\begin{array}{r} 18,000 \\ + \quad 80 \\ \hline 18,080 \end{array} \rightarrow \text{product from partial products}$$

N. Fiorella

Problem Set

Solve each problem. Remember to round to the nearest penny when necessary.

1. Calculate the product. 45.67×32.58
2. Deprina buys a large cup of coffee for \$4.70 on her way to work every day. If there are 24 workdays in the month, how much does Deprina spend on coffee throughout the entire month?
3. Krego earns \$2,456.75 every month. He also earns an extra \$4.75 every time he sells a new gym membership. Last month, Krego sold 32 new gym memberships. How much money did Krego earn last month?
4. Kendra just bought a new house and needs to buy new sod for her backyard. If the dimensions of her yard are 24.6 feet by 14.8 feet, what is the area of her yard?

multiply how much the coffee costs per day by how many days the coffee is purchased

$$\begin{array}{r}
 \overset{2}{\$}4.70 \\
 \times 24 \\
 \hline
 1880 \\
 + 9400 \\
 \hline
 \$112.80
 \end{array}$$

→ nearest penny given so no need to round

N. Fiorella

Problem Set

Round to estimate the quotient. Then, compute the quotient using a calculator, and compare the estimate to the quotient.

1. $715 \div 11$
2. $7,884 \div 12$
3. $9,646 \div 13$
4. $11,942 \div 14$
5. $48,825 \div 15$
6. $135,296 \div 16$
7. $199,988 \div 17$
8. $116,478 \div 18$
9. $99,066 \div 19$
10. $181,800 \div 20$

① Round both numbers
 715 is closest to 700
 11 is closest to 10

③ Divide original numbers

$$\begin{array}{r} 65 \rightarrow \text{quotient} \\ 11 \overline{) 715} \end{array}$$

65 is close to 70

② Divide rounded numbers

$$\begin{array}{r} 70 \rightarrow \text{estimated quotient} \\ 10 \overline{) 700} \\ -70 \\ \hline 00 \end{array}$$

N. Fiorella

Problem Set

Divide using the division algorithm.

1. $1,634 \div 19$
2. $2,450 \div 25$
3. $22,274 \div 37$
4. $21,361 \div 41$
5. $34,874 \div 53$
6. $50,902 \div 62$
7. $70,434 \div 78$
8. $91,047 \div 89$
9. $115,785 \div 93$
10. $207,968 \div 97$
11. $7,735 \div 119$
12. $21,948 \div 354$
13. $72,372 \div 111$
14. $74,152 \div 124$
15. $182,727 \div 257$
16. $396,256 \div 488$
17. $730,730 \div 715$
18. $1,434,342 \div 923$
19. $1,775,296 \div 32$
20. $1,144,932 \div 12$

$$\begin{array}{r}
 19 \overline{) 1634} \\
 \underline{-152} \\
 114 \\
 \underline{-114} \\
 0
 \end{array}$$

(86) → quotient

N. Fiorella

Problem Set

Convert decimal division expressions to fractional division expressions to create whole number divisors.

1. $35.7 \div 0.07$

2. $486.12 \div 0.6$

3. $3.43 \div 0.035$

4. $5,418.54 \div 0.009$

5. $812.5 \div 1.25$

6. $17.343 \div 36.9$

① change decimal to fraction division

$$\frac{35.7}{0.07}$$

② multiply each by 100

$$\frac{35.7}{0.07} \times \frac{100}{100} = \frac{3570}{7}$$

N. Fiorella

Estimate quotients. Convert decimal division expressions to fractional division expressions to create whole number divisors. Compute the quotients using the division algorithm. Check your work with a calculator and your estimates.

7. Norman purchased 3.5 lb. of his favorite mixture of dried fruits to use in a trail mix. The total cost was \$16.87. How much does the fruit cost per pound?
8. Divide: $994.14 \div 18.9$
9. Daryl spent \$4.68 on each pound of trail mix. He spent a total of \$14.04. How many pounds of trail mix did he purchase?
10. Mamie saved \$161.25. This is 25% of the amount she needs to save. How much money does Mamie need to save?
11. Kareem purchased several packs of gum to place in gift baskets for \$1.26 each. He spent a total of \$8.82. How many packs of gum did he buy?
12. Jerod is making candles from beeswax. He has 132.72 ounces of beeswax. If each candle uses 8.4 ounces of beeswax, how many candles can he make? Will there be any wax left over?
13. There are 20.5 cups of batter in the bowl. This represents 0.4 of the entire amount of batter needed for a recipe. How many cups of batter are needed?
14. Divide: $159.12 \div 6.8$
15. Divide: $167.67 \div 8.1$

Problem Set

Use mental math, estimation, and the division algorithm to evaluate the expressions.

1. $118.4 \div 6.4$
2. $314.944 \div 3.7$
3. $1,840.5072 \div 23.56$
4. $325 \div 2.5$
5. $196 \div 3.5$
6. $405 \div 4.5$
7. $3,437.5 \div 5.5$
8. $393.75 \div 5.25$
9. $2,625 \div 6.25$
10. $231 \div 8.25$
11. $92 \div 5.75$
12. $196 \div 12.25$
13. $117 \div 6.5$
14. $936 \div 9.75$
15. $305 \div 12.2$

Place the decimal point in the correct place to make the number sentence true.

16. $83.375 \div 2.3 = 3,625$
17. $183.575 \div 5,245 = 3.5$
18. $326,025 \div 9.45 = 3.45$
19. $449.5 \div 725 = 6.2$
20. $446,642 \div 85.4 = 52.3$

Mental math

① Multiply each number by 5 to make the dividend a whole number

$$\frac{118.4 \times 5}{6.4 \times 5} = \frac{592}{32} \overset{\text{divide}}{\curvearrowright} = 18.5$$

Division Algorithm

① Use the whole numbers from mental math

$$\begin{array}{r} 18.5 \\ 32 \overline{) 592} \\ \underline{-32} \\ 2672 \\ \underline{-256} \\ 17 \end{array}$$

Estimation

① Round each number to the closest whole number

$$\frac{118}{6} = 19.6 \rightarrow \text{is close to } 18.5$$

N. Fiorella

Lesson Summary

Adding:

- The sum of two even numbers is even.
- The sum of two odd numbers is even.
- The sum of an even number and an odd number is odd.

Multiplying:

- The product of two even numbers is even.
- The product of two odd numbers is odd.
- The product of an even number and an odd number is even.

Problem Set

Without solving, tell whether each sum or product is even or odd. Explain your reasoning.

1. $346 + 721$

2. $4,690 \times 141$

3. $1,462,891 \times 745,629$

4. $425,922 + 32,481,064$

5. $32 + 45 + 67 + 91 + 34 + 56$

① Look at the last digit in each number

② For #1 there is an even digit and odd digit

③ The sum of an even and odd number is odd.



! ← groups of 2 are circled leaving 1 left over

N. Fiorella

Lesson Summary

To determine if a number is divisible by 3 or 9:

- Calculate the sum of the digits.
- If the sum of the digits is divisible by 3, the entire number is divisible by 3.
- If the sum of the digits is divisible by 9, the entire number is divisible by 9.

Note: If a number is divisible by 9, the number is also divisible by 3.

Problem Set

1. Is 32,643 divisible by both 3 and 9? Why or why not?

2. Circle all the factors of 424,380 from the list below.

2 3 4 5 8 9 10

3. Circle all the factors of 322,875 from the list below.

2 3 4 5 8 9 10

4. Write a 3-digit number that is divisible by both 3 and 4. Explain how you know this number is divisible by 3 and 4.

5. Write a 4-digit number that is divisible by both 5 and 9. Explain how you know this number is divisible by 5 and 9.

① Add all digits in the number.

$$3 + 2 + 6 + 4 + 3 = 18$$

② Can 3 and 9 both be divided into 18 evenly?

$$\begin{array}{r} 6 \\ 3 \overline{)18} \end{array}$$

$$\begin{array}{r} 2 \\ 9 \overline{)18} \end{array}$$

→ Yes 32,643 is divisible by 9 and 3

N. Fiorella

Lesson 18: Least Common Multiple and Greatest Common Factor

Classwork

Opening

The *greatest common factor* of two whole numbers (not both zero) is the greatest whole number that is a factor of each number. The greatest common factor of two whole numbers a and b is denoted by $GCF(a, b)$.

The *least common multiple* of two whole numbers is the smallest whole number greater than zero that is a multiple of each number. The least common multiple of two whole numbers a and b is denoted by $LCM(a, b)$.

Example 1: Greatest Common Factor

Find the greatest common factor of 12 and 18.

Follow these steps

- Listing these factor pairs in order helps ensure that no common factors are missed. Start with 1 multiplied by the number.
- Circle all factors that appear on both lists.
- Place a triangle around the greatest of these common factors.

$GCF(12, 18) = 6$

12

①	12
②	⑥
③	4

18

①	18
②	9
③	⑥

N. Fiorella

Problem Set

- Use Euclid's algorithm to find the greatest common factor of the following pairs of numbers:
 - GCF (12, 78)
 - GCF (18, 176)
- Juanita and Samuel are planning a pizza party. They order a rectangular sheet pizza that measures 21 inches by 36 inches. They tell the pizza maker not to cut it because they want to cut it themselves.
 - All pieces of pizza must be square with none left over. What is the side length of the largest square pieces into which Juanita and Samuel can cut the pizza?
 - How many pieces of this size can be cut?
- Shelly and Mickelle are making a quilt. They have a piece of fabric that measures 48 inches by 168 inches.
 - All pieces of fabric must be square with none left over. What is the side length of the largest square pieces into which Shelly and Mickelle can cut the fabric?
 - How many pieces of this size can Shelly and Mickelle cut?

① Divide the larger number by the smaller

$$78 \div 12 = 6.5$$

$$\begin{array}{r} 6 \\ 12 \overline{)78} \\ \underline{-72} \\ 6 \end{array}$$

② Because there is a remainder, divide it into the divisor so: $12 \div 6 = 2$

③ The final divisor is the GCF of the two original numbers (12, 78)

$$\textcircled{4} \text{ GCF} = 6$$