Name ______________________________ Period __________ Date ____________

6-6
STUDENT PACKET

MATHLINKS: GRADE 6
STUDENT PACKET 6
FRACTION ADDITION AND SUBTRACTION

WORD BANK

Word or Phrase	Definition or Description	Example or Picture
common denominator		
difference		
estimate		
equivalent fractions		
greatest common factor		
least common multiple		
least common denominator		
multiplication property of 1		
sum		

EQUIVALENT FRACTIONS

Summary

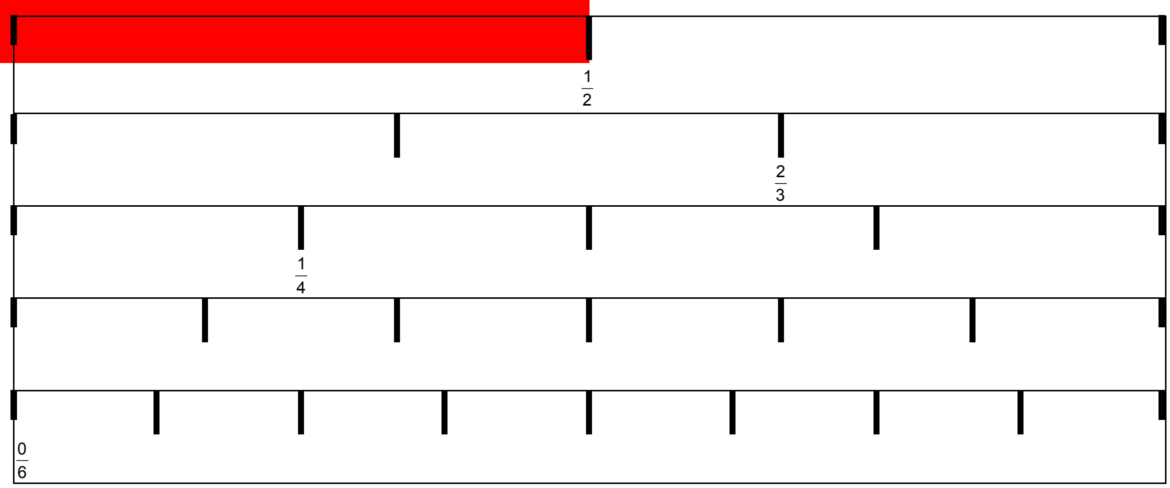
We will use diagrams to illustrate equivalent fractions. We will connect the diagrams to computations. We will compare fractions in a problem solving setting.

Goals

- Use splitting, replicating, and grouping diagrams to show equivalent fractions.
- Use equivalent fractions to solve problems.
- Connect visual representations of equivalent fractions to the multiplication property of 1 (the “big 1”).
- Simplify fractions.
- Compare two fractions using a common denominator.

Warmup

1. Write in fractions to complete this portion of a fraction array. Careful! Some rows have been deleted.



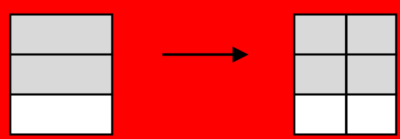
2. Use the array in problem 1 to name two different pairs of equivalent fractions. How do you know each pair is equivalent?

3. Draw a set model that represents $\frac{2}{3}$.	4. Draw an area model that represents $\frac{2}{3}$.

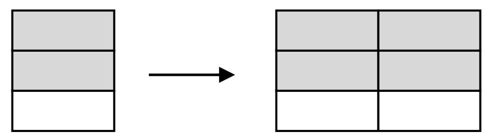
EQUIVALENT FRACTIONS WITH AREA MODELS

1. Mrs. Jetter asked her students to draw diagrams to show that $\frac{2}{3} = \frac{4}{6}$. Here are the drawings of Judy and Jane. Explain how their diagrams are the same and how they are different.

Judy

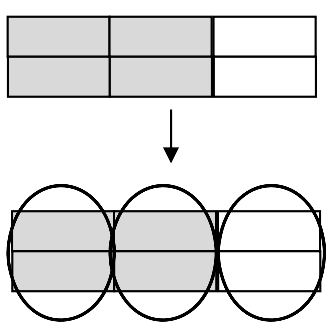


Jane

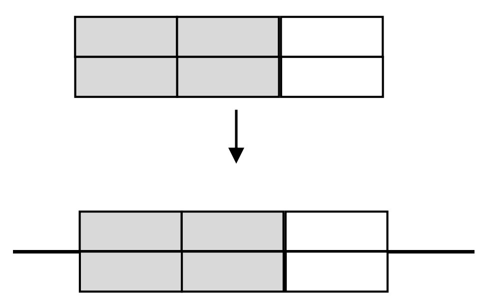


2. Then Mrs. Jetter asked her students to draw diagrams to show that $\frac{4}{6} = \frac{2}{3}$. Here are the drawings of Rex and Luke. Explain how their diagrams are the same and how they are different.

Rex



Luke

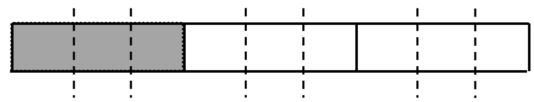


EQUIVALENT FRACTIONS: SPLITTING

In both diagrams to the right, the area of the large rectangle is one whole. The shaded part represents $\frac{1}{3}$ of the whole.

Diagram 1

Diagram 2



One way to show that $\frac{1}{3} = \frac{3}{9}$ is to divide each of the one-third sections into three equal parts.

We call this the "splitting method" for illustrating equivalent fractions.

1. Use diagrams 1 and 2 above to answer the following questions.

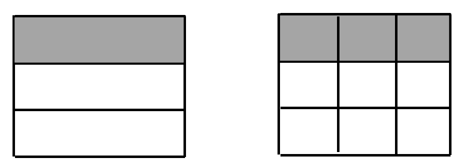
	Diagram 1	**Diagram 2**
How many parts are shaded?		
How many parts are in one whole?		

2. Diagrams 3 and 4 also illustrate that $\frac{1}{3} = \frac{3}{9}$.

   How are they the same as Diagrams 1 and 2?

   How are they different than Diagrams 1 and 2?

Diagram 3 Diagram 4



3. In the splitting method, does the part to whole relationship stay the same? _______

   In the splitting method, does the size of the whole stay the same? ______

   In the splitting method, does the size of the part stay the same? ______

Draw diagrams using the splitting method to show that the fractions are equivalent.

4. $\frac{1}{2} = \frac{3}{6}$	5. $\frac{2}{5} = \frac{4}{10}$

EQUIVALENT FRACTIONS: REPLICATING

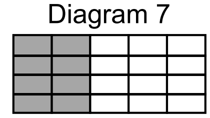
In Diagram 5 below, $\frac{2}{5}$ of the whole rectangle is shaded. One way to show that $\frac{2}{5} = \frac{8}{20}$ is to make four copies of this whole rectangle (Diagram 6 below). The shaded portion is $\frac{8}{20}$ of the new rectangle. Though the new whole is greater, the fractional portion is the same. Both rectangles show two parts shaded for every 5 parts.

Diagram 5 Diagram 6

We call this the "replicating" method for showing equivalent fractions.

1. In the example above, why was the original rectangle replicated four times to show that $\frac{2}{5} = \frac{8}{20}$?

Diagram 7



2. Diagram 7 also illustrates that $\frac{2}{5} = \frac{8}{20}$. How is it different than diagram 6?

3. In the replicating method, does the part to whole relationship stay the same? ______

   In the replicating method, does the size of the whole stay the same? ______

   In the replicating method, does the size of the part stay the same? ______

Draw replicating diagrams to show that the fractions are equivalent.

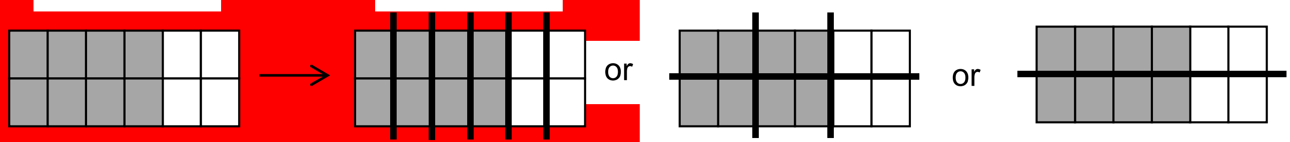
4. $\frac{1}{2} = \frac{5}{10}$	5. $\frac{3}{5} = \frac{9}{15}$

6. Use the replicating diagram in problem 4 above to explain why $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$.

EQUIVALENT FRACTIONS: GROUPING

The area of each rectangle below is one whole. The shaded part is $\frac{8}{12}$ of the whole. To show $\frac{8}{12} = \frac{4}{6}$ draw lines to make six equal groups with four parts shaded (Diagram 9 or 10); or draw two equal groups with four parts shaded out of six in each group (Diagram 11).

Diagram 8 $\frac{8}{12}$ — Diagram 9 $\frac{4}{6}$ — Diagram 10 $\frac{4}{6}$ — Diagram 11 $\frac{4}{6}$



So $\frac{8}{12} = \frac{4}{6}$. We will call this the "grouping method" for showing equivalent fractions.

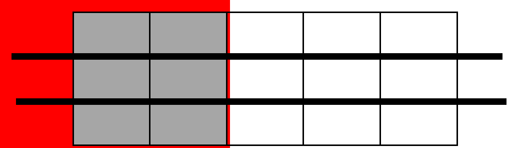
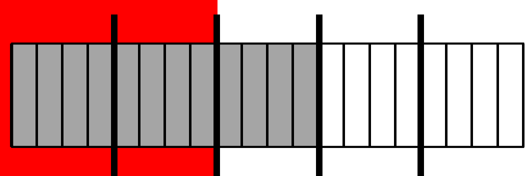
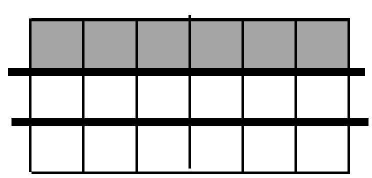
1. In which grouping diagrams do the part to whole relationships stay the same? ____
2. In which grouping diagrams do the size of the whole stay the same? _____
3. In which grouping diagrams do the size of the part stay the same? _____
4. Which grouping diagrams "undo" splitting? _____
5. Which grouping diagrams "undo" replicating? _____
6. Circle groups of objects to show that $\frac{8}{12} = \frac{2}{3}$ using a set model in two different ways.

Draw diagrams using a grouping method to show that the fractions are equivalent.

7. $\frac{6}{10} = \frac{3}{5}$	8. $\frac{9}{12} = \frac{3}{4}$

THE "BIG 1"

Two fractions are equivalent if they have the same value. To find equivalent fractions, multiply (or divide) by a form of one, which we call the "big 1." This is an application of the <u>multiplication property of 1</u>.

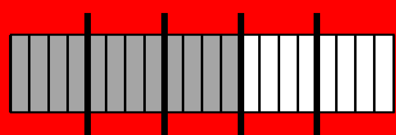
	Equivalent fractions	Diagram	"Big 1" calculation
1.	$\frac{2}{5} = \frac{6}{15}$		$\frac{2}{5} \bullet \frac{\ }{\ } = \frac{6}{15}$
2.			$\frac{12}{20} \div \frac{4}{4} = \boxed{\frac{\ }{\ }}$
3.	$\frac{2}{4} = \frac{1}{2}$		
4.			$\frac{2}{3} \bullet \frac{3}{3} = \boxed{\frac{\ }{\ }}$
5.			
6.	$\frac{3}{4} = \frac{6}{8}$		

USING THE GCF TO FIND EQUIVALENT FRACTIONS

Recall the <u>greatest common factor</u>, or GCF, is the greatest factor that divides two numbers.

1. Find the greatest common factor (GCF) of 12 and 20.

Here is an example from the previous page.

Diagram	"Big 1" calculation
	$\frac{12}{20} \div \frac{4}{4} = \frac{3}{5}$

2. How is the GCF of 12 and 20 used above to show that $\frac{12}{20}$ is equivalent to $\frac{3}{5}$?

Use the GCF strategy to rename each fraction in its equivalent simplest form.

3. $\frac{6}{8} \div \frac{2}{2} =$ Think: I will divide by $\frac{2}{2}$ because the GCF of 6 and 8 is 2.	4. $\frac{3}{12}$	5. $\frac{6}{20}$
6. $\frac{10}{25}$	7. $\frac{6}{19}$	8. $\frac{12}{16}$

COMPARING FRACTIONS REVISITED

1. Which is greater $\frac{2}{3}$ or $\frac{5}{8}$? ______ How do you know?

Recall that the <u>least common multiple</u> of two numbers, or LCM, is the least nonzero number that is a multiple of both. One way to compare two fractions is to rename them using a common multiple of the denominators as the new denominator (called a <u>common denominator</u>). The least common multiple (LCM) is most efficient, but any multiple will do.

Example: Which is greater $\frac{2}{3}$ or $\frac{5}{8}$?

Think: A common multiple of 3 and 8 is 24.
(It is also the LCM.)

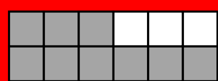
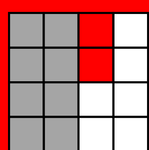
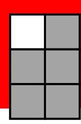
$\frac{1}{2} \bullet \frac{8}{8} = \frac{16}{24}$ and $\frac{5}{8} \bullet \frac{3}{3} = \frac{15}{24}$. Since $\frac{16}{24} > \frac{15}{24}$, $\frac{2}{3} > \frac{5}{8}$.

Write each pair of fractions using a common denominator. Then circle the fraction with the greater value.

2. $\frac{1}{2}$ and $\frac{3}{4}$	3. $\frac{2}{3}$ and $\frac{3}{4}$	4. $\frac{5}{6}$ and $\frac{1}{3}$
5. $\frac{1}{4}$ and $\frac{3}{5}$	6. $\frac{5}{3}$ and $\frac{7}{5}$	7. $\frac{3}{8}$ and $\frac{1}{2}$
8. $\frac{13}{10}$ and $\frac{7}{5}$	9. $\frac{4}{5}$ and $\frac{9}{15}$	10. $3\frac{2}{7}$ and $3\frac{1}{3}$

THE FLOWER GARDEN PROBLEM

Four students have gardens of different sizes. Below are scale drawings of the gardens, where each square represents one square yard. The shaded portions below represent the part of each garden that is planted.

Student name and garden	Number of square yards planted	Total number of square yards	Fraction of garden that is planted
1. Colin 			
2. Indy 			
3. Sam 			
4. Blue 			

Indy says that his garden has the largest fractional part planted. Colin, Sam, and Blue disagree with Indy. Settle the disagreement. Use diagrams, “big 1” calculations, and sense making arguments to help each student understand your answer.

5. Who has the larger fractional part planted: Colin or Indy?

6. Who has the larger fractional part planted: Sam or Indy?

THE FLOWER GARDEN PROBLEM (Continued)

7. Who has the larger fractional part planted: Blue or Indy?

Here are some other ways to compare the gardens.

8. Write an inequality that compares the sizes of the whole gardens. Who has the largest garden? How big is it?

9. Write an inequality that compares the sizes of the planted portions of the gardens. Who has the largest amount of their garden planted? How big is it?

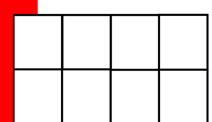
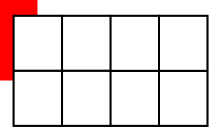
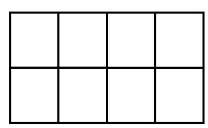
10. Write an inequality that compares the fractional parts of the gardens that are planted. Who has the largest fractional part of their garden planted? How much is it?

FRACTION ADDITION

Summary	Goals
We will review adding fractions and learn different methods to add mixed numbers.	• Review using for a common denominator to add fractions. • Use diagrams, mental math and estimation to add. • Explore addition of mixed numbers.

Warmup

Shade the appropriate portion of the diagram in each problem. Then record the numbers.

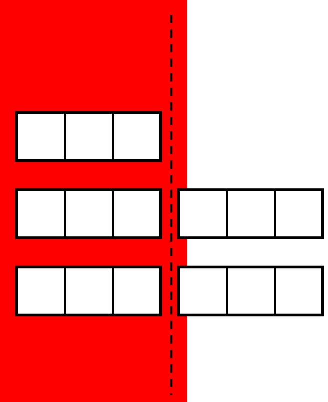
	Words	Diagram	Numbers
1.	Shade three-eighths of the large rectangle.		
2.	Shade one-fourth of the large rectangle.		
3.	Shade three-eighths of the large rectangle plus another one-fourth of it. How much of this large rectangle is shaded?		$\frac{3}{8}+\frac{1}{4}=\frac{3}{8}+\frac{\ }{8}=\frac{\ }{8}$

4. Why do the denominators have to be the same for both fractions when adding?

5. A student added this way: $\frac{3}{8}+\frac{1}{4}=\frac{4}{12}$. Other than being wrong, why does a result of $\frac{4}{12}$ not make sense for this problem?

ADDING MIXED NUMBERS: MENTAL MATH

Shade the appropriate portions in each problem. Then record the numbers.

Words	Diagram	Number Sentences
1. You have two and one-third protein bars. Your friend gives you another one and two-thirds protein bars. How much protein bar do you have in all?		$2\frac{1}{3} + 1\frac{2}{3}$ $= \left(2 + \frac{1}{3}\right) + \left(1 + \frac{2}{3}\right)$ $= (2 + 1) + \left(\frac{1}{3} + \frac{2}{3}\right)$ = ___ + ___ = ______

Use mental math to add.

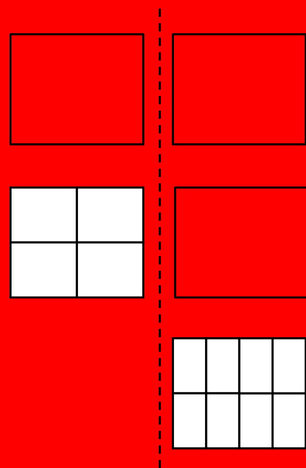
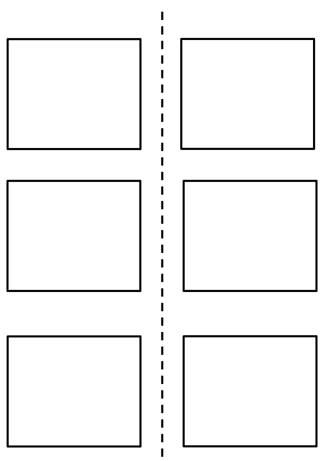
2. $6\frac{1}{3} + 2\frac{1}{4} + 4\frac{2}{3}$	3. $\frac{2}{5} + 12\frac{3}{5} + 14\frac{2}{7}$
4. $1\frac{3}{11} + 2\frac{7}{9} + 4\frac{2}{9}$	5. $\frac{4}{7} + 2\frac{1}{7} + 4\frac{3}{7} + \frac{2}{7}$

Use estimation. Circle the phrase that represents your estimation.

6. $4\frac{3}{5} + 1\frac{2}{3}$ Less than 6 Greater than 6	7. $2\frac{1}{8} + 4\frac{1}{9}$ Closer to 6 Closer to 7
8. $3\frac{1}{4} + 6\frac{2}{5}$ Less than 10 Greater than 10	9. $1\frac{1}{6} + 2\frac{1}{8}$ Closer to 3 Closer to 4

ADDING MIXED NUMBERS

Shade the appropriate portions in each problem. Then record the numbers.

Words	Diagram	Mixed Numbers	Improper Fractions
1. You have one and one-fourth sandwiches. Your friend has two and one-eighth sandwiches. How many sandwiches are there in all? Think: A common multiple of 4 and 8 is 8. 8 is a common denominator. (It is also the LCM.)		$1\frac{1}{4} + 2\frac{1}{8}$ $= \left(1 + \frac{1}{4}\right) + \left(2 + \frac{1}{8}\right)$ $= (1 + 2) + \left(\frac{1}{4} + \frac{1}{8}\right)$ $=$ ___ $+ \left(\frac{2}{8} + \frac{1}{8}\right)$ $=$	$1\frac{1}{4} + 2\frac{1}{8}$ $= \frac{5}{4} + \frac{17}{8}$ $= \frac{10}{8} + \frac{17}{8}$ $=$
2. You have two and two-thirds sandwiches. Your friend has one and one-half sandwiches. How many sandwiches are there in all? Think: A common multiple of 2 and 3 is 6. 6 is a common denominator.			

PRACTICE

Look at each problem before deciding on which method to use to add. If mental math is used, write “MM” next to the answer. Otherwise, show your work.

1. $10\frac{3}{8} + 20\frac{5}{8}$	2. $4\frac{1}{6} + 2\frac{5}{6} + 6\frac{1}{2}$	3. $27\frac{1}{5} + 13\frac{7}{10}$
4. $1\frac{1}{3} + 2\frac{1}{6} + 4\frac{1}{2}$	5. $8\frac{1}{4} + 7\frac{2}{5}$	6. $2\frac{3}{4} + 1\frac{2}{3}$
7. $14\frac{7}{20} + 2\frac{4}{5}$	8. $1\frac{3}{8} + 2\frac{1}{4} + 4\frac{5}{12}$	9. $6\frac{1}{15} + 2\frac{5}{12}$

FRACTION SUBTRACTION

Summary

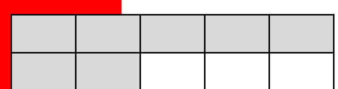
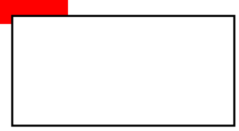
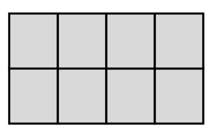
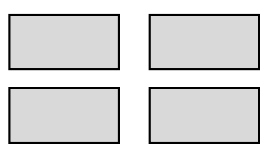
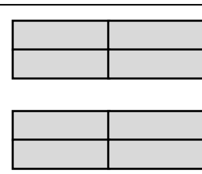
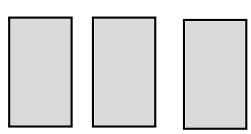
We will review subtracting fractions, and learn different methods to subtract fractions.

Goals

- Review the need for a common denominator when subtracting fractions.
- Use mental math to subtract fractions.
- Explore subtraction of mixed numbers.

Warmup

Compete the diagram and record the number sentences.

Words	Diagram	Number Sentences
1. Seven-tenths of a rectangle is shaded. Cross off three-tenths of a rectangle in the shaded region. How much of the whole rectangle remains shaded?		$\frac{\square}{\square} - \frac{\square}{\square} = \frac{\square}{\square}$
2. Shade five-sixths of the rectangle and cross off one-sixth of the rectangle in the shaded region. How much of the whole rectangle remains shaded?		
3. One whole rectangle is shaded. Cross off five-eighths of the whole rectangle. How much of the whole rectangle remains shaded?		$1 - \frac{\square}{\square} = \frac{\square}{\square}$
4. Four whole rectangles are shaded. Cross off one-third of a whole rectangle. How many of the rectangles remains shaded?		
5. Two whole rectangles are shaded. Cross off one and one-fourth rectangles. How many of the rectangles remains shaded?		
6. Three whole rectangles are shaded. Cross off two and one half rectangles. How many of the rectangles remains shaded?		

SUBTRACTING FRACTIONS USING MENTAL MATH

Describe the following mental strategies. Use the examples from the warmup on page 15.

1. Subtracting fractions with common denominators, like problem(s) __________.
2. Subtracting a proper fraction from a whole number, like problem(s) __________.
3. Subtracting a mixed number from a whole number, like problem(s) __________.

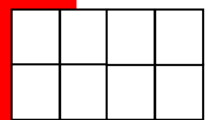
Use mental math to subtract.

4. $\frac{5}{9} - \frac{3}{9}$	5. $6\frac{5}{9} - \frac{3}{9}$	6. $6\frac{5}{9} - 2\frac{3}{9}$
7. $1 - \frac{2}{3}$	8. $5 - \frac{1}{5}$	9. $3 - 1\frac{2}{7}$
10. $\frac{7}{11} - \frac{2}{11}$	11. $1 - \frac{4}{13}$	12. $12 - \frac{3}{20}$

12. Julio says he knows that $1 - \frac{14}{25}$ is $\frac{11}{25}$ because $11 + 14 = 25$. Why does his strategy work?

SUBTRACTING PROPER FRACTIONS

Complete diagrams and record number sentences.

Words	Diagrams	Number Sentences
1. Shade three-eighths of the whole rectangle. Then cross off one-fourth of the rectangle in the shaded region. How much of this whole rectangle remains shaded?		$\frac{3}{8} - \frac{1}{4} = \frac{3}{8} - \underline{\quad} = \underline{\quad}$
2. Shade two-thirds of the whole rectangle. Then cross off one-half of the whole rectangle in the shaded region. How much of this whole rectangle remains shaded?		

3. Why do the denominators have to be the same when subtracting fractions?

4. A student incorrectly subtracted this way: $\frac{3}{8} - \frac{1}{4} = \frac{2}{4}$. Explain why a result of $\frac{2}{4}$ does **not** make sense for this problem.

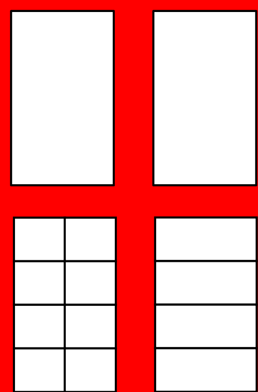
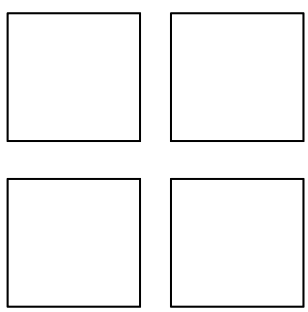
5. A student incorrectly subtracted this way: $\frac{2}{3} - \frac{1}{2} = \frac{1}{1}$. Explain why a result of $\frac{1}{1}$ does **not** make sense for this problem.

Subtract. If mental math is used, write "MM" next to the answer. Otherwise, show your work.

6. $\frac{5}{12} - \frac{1}{4}$	7. $\frac{5}{6} - \frac{1}{9}$	8. $4\frac{7}{13} - \frac{5}{13}$

SUBTRACTING MIXED NUMBERS

Shade the appropriate portions in each problem. Then record the numbers.

Words	Diagrams	Mixed Numbers	Improper Fractions
1. You have three and three-fourths bars. You give away one and one-eighth bar. How much is left? Think: A common multiple of 4 and 8 is 8. 8 is a common denominator.		$3\frac{3}{4} - 1\frac{1}{8}$ $= 3 + \frac{3}{4} - 1 - \frac{1}{8}$ $= 2 - \frac{\_\_}{8} - \frac{3}{4}$ $=$	$3\frac{3}{4} - 1\frac{1}{8}$ $= \frac{\_\_}{4} - \frac{\_\_}{8}$ $= \frac{\_\_}{8} - \frac{\_\_}{8}$
2. You have two and two-third sandwiches. You give one and one-fourth to a friend. How much remains? Think: A common multiple of 3 and 4 is ___. ___ is a common denominator.			

SUBTRACTING MIXED NUMBERS (Continued)

Shade the appropriate portions in each problem. Then record the numbers.

Words	Diagrams	Mixed Numbers	Improper Fractions
3. You have one and one-half sandwiches. You eat five-eighths of a sandwich. How much sandwich is left? Think: A common multiple of ___ and ___ is ___. ___ is a common denominator.			
4. You have two and one-third sandwiches. You give your friend one-half of a sandwich. How much is left? Think: A common multiple of ___ and ___ is ___. ___ is a common denominator.			

SUBTRACTING MIXED NUMBERS PRACTICE

1. Compute $2\frac{3}{4} - 1\frac{1}{3}$.

Mixed Numbers	Improper Fractions

Look at each problem before deciding which method to use. If mental math is used, write “MM” next to the answer. Otherwise, show all work.

2. $5\frac{2}{3} - 4\frac{1}{4}$	3. $8\frac{5}{8} - 2 - 6\frac{1}{6}$	4. $50\frac{3}{10} - 25\frac{2}{5}$

5. Ping says that subtracting $2 - 1\frac{1}{3}$ gives the same result as computing $2 - 1 + \frac{1}{3}$.

   Quon says that subtracting $2 - 1\frac{1}{3}$ gives the same result as computing $2 - 1 - \frac{1}{3}$.

   Is either boy correct? Explain.

HELPING AT THE FOOD BANK

Tiffany works 5 hours each week at the food bank. On Monday, she worked $1\frac{1}{4}$ hours. On Wednesday, she worked $2\frac{1}{6}$ hours.

1. How many more hours does Tiffany have to work at the food bank this week?

2. If Tiffany plans to go to the food bank on Friday and Saturday, suggest three different way she might complete her hours.

The Math Club and the Art Club are collecting canned food for the food bank. They pack the cans in crates that are all the same size, and every week they drop off their donations. Each club recorded the number of crates they filled each week for a month.

Week Number	**1**	**2**	**3**	**4**
Crates packed by the Math Club	$1\frac{1}{2}$	$3\frac{3}{4}$	$2\frac{2}{5}$	$\frac{3}{5}$
Crates packed by the Art Club	$1\frac{4}{5}$	$2\frac{1}{4}$	$3\frac{1}{2}$	$\frac{3}{10}$

3. Which club collected the most crates? How many more?

SKILL BUILDERS, VOCABULARY, AND REVIEW

SKILL BUILDER 1

1. Find the product of 389 × 34.

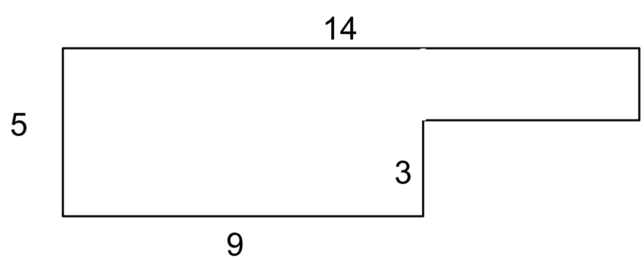
2. Find the quotient of 563 ÷ 43.

3. List all the factors of 12.

   List all the factors of 20.

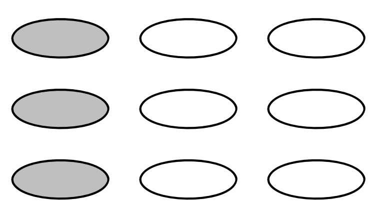
   What is the greatest common factor of 12 and 20?

4. Find the perimeter of the figure below. Each angle is a right angle.

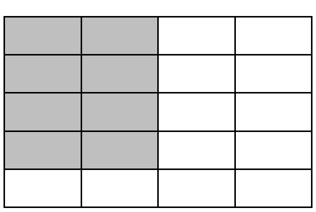


5. Write a fraction for each model pictured.

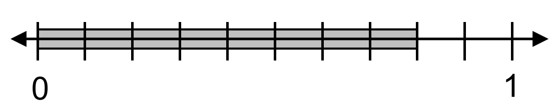
a.



b.



c.



SKILL BUILDER 2

The data below shows the times (in seconds) it took Ms. Frame's 6th grade students to run the 100-meter dash. Use this data for problems 1-3.

17	16	19	19	22	21	21	23	20	19

1. Arrange the data in numerical order from least to greatest in the table below.

2. Find the three measures of center for the data set.

   Mean: _______ Median: _______ Mode: _______

3. Find the five-number summary for the data set.

   (________, ________, ________, ________, ________)
   min Q_1 $Q_2 = M$ Q_3 *max*

For problems 4-7, underline the question that is a better example of a statistical question.

4. How long does it take for Dr. Erving to drive from his house to Mercy Hospital?

   How long does it take for most of the doctors at Mercy Hospital to drive from their houses to the hospital?

5. How many rushing yards is Steve averaging per game so far this season?

   How many rushing yards did Steve have in last night's football game?

6. Did I pass the last test?

   Are my test scores good enough to pass the class?

7. How much money does Tracey make as an architect?

   How much money do architects make in a year?

SKILL BUILDER 3

Use the order of operations conventions to simplify each expression below.

1. $(7 + 3)^2 - 6 \div 2$	2. $\dfrac{14 - 2^3}{3}$

For each fraction, find the greatest common factor (GCF) of the numerator and denominator. Then use the GCF to simplify the fraction.

	Given Fraction	GCF	Simplified Fraction
Ex.	$\frac{4}{8}$	4	$\frac{4}{8} \div \frac{4}{4} = \frac{1}{2}$
3.	$\frac{3}{12}$		
4.	$\frac{12}{20}$		
5.	$\frac{14}{35}$		
6.	$\frac{30}{100}$		
7.	$\frac{40}{100}$		

8. Choose all rational numbers below that are equivalent to $\frac{8}{12}$.

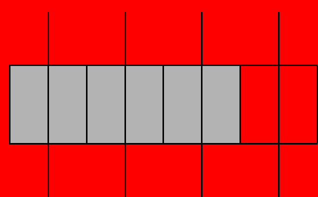
A. $\frac{9}{16}$ B. $\frac{2}{3}$ C. $\frac{16}{24}$ D. $\frac{4}{6}$

SKILL BUILDER 4

Use splitting and replicating diagrams to show that each pair of fractions is equivalent.

1. $\frac{3}{4} = \frac{6}{8}$

Splitting:



Replicating:

2. $\frac{4}{5} = \frac{20}{25}$

Splitting:

Replicating:

3. $\frac{5}{6} = \frac{15}{18}$

Splitting:

Replicating:

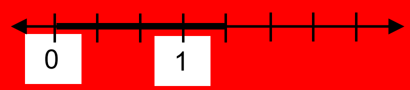
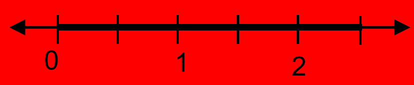
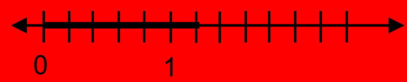
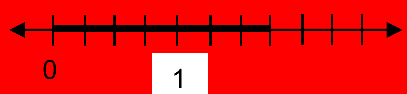
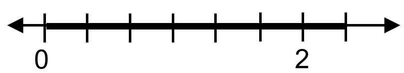
4. $\frac{1}{2} = \frac{5}{10}$

Splitting:

Replicating:

SKILL BUILDER 5

Complete the table.

Number line representation	Addition Expression	Mixed Number	Conversion	Improper Fraction
Ex. 	$1 + \frac{1}{3}$	$1\frac{1}{3}$	$\frac{3}{3} + \frac{1}{3}$	$\frac{4}{3}$
1. 				
2. 				
3. 				
4. 				

Add mentally.

5. $6\frac{3}{5} + \frac{1}{4} + 2\frac{2}{5}$	6. $5\frac{1}{2} + 4\frac{1}{2} + 3\frac{1}{2}$
7. $4\frac{1}{2} + 3\frac{1}{6} + 1\frac{1}{2}$	8. $4\frac{4}{5} + 5\frac{2}{5} + 1\frac{4}{5}$
9. $1\frac{4}{7} + 5 + 3\frac{1}{7} + 1\frac{2}{7}$	10. $10\frac{2}{3} + 20\frac{2}{3} + 30\frac{1}{3}$

SKILL BUILDER 6

Use estimation. Circle the phrase that represents your estimation.

1.	$2\frac{3}{4} + 5\frac{1}{9}$	Less than 8 Greater than 8	2.	$4\frac{2}{5} + 3\frac{1}{4}$	Closer to 7 Closer to 8
3.	$6\frac{7}{8} + 2\frac{1}{4}$	Less than 9 Greater than 9	4.	$10\frac{8}{9} + 15 + 5\frac{9}{10}$	Closer to 31 Closer to 32

5. Compute $3\frac{1}{2} - 2\frac{1}{3}$ using the two methods suggested below.

Mixed Numbers	Improper Fractions

Look at each problem before deciding which method to use. If mental math is used, write "MM" next to the answer. Otherwise, show all work.

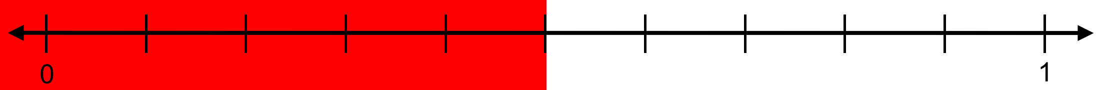
6. $35\frac{5}{7} - 25\frac{3}{7}$	7. $5\frac{5}{6} - 2\frac{3}{4}$	8. $15\frac{3}{5} - 2\frac{1}{4}$
9. $5\frac{1}{2} + 2\frac{1}{4} - 3\frac{1}{4}$	10. $7\frac{7}{8} - 3 - 4\frac{1}{4}$	11. $700\frac{3}{4} - 600\frac{1}{2}$

12. Create a word problem that could be answered with the calculation in problem 5.

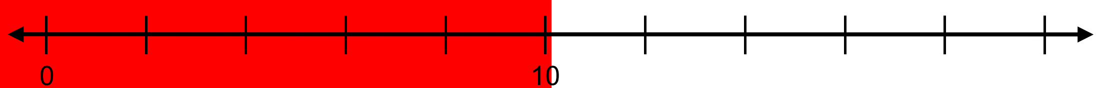
SKILL BUILDER 7

Label the number lines below using the scales provided. Then write letters above the number lines to estimate the placement of the given numbers.

1. (A) 0.4 (B) 0.04 (C) 0.33 (D) 0.799 (E) 0.909



2. (F) 10.5 (G) 10.05 (H) 12.09 (J) 12.9 (K) 19.1



3. Order these numbers from least to greatest.

0.88 8.08 0.08 8 0.0888

________ < ________ < ________ < ________ < ________

4. Write 41% as a decimal and a fraction.

Change each mixed number into an improper fraction.

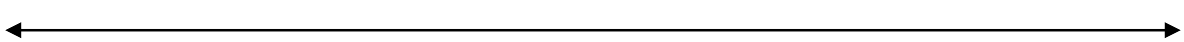
5. $5\frac{2}{3}$	6. $1\frac{5}{6}$	7. $7\frac{1}{7}$

Change each improper fraction into a mixed number.

8. $\frac{8}{3}$	9. $\frac{9}{2}$	10. $\frac{17}{6}$

11. Estimate the location of each number on the number line below.

$\frac{3}{4}$ $\frac{3}{7}$ $\frac{3}{9}$ $\frac{1}{4}$ $\frac{1}{3}$



FOCUS ON VOCABULARY

Explain what was done in each step of this subtraction problem. Use as many vocabulary words from the word list below as you can in your explanations.

Problem step		Explanation
1.	$= 1\frac{1}{2} - \frac{5}{8}$	Problem given as the difference between a mixed number and a proper fraction.
2.	$= 1 + \frac{1}{2} - \frac{5}{8}$	
3.	$= \left(1 - \frac{5}{8}\right) + \frac{1}{2}$	
4.	$= \left(\frac{8}{8} - \frac{5}{8}\right) + \frac{1}{2}$	
5.	$= \left(\frac{8}{8} - \frac{5}{8}\right) + \frac{1}{2}\left(\frac{4}{4}\right)$	
6.	$= \left(\frac{8}{8} - \frac{5}{8}\right) + \frac{4}{8}$	
7.	$= \frac{7}{8}$	

Word List

common denominator	improper fraction	mixed number
difference	least common multiple	proper fraction
equivalent fractions	least common denominator	multiplication property of 1
greatest common factor		sum

SELECTED RESPONSE

Show your work on a separate sheet of paper.

1. Choose all fractions below that are equivalent to $\frac{6}{8}$.

   A. $\frac{2}{3}$ B. $\frac{3}{4}$ C. $\frac{4}{6}$ D. $\frac{12}{16}$

2. A number has a numerator of 24 and is equivalent to $\frac{3}{8}$. What is its denominator?

   A. 3   B. 8   C. 9   D. 64

3. Choose all fractions below that are greater than $\frac{3}{5}$.

   A. $\frac{2}{5}$ B. $\frac{2}{3}$ C. $\frac{4}{5}$ D. $\frac{8}{15}$

Use the following information for problems 4 - 7.
On a hike, Maria drank $1\frac{2}{3}$ bottles of water, Nina drank $\frac{3}{4}$ of a bottle, and Shauna drank $2\frac{1}{3}$ bottles.

4. Who drank the LEAST amount of water?

   A. Maria   B. Nina   C. Shauna

5. How much water did the three of them drink in all?

   A. $1\frac{3}{4}$ bottles   B. $3\frac{3}{4}$ bottles   C. $4\frac{3}{4}$ bottles   D. $3\frac{6}{12}$ bottles

4. How much more water did Shauna drink compared to Maria?

   A. $\frac{2}{3}$ of a bottle   B. 1 bottle   C. $1\frac{1}{3}$ of a bottle   D. 2 bottles

KNOWLEDGE CHECK

Show your work on a separate sheet of paper and write your answers on this page.

7.1 Equivalent Fractions

1. Draw diagrams using the splitting method to show that $\frac{4}{6} = \frac{2}{3}$.

2. Draw diagrams using the replicating method to show that $\frac{3}{5} = \frac{12}{20}$.

3. Write each pair of fractions using a common denominator. Then circle the fraction with greater value.

   $\frac{2}{3}$ and $\frac{4}{5}$ $\qquad\qquad$ $\frac{1}{3}$ and $\frac{2}{7}$

7.2 Fraction Addition

Find the following sums.

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

5. $6\frac{5}{8} + 5\frac{3}{4}$

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

7. Create a word problem that could involve the calculation in problem 4.

6.3 Fraction Subtraction

Find the following differences.

8. $10\frac{1}{4} - 8\frac{3}{8}$

9. $6\frac{2}{3} - \frac{1}{2} - 3\frac{1}{6}$

10. You have 3 energy bars. You give $1\frac{1}{3}$ bars to your friend. Then you give $\frac{2}{3}$ of a bar to your sister. How much do you have left?

HOME SCHOOL CONNECTION

Here are some questions to review with your young mathematician.

1. Use either replicating or splitting diagrams to show that the pairs of fractions below are equivalent.

$$\frac{5}{7} = \frac{15}{21} \qquad\qquad \frac{1}{4} = \frac{3}{12}$$

2. Ming is making two birthday cakes for his twin sisters. One cake needs $1\frac{2}{3}$ cups of flour and $\frac{3}{4}$ of a cup of sugar. The other cake needs $2\frac{1}{2}$ cups of flour and 1 cup of sugar.

   a. How much flour does Ming need in total?

   b. How much sugar does he need in total?

   c. Does he need more flour or sugar? How much more?

Parent (or Guardian) Signature ______________________________

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COMMON CORE STATE STANDARDS – MATHEMATICS

STANDARDS FOR MATHEMATICAL CONTENT	
4.NF.1*	Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
4.NF.2*	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
5.NF.1*	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)
5.NF.2*	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.

*Review of content essential for success in 6th grade.

STANDARDS FOR MATHEMATICAL PRACTICE	
MP3	Construct viable arguments and critique the reasoning of others.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

9 7 8 1 6 1 4 4 5 0 1 1 5

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