Day 1 Answer Keys

Monday, March 16, 2020   8:23 AM

Day 1
MGSE5 N

Lesson 11

Add and Subtract Fractions in Word Problems

Name: _____

Prerequisite: Use Benchmark Fractions

Study the example problem showing comparing numbers by using the benchmark fraction $\frac{1}{2}$. Then solve problems 1–5.

Example

Ricci and his brother Lorenzo both have to practice for an upcoming karate tournament. Ricci practices for $\frac{3}{8}$ hour, and Lorenzo practices for $\frac{3}{4}$ hour. Which brother practices for a longer time?

Compare both numbers to the benchmark fraction $\frac{1}{2}$.
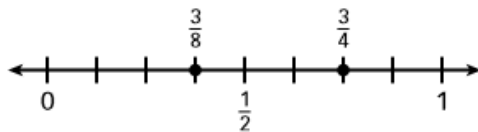
Look at the number line. It shows that $\frac{3}{8}$ is less than $\frac{1}{2}$ and $\frac{3}{4}$ is greater than $\frac{1}{2}$.

So, $\frac{3}{8} < \frac{3}{4}$ and $\frac{3}{4} > \frac{3}{8}$.

Lorenzo practices for a longer time.

1 Use the number line in the example problem to compare each fraction below to $\frac{1}{2}$. Write each fraction in the correct box.

$$\frac{6}{8} \quad \frac{3}{4} \quad \frac{1}{4} \quad \frac{5}{8} \quad \frac{2}{4} \quad \frac{7}{8} \quad \frac{2}{8}$$

Less than $\frac{1}{2}$	Equal to $\frac{1}{2}$	Greater than $\frac{1}{2}$
$\frac{1}{4}, \frac{2}{8}$	$\frac{2}{4}$	$\frac{4}{8}, \frac{3}{4}, \frac{5}{8}, \frac{7}{8}$

Vocabulary

benchmark fraction
a common fraction you can judge other numbers against
$\left(\text{example: } \frac{1}{4}, \frac{1}{2}, \frac{3}{4}\right)$

　　Lesson 11 Add and Subtract Fractions in Word Problems　**113**

Solve.

2 You can also use the number 1 as a benchmark. Use the fractions from the box.

Write each fraction that is

a.　greater than 1. $\frac{4}{3}$, $\frac{7}{5}$, $\frac{16}{10}$

b.　less than 1. $\frac{1}{3}$, $\frac{12}{15}$, $\frac{3}{10}$, $\frac{2}{5}$

c.　equal to 1. $\frac{3}{3}$

$\frac{1}{3}$	$\frac{4}{3}$	$\frac{12}{15}$
	$\frac{3}{10}$	$\frac{7}{5}$
$\frac{3}{3}$	$\frac{2}{5}$	$\frac{16}{10}$

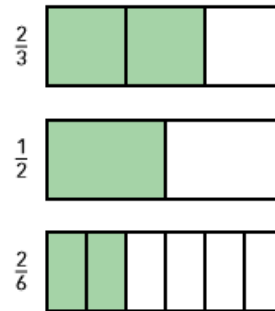**3** Which fraction from problem 2 is greater than $1\frac{1}{2}$?

Explain how you know. $\frac{16}{10}$ simplifies to $1\frac{6}{10}$, which is more than $1\frac{5}{10}$ which is $1\frac{1}{2}$.

4 You can also model comparisons to $\frac{1}{2}$ using fraction strips. Write $>$, $=$, or $<$ to compare each set of fractions below.

$\frac{2}{3}$ ___$>$___ $\frac{1}{2}$　　　　$\frac{2}{6}$ ___$<$___ $\frac{1}{2}$

So, $\frac{2}{3}$ ___$>$___ $\frac{2}{6}$.

5 Josan and Andrea are on a long-distance bike ride. They decide they will stop for water if either of their water bottles is less than half full. Josan's bottle is $\frac{2}{5}$ full. Andrea's bottle is $\frac{5}{6}$ full. Should they stop? Explain.

Show your work.

Solution: Yes $\frac{2}{5}$ is less than $\frac{1}{2}$

Lesson 11

Name: _____

Estimate using Benchmark Fractions

Study the example problem showing how to estimate a sum using benchmark fractions. Then solve problems 1–5.
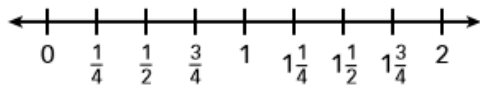
Example

David grew $1\frac{3}{4}$ inches last year and $1\frac{5}{8}$ inches this year. Estimate how much he grew in the two years.

You can estimate $1\frac{3}{4} + 1\frac{5}{8}$ using benchmark fractions. The number line below shows common fractions used as benchmark fractions to estimate sums and differences.

$$0 \quad \frac{1}{4} \quad \frac{1}{2} \quad \frac{3}{4} \quad 1 \quad 1\frac{1}{4} \quad 1\frac{1}{2} \quad 1\frac{3}{4} \quad 2$$

$1\frac{3}{4}$ is already one of the benchmark fractions, so just estimate $1\frac{5}{8}$.

$1\frac{5}{8}$ is a little greater than $1\frac{1}{2}$. Estimate using $1\frac{1}{2}$.

$1\frac{3}{4} + 1\frac{1}{2} = 1\frac{3}{4} + 1\frac{2}{4} = 2\frac{5}{4}$, or $3\frac{1}{4}$.

The sum is a little greater than $3\frac{1}{4}$, so David grew a little more than $3\frac{1}{4}$ inches.

1 Look at the example problem. Explain how you know $1\frac{5}{8}$ is a little greater than $1\frac{1}{2}$.

$1\frac{1}{2} = 1\frac{4}{8}$ which is less than $1\frac{5}{8}$

2 Find the actual sum of $1\frac{3}{4} + 1\frac{5}{8}$ to determine how much David grew in two years. Explain how you know your answer is reasonable.

Show your work.

$1\frac{3}{4} = 1\frac{6}{8} + 1\frac{5}{8} = 2\frac{11}{8} \left(= 3\frac{3}{8}\right)$

$3\frac{3}{8}$

Solution: 1. Found common denominators 2. Made equivalent fractions 3. added 4. simplified.

Lesson 11 Add and Subtract Fractions in Word Problems   **115**

Solve.

Irene makes $4\frac{2}{3}$ cups of pancake batter. She splits the batter into 2 bowls. She mixes blueberries into $2\frac{1}{4}$ cups of batter and walnuts into the rest of the

$4\frac{2}{3} - 2\frac{1}{4}$ is about

batter.

3 Estimate how much of the batter has walnuts in it. Explain your estimate.

$$4\frac{2}{4} - 2\frac{1}{4} = 2\frac{1}{4}$$

about 2¼. I estimated 4⅔ to be about 4½ which is 4²⁄₄. Then I subtracted.

4 Find the actual amount of batter that has walnuts in it. Explain how you know your answer is reasonable.

Show your work.

$$4\frac{2}{3} - 2\frac{1}{4} = 4\frac{8}{12} - 2\frac{3}{12} \boxed{2\frac{5}{12}}$$

Solution: *1. Common denominators 2. equivalent fractions 3. Subtracted 4. simplify*

5 Irene makes a second batch of $3\frac{1}{4}$ cups of pancake batter. She wants to know how much more batter she made in the first batch. She estimates that the difference between the sizes of the two batches $4\frac{2}{3} - 3\frac{1}{4}$ is $2\frac{1}{12}$. Explain why this estimate is *not* reasonable.

$$4\frac{2}{8} \overset{(about)}{\approx} 4\frac{1}{2} - 3\frac{1}{4} = 1\frac{1}{2}$$

while It is a close estimate, 2¹⁄₂ is a bit large for the answer.
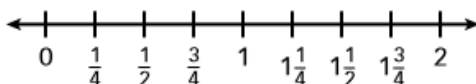
Lesson 11

Name: _____

Add and Subtract Fractions in Word Problems

Solve the problems.

1 Write the missing numbers to show equivalent fractions for some common numbers used as benchmarks.

> **Remember to multiply both the numerator and denominator by the same number to show an equivalent fraction.**

Number line: 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2

$\boxed{2}$ $\boxed{3}$ $\boxed{6}$ $\boxed{9}$

a. $\frac{\cdot}{4}, \overline{\frac{}{8}}, \overline{\frac{}{12}}$ **c.** $\frac{\cdot}{4}, \overline{\frac{}{8}}, \overline{\frac{}{12}}$

b. $\frac{1}{2}, \frac{\boxed{4}}{8}, \frac{\boxed{5}}{10}$ **d.** $2, \frac{\boxed{2}}{2}, \frac{\boxed{8}}{4}$

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2 The Graf family made two pizzas. They ate $1\frac{1}{8}$ pizza before watching a movie, and $\frac{1}{2}$ pizza more after the movie. Which is a reasonable estimate for the amount of pizza left?

Where is $1\frac{1}{8}$ located on the number line?

A less than $\frac{1}{2}$ **C** less than $1\frac{1}{4}$

B more than $\frac{1}{2}$ **D** more than $1\frac{1}{4}$

Tammy chose **A** as the correct answer. How did she get that answer?

She could have subtracted from 2 or added and then subtracted from 2

$2 - 1\frac{1}{8} = \frac{7}{8} - \frac{4}{8} = \frac{3}{8}$

Lesson 11 Add and Subtract Fractions in Word Problems   **117**

Solve.

3 Lexi bought $1\frac{2}{5}$ pounds of green grapes and $2\frac{3}{10}$ pounds of red grapes. Grapes are \$2.99 a pound. Did Lexi spend more or less than \$12 on grapes? Explain.

$1\frac{4}{10} + 2\frac{3}{10} = 3\frac{7}{10} \approx 3\frac{1}{2}$

Do I need to find the actual number of pounds of grapes, or can I answer the question using an estimate?

Less than 12. $3\frac{1}{2}$ pounds is between \$9-\$12 because \$2.99 rounds to 3. 3×3=9 and 3×4=12.

4 On Monday Marco practiced the piano for $\frac{7}{10}$ hour. On Tuesday he practiced for $1\frac{5}{6}$ hours. He is supposed to practice $1\frac{1}{4}$ hours each day.

Use this information to write a question that involves adding or subtracting fractions.

$$1\frac{1}{4} - \frac{7}{10} \quad \text{or} \quad 1\frac{5}{6} - 1\frac{1}{4}$$

> What fractions can I use to write an addition or subtraction question?

5 Look at the question you wrote in problem 4. Show how to estimate the answer. Then find the actual answer.

Show your work.

$$1\frac{1}{4} - \frac{3}{4} = \frac{2}{4} \text{ or } \frac{1}{2}$$

$$\sqrt{\frac{25}{20}} - \frac{14}{20} = \frac{11}{20} \text{ hours too short}$$

> What benchmark fractions could I use to estimate?

Solution: _____

Day 1
MGSE5 N

Lesson 11   👥 Introduction

MGSE5.NF.2

Add and Subtract Fractions in Word Problems

🅖 Use What You Know

Now that you can add and subtract fractions with different denominators, you can use this skill to solve word problems. Take a look at this problem.

Aleena has a 1-gallon watering can that is full of water. She uses $\frac{3}{8}$ gallon to water her roses and $\frac{1}{3}$ gallon to water her geraniums. How much water did Aleena use to water both the roses and geraniums?
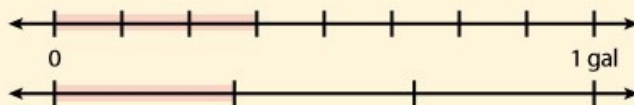
a. Does Aleena use more than $\frac{1}{2}$ gallon or less than $\frac{1}{2}$ gallon of water? <u>less</u>

b. How do you know? <u>the line on the bottom is less than the one on the top.</u>

c. Estimate how much water Aleena used. <u>$\frac{7}{8}$</u>

d. Write an equation with equivalent fractions to find the amount of water Aleena used.

$$\frac{3}{8}+\frac{1}{3}=\frac{9}{24}+\frac{8}{24}=\boxed{\frac{17}{24}}$$

e. Is this answer reasonable based on your estimate? Explain. <u>It is smaller than my estimate.</u>

104   **Lesson 11** Add and Subtract Fractions in Word Problems   ©Curriculum Associates, LLC   Copying is not permitted.

▶ Find Out More

The number line below shows the location of **benchmark fractions** between 0 and 2. You can use these fractions to estimate sums and differences.

Number line: 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2
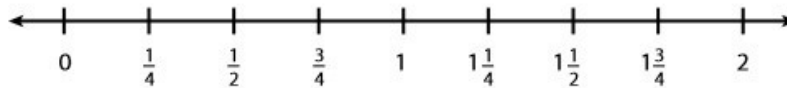
There are different ways to estimate the sums or differences of fractions. The examples below show two ways to think about fractions to find estimates for the amount of water Aleena used to water her flowers.

$$\frac{3}{8}+\frac{1}{3}=?$$

Student A

$\frac{3}{8}$ and $\frac{1}{3}$ are both less than $\frac{1}{2}$, or $\frac{4}{8}$.

So the sum must be less than 1.

Student B

$\frac{3}{8}$ is a little greater than $\frac{1}{4}$. $\frac{1}{3}$ is a little greater than $\frac{1}{4}$.

I know $\frac{1}{4}+\frac{1}{4}$ is $\frac{2}{4}$, or $\frac{1}{2}$.

So, I estimate the sum is greater than $\frac{1}{2}$.

▶ Reflect

1 Both estimates above model correct thinking. Which estimate makes more sense to

both estimates above model correct thinking. Which estimate makes more sense to you? Why?

student A because I know ⅓+½ is equal to 1 so it will be less than 1.

Lesson 11 Add and Subtract Fractions in Word Problems   **105**

**Lesson 11** 👥 **Modeled and Guided Instruction**

Learn About **Solving Word Problems with Fractions**

Read the problem below. Then explore different ways to estimate and solve problems with fractions.

> Frankie purchases a $3\frac{1}{2}$-pound bag of chicken. He uses $1\frac{1}{3}$ pounds of chicken for fajitas. How many pounds of chicken are left?

▶ **Picture It** **You can picture the problem using a fraction strip.**

The fraction strip below represents $3\frac{1}{2}$ pounds of chicken. It is separated into sections representing the $1\frac{1}{3}$ pounds used for fajitas and the unused amount.


$1\frac{1}{3}$ **pounds for fajitas**   **unused amount**

total amount of chicken
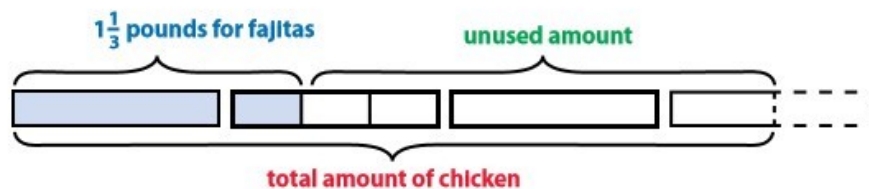
The model shows the difference $3\frac{1}{2} - 1\frac{1}{3}$.

▶ **Model It** **You can model the problem with a number line.**

Since $2 \times 3 = 6$, the fractions in the problem, $3\frac{1}{2}$ and $1\frac{1}{3}$, can be rewritten using a common denominator of 6. $3\frac{1}{2} = 3\frac{3}{6}$ and $1\frac{1}{3} = 1\frac{2}{6}$.

The number line below is divided into sixths. It shows starting with a total of $3\frac{1}{2}$ pounds, with two jumps to the left representing the $1\frac{1}{3}$ pounds of chicken used.

$-\frac{1}{3}$ -1
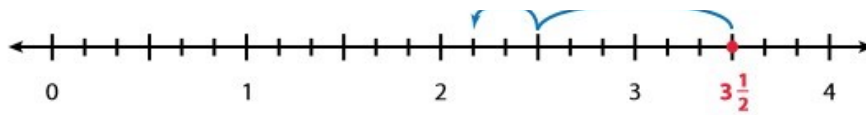
You can rewrite the difference $3\frac{1}{2} - 1\frac{1}{3}$ as $3\frac{3}{6} - 1\frac{2}{6}$.

▶ **Connect It** Now you will estimate and then solve the problem from the previous page using benchmark fractions and an equation.

2 Identify the closest half on either side of $1\frac{1}{3}$.

$1\frac{1}{3}$ is greater than __1__ and less than __$1\frac{1}{2}$__.

3 Why are halves a good choice for benchmark fractions for $1\frac{1}{3}$?

$\frac{1}{3}$ is in between halfs.

4 The difference $3\frac{1}{2}$ minus $1\frac{1}{3}$ must be between __$2\frac{1}{2}$__ and __$1\frac{1}{2}$__.

Estimate $3\frac{1}{2} - 1\frac{1}{3}$ and explain your estimate.

$3\frac{1}{2} - 1\frac{1}{2} = 2$

5 Find the actual difference. $3\frac{3}{6} - 1\frac{2}{6} = 2\frac{1}{6}$

There are __$2\frac{1}{6}$__ pounds of chicken remaining.

6 Is this a reasonable answer based on your estimate? Explain. yes.

It is between $2\frac{1}{2}$ and $1\frac{1}{2}$

7 Explain how you can check if a fraction sum or difference is reasonable.

Estimate

▶ **Try It** Use what you just learned about estimating with benchmark fractions to solve this problem. Show your work on a separate sheet of paper.

8 Tim's bean sprout grew $3\frac{3}{8}$ inches. Teegan's bean sprout grew $2\frac{3}{4}$ inches. How many more inches did Tim's bean sprout grow than Teegan's? First, estimate the difference and explain your reasoning. Then find the actual difference.

$3\frac{3}{8} - 2\frac{3}{4} \approx 3\frac{1}{2} - 3 = \frac{1}{2}$

_2 4 9   _2 8 ⁻(8)

## Lesson 11   👥 Guided Practice

Practice > Solving Word Problems with Fractions

Study the example below. Then solve problems 9–11.

Example

The blue field of stars on a flag has an area of $1\frac{3}{5}$ square yards. The red stripes have a combined area of $2\frac{3}{10}$ square yards. What is the difference between the area of the blue field of stars and the area of the red stripes?

Look at how you could show your work using fraction strips.

red | 1 | 1 | $\frac{3}{10}$ |

blue | 1 | $\frac{6}{10}$ |

difference $= \frac{7}{10}$
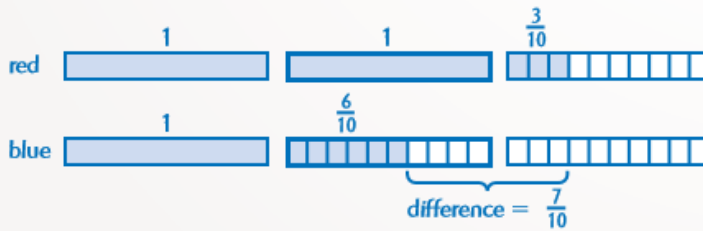
Solution $\frac{7}{10}$ square yard

> **What common denominator was used to subtract these fractions?**

> 💬 **Pair/Share**
> What benchmark fractions could you use to estimate the answer?

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9 Parker mixes $3\frac{1}{2}$ ounces of blue paint with $1\frac{2}{5}$ ounces of yellow paint to create green paint to use for the leaves of a tree. How many ounces of green paint did Parker create?

Estimate, and then compute. Explain how you know your result is reasonable.

Show your work.

$3\frac{1}{2} + 1\frac{2}{5} = 3\frac{1}{2} + 1\frac{1}{2} = 5$

$3\frac{5}{10} + 1\frac{4}{10} = \boxed{4\frac{9}{10}}$

> **Will there be a little more than $4\frac{1}{2}$ ounces or a little less than $4\frac{1}{2}$ ounces of green paint?**

> 💬 **Pair/Share**
> Was your estimate more than or less than the actual answer? By how much?

Solution _____

_____

10 Jose's football weighs $\frac{7}{8}$ pound. His football helmet weighs $5\frac{1}{6}$ pounds. Estimate how much more the helmet weighs than the football. Explain your estimate.

$$5\frac{1}{6} - \frac{7}{8} \approx 5 - 1 = 4$$

$5\frac{1}{6}$ is close to 6 and $\frac{7}{8}$ is close to 1.

$$5 - 4 = 4$$

> What benchmark fractions could I use to estimate the difference in weight?

> **Pair/Share**
> How does an estimate help you tell if your answer is reasonable?

Solution _____

11 Which is a reasonable estimate for the difference $5\frac{1}{2} - 3\frac{5}{9}$? Circle the letter of the correct answer.

A between $\frac{1}{2}$ and 1

B between 1 and $1\frac{1}{2}$

C between $1\frac{1}{2}$ and 2

D between 2 and $2\frac{1}{2}$

$$5\frac{1}{2} - 3\frac{1}{2} = 2$$

> How can I use benchmark fractions to estimate the difference?

Elise chose **D** as the correct answer. How did she get that answer?

She might have rounded $3\frac{5}{9}$ to $3\frac{1}{2}$.

> **Pair/Share**
> Does Elise's answer make sense?

Lesson 11 Add and Subtract Fractions in Word Problems   **109**

Lesson 11 👤 **Independent Practice**

Practice Solving Word Problems with Fractions

Solve the problems.

1 William compares monthly rainfall amounts for the summer months using the table below.

Month	Monthly Rainfall
June	$3\frac{3}{10}$ inches
July	$3\frac{3}{4}$ inches
August	$3\frac{1}{2}$ inches

About how much more rain fell in July than in June?

A $\frac{1}{4}$ inch

B $\frac{1}{2}$ inch

C 1 inch

D $1\frac{1}{2}$ inches

$$3\frac{3}{4} - 3\left(\frac{3}{10}\right) \approx \frac{1}{4}$$

2 Several expressions are shown. Decide if the value of each expression is less than $1\frac{1}{2}$, between $1\frac{1}{2}$ and 2, or greater than 2. Write each expression in the correct category in the chart.

$2\frac{1}{2} - 1\frac{1}{8}$ $1\frac{5}{11} + \frac{3}{4}$ $3\frac{4}{5} - 1\frac{1}{3}$ $\frac{3}{8} + \frac{9}{10}$

Less than $1\frac{1}{2}$	Between $1\frac{1}{2}$ and 2	Greater than 2
$2\frac{1}{2} - 1\frac{1}{8}$	$1\frac{5}{11} + \frac{3}{4}$ $\frac{3}{8} + \frac{9}{10}$	$3\frac{4}{5} - 1\frac{1}{3}$

3 The table below shows the thickness of coins.

Coin	Thickness
quarter	$1\frac{3}{4}$ millimeters
dime	$1\frac{7}{20}$ millimeters
nickel	$1\frac{19}{20}$ millimeters
penny	$1\frac{1}{2}$ millimeters

Hailey stacks a dime on top of a penny. She estimates the thickness of the two coins to be less than 3 millimeters.

Write a symbol ($<$, $>$, or $=$) in the box to make the statement true. Then use the statement to tell whether Hailey's estimate is correct.

$$1\frac{1}{2} + 1\frac{7}{20} \boxed{<} 1\frac{1}{2} + 1\frac{1}{2}$$

Is Hailey's estimate correct? _yes. It is close_

4 Jimmy says $3\frac{4}{9} - 2\frac{5}{6}$ is $1\frac{1}{3}$.

Part A Without finding the actual difference, explain why Jimmy's difference is or is not reasonable.

$3\frac{1}{3} - 2\frac{2}{3} = \frac{2}{3}$. His estimate is too high.

Part B Find the actual difference.
Show your work.

$$3\frac{4}{9} - 2\frac{5}{6} = 2\frac{24}{54} - 2\frac{45}{54} = \boxed{\frac{33}{54}}$$

78
$+54$
24

78
-45
33

Solution _____

✓ **Self Check** Go back and see what you can check off on the Self Check on page 93.