Name _____

Estimating Fraction Sums

R 10-1

When you add two fractions, the sum is going to be less than, equal to, or greater than 1. An easy way to estimate the sum is to compare both of the fractions to $\frac{1}{2}$.

If both of the fractions are less than $\frac{1}{2}$, then the sum is going to be less than 1.

Example: $\frac{1}{5} + \frac{1}{3} < 1$

If both of the fractions are greater than $\frac{1}{2}$, then the sum is going to be greater than 1.

Example: $\frac{4}{5} + \frac{6}{7} > 1$

To compare a fraction to $\frac{1}{2}$, divide the denominator by 2. If the numerator is less than your quotient, the fraction is less than $\frac{1}{2}$. If it is greater than your quotient, the fraction is greater than $\frac{1}{2}$.

Write $>$ or $<$ for each ◯.

1. $\frac{3}{4} + \frac{5}{6}$ ◯ 1 **2.** $\frac{2}{7} + \frac{1}{3}$ ◯ 1 **3.** $\frac{5}{16} + \frac{3}{10}$ ◯ 1 **4.** $\frac{3}{12} + \frac{2}{12}$ ◯ 1

5. $\frac{4}{5} + \frac{5}{7}$ ◯ 1 **6.** $\frac{6}{10} + \frac{9}{10}$ ◯ 1 **7.** $\frac{1}{3} + \frac{1}{4}$ ◯ 1 **8.** $\frac{2}{3} + \frac{7}{12}$ ◯ 1

Estimate to decide whether each sum is greater than 1 or less than 1. If you cannot tell, explain why.

9. $\frac{9}{12} + \frac{2}{5}$ _____

_____

10. $\frac{1}{4} + \frac{7}{16}$ _____

11. Number Sense Is $\frac{2}{4} + \frac{8}{16}$ greater than, equal to, or less than 1? Explain.

_____

_____

_____

Name _____

Adding Fractions with Like Denominators

R 10-2

How to add fractions that have the same denominator:

$\frac{2}{3} + \frac{2}{3}$

Step 1

Estimate.

$\frac{2}{3} > \frac{1}{2}$, so $\frac{2}{3} + \frac{2}{3} > 1$.

Step 2

Add the numerators. Keep the denominator the same. Write the sum of the numerators over the denominator.

$\frac{2}{3} + \frac{2}{3} = \frac{4}{3}$

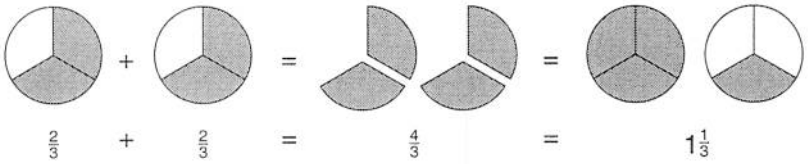
Step 3

Simplify, if necessary.

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

So, $\frac{2}{3} + \frac{2}{3} = 1\frac{1}{3}$

The answer is reasonable since $1\frac{1}{3} > 1$.



Find each sum.

1. $\frac{2}{5} + \frac{1}{5} =$ _____

2. $\frac{1}{3} + \frac{1}{3} =$ _____

3. $\frac{2}{4} + \frac{3}{4} =$ _____

4. $\frac{6}{10} + \frac{2}{10} =$ _____

5. $\frac{1}{5} + \frac{3}{5} =$ _____

6. $\frac{9}{16} + \frac{3}{16} =$ _____

7. $\frac{4}{12} + \frac{9}{12} =$ _____

8. $\frac{6}{7} + \frac{6}{7} =$ _____

9. $\frac{3}{15} + \frac{5}{15} =$ _____

10. $\frac{5}{10} + \frac{9}{10} =$ _____

11. Number Sense Jake estimates that $\frac{12}{19} + \frac{18}{19}$ is less than 1, since both fractions are less than 1. Is he correct?

_____

_____

_____

Name _____

Adding Fractions with Unlike Denominators

R 10-3

To change fractions to like denominators, you write equivalent fractions.

Example: $\frac{1}{8} \times \frac{2}{2} = \frac{2}{16}$

So, $\frac{1}{8} = \frac{2}{16}$.

$$\begin{array}{r} \frac{2}{6} \\ +\ \frac{1}{4} \\ \hline \end{array}$$

Step 1

First estimate.

$\frac{2}{6} < \frac{1}{2}$ and
$\frac{1}{4} < \frac{1}{2}$, so
$\frac{2}{6} + \frac{1}{4} < 1$.

Step 2

Find equivalent fractions with like denominators.

$$\begin{array}{r} \frac{2}{6} = \frac{8}{24} \\ +\ \frac{1}{4} = \frac{6}{24} \\ \hline \end{array}$$

Step 3

Add the numerators. Write the sum over the denominator. Simplify, if necessary.

$$\begin{array}{r} \frac{8}{24} \\ +\ \frac{6}{24} \\ \hline \frac{14}{24} = \frac{7}{12} \end{array}$$

The sum is reasonable since $\frac{7}{12} < 1$.

1. $\begin{array}{r} \frac{5}{6} \\ +\ \frac{1}{3} \\ \hline \end{array}$

2. $\begin{array}{r} \frac{1}{4} \\ +\ \frac{4}{5} \\ \hline \end{array}$

3. $\begin{array}{r} \frac{3}{10} \\ +\ \frac{1}{20} \\ \hline \end{array}$

4. $\begin{array}{r} \frac{3}{4} \\ +\ \frac{1}{6} \\ \hline \end{array}$

5. $\begin{array}{r} \frac{1}{2} \\ +\ \frac{3}{8} \\ \hline \end{array}$

6. $\begin{array}{r} \frac{1}{9} \\ +\ \frac{2}{3} \\ \hline \end{array}$

7. Reasoning Carl says that since the sum of 3 and 5 is 8, he can use 8 as a denominator to add $\frac{1}{3} + \frac{1}{5}$. Is he correct? Explain.

_____

_____

Name _____

Subtracting Fractions with Like Denominators

R 10-4

When two fractions with the same denominator are being subtracted, the denominator in the difference remains the same and the numerators are subtracted.

Find $\frac{9}{12} - \frac{3}{12}$.

Step 1

Subtract the numerators. Write the difference over the denominator.

$$\frac{9}{12} - \frac{3}{12} = \frac{6}{12}$$

Note that the denominator stays the same.

Step 2

Simplify, if necessary.

$\frac{6}{12}$ is not in simplest form.

6 is a common factor of 6 and 12, so divide each number by 6.

$$\frac{6 \div 6}{12 \div 6} = \frac{1}{2}$$

So, $\frac{9}{12} - \frac{3}{12} = \frac{1}{2}$

1. $\frac{3}{5} - \frac{1}{5} =$ _____

2. $\frac{5}{9} - \frac{2}{9} =$ _____

3. $\frac{6}{12} - \frac{5}{12} =$ _____

4. $\frac{2}{3} - \frac{1}{3} =$ _____

5. $\frac{4}{8} - \frac{1}{8}$

6. $\frac{4}{7} - \frac{3}{7}$

7. $\frac{7}{8} - \frac{1}{8}$

8. $\frac{9}{12} - \frac{1}{12}$

9. Estimation Is $\frac{5}{8} - \frac{3}{8}$ more or less than $\frac{1}{2}$? Explain.

Name _____

Subtracting Fractions with Unlike Denominators

R 10-5

When the denominators are not easily found for both of the fractions, you can multiply the denominators together.

$$\begin{array}{r} \frac{3}{7} \\ -\ \frac{1}{6} \\ \hline \end{array}$$

Take the denominator from the second fraction, and multiply both the numerator and the denominator of the first fraction.

$$\frac{3}{7}\ \frac{\times 6}{\times 6} = \frac{18}{42}$$
$$-\frac{1}{6}$$

Take the denominator from the first fraction, and multiply both the numerator and the denominator of the second fraction.

$$\frac{3}{7} = \frac{18}{42}$$
$$-\frac{1}{6}\ \frac{\times 7}{\times 7} = -\frac{7}{42}$$

After the fractions have like denominators, subtract the numerators. Simplify the answer if necessary.

$$\frac{3}{7} = \frac{18}{42}$$
$$-\frac{1}{6} = \frac{7}{42}$$
$$18-7 = \frac{11}{42}$$

1. $\frac{3}{4} - \frac{5}{8} =$ _____

2. $\frac{7}{10} - \frac{1}{2} =$ _____

3. $\frac{7}{8} - \frac{2}{16} =$ _____

4. $\frac{3}{5} - \frac{3}{10} =$ _____

5. $\begin{array}{r} \frac{5}{6} \\ -\ \frac{3}{4} \\ \hline \end{array}$

6. $\begin{array}{r} \frac{2}{3} \\ -\ \frac{1}{2} \\ \hline \end{array}$

7. $\begin{array}{r} \frac{4}{7} \\ -\ \frac{3}{14} \\ \hline \end{array}$

8. $\begin{array}{r} \frac{5}{6} \\ -\ \frac{7}{10} \\ \hline \end{array}$

9. Number Sense Simon ran $\frac{3}{4}$ of a mile on Monday, $\frac{1}{3}$ of a mile on Tuesday, and $\frac{1}{2}$ a mile on Wednesday. How much farther did Simon run on Monday than on Wednesday?

_____

Name _____

PROBLEM-SOLVING STRATEGY **R 10-6**

Use Logical Reasoning

Sports Alan, Jack, Todd, and Trent play baseball, basketball, football, and soccer. Alan does not play a sport that begins with the letter b. Todd plays football. Jack does not play basketball. What sport does Trent play?

Read and Understand

Step 1: What do you know?

Alan does not play baseball or basketball. Todd plays football. Jack does not play basketball.

Step 2: What are you trying to find?

What sport Trent plays

Plan and Solve

Step 3: What strategy will you use?

Strategy: Use logical reasoning

You know that Todd is playing football, so you then know that Alan, Jack, and Trent do not play football. You also know that Todd is not playing baseball, basketball, or soccer.

Answer: Trent plays basketball.

	Baseball	Basketball	Football	Soccer
Alan	No	No	No	Yes
Jack	Yes	No	No	No
Todd	No	No	Yes	No
Trent	No	Yes	No	No

Look Back and Check

Step 4: Is your work correct? Yes, I filled in the information I was given and made the right conclusions.

1. Joleen, Cori, and Bethany are cousins, but they each have a different last name. None of the cousins have a last name that begins with the same letter as their first name. Bethany is not a Carson. What is each cousin's full name?

	Butcher	Carson	Jacobson
Bethany			
Cori			
Joleen			

Name _____

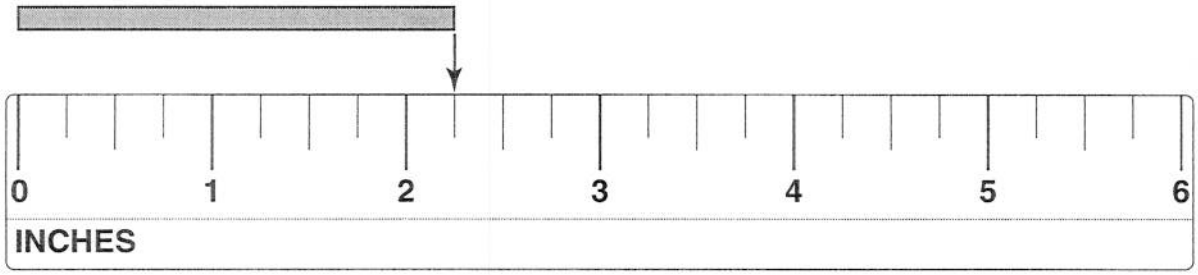
Length and Customary Units

R 10-7

Unit	Example
inch	width of a U.S. quarter
1 foot (ft) = 12 inches (in.)	gym shoes
1 yard (yd) = 3 feet	height of a desk
1 mile (mi) = 5,280 feet	distance between school and home

How to measure an object:

To measure an object, make sure one end of the object begins at the zero unit.



The rectangle is closest to the 2 in. mark, so we can say the rectangle is 2 in. long to the nearest inch.

Estimate first. Then find each length to the nearest inch.

1.  _____

2.  _____

Choose the most appropriate unit to measure the length of each. Write in., ft, yd, or mi.

3. cat _____

4. lake _____

5. hallway _____

6. basketball court _____

Name _____

Fractions of an Inch

R 10-8

The nail is just over $2\frac{1}{8}$ in. long.

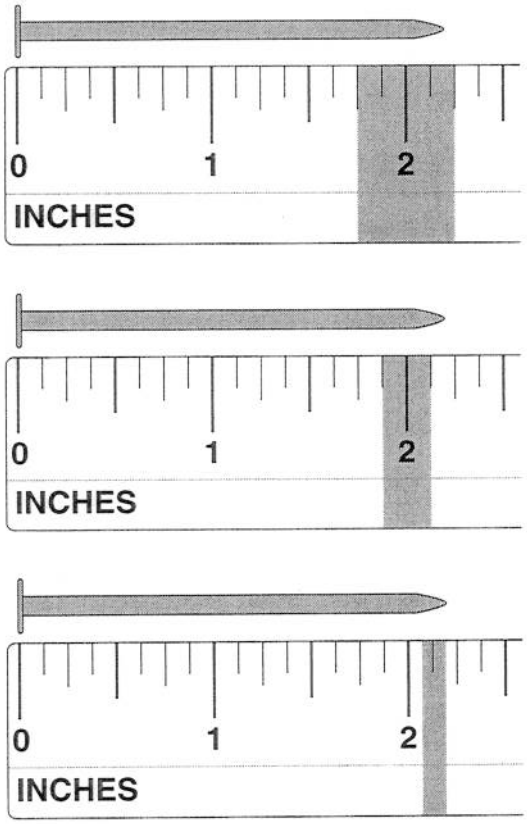
To the nearest inch, the nail is 2 in.

To the nearest $\frac{1}{2}$ in., the nail is also 2 in. long, because it is closer to 2 in. than it is to $2\frac{1}{2}$ in.

To the nearest $\frac{1}{4}$ in., the nail is $2\frac{1}{4}$ in. long, because the length is over $2\frac{1}{8}$, which is the halfway point between 2 and $2\frac{1}{4}$.

To the nearest $\frac{1}{8}$ in., the nail is $2\frac{1}{8}$ in. long.

The measurement to the nearest $\frac{1}{8}$ in. is the closest to the actual measurement.



Measure each segment to the nearest $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ in.

1. ⊢——————————⊣

_____, _____, _____

2. ⊢————————————⊣

_____, _____, _____

3. ⊢————⊣

_____, _____, _____

4. Number Sense A beetle is just over $1\frac{5}{8}$ in. long. How long is the beetle to the nearest $\frac{1}{2}$ in.?

_____

Name _____

Capacity and Customary Units

R 10-9

Capacity is the amount that a container can hold. Capacity is measured in teaspoons, tablespoons, fluid ounces, cups, pints, quarts, and gallons, from smallest to largest.

1 tablespoon (tbsp) = 3 teaspoons (tsp)

1 fluid ounce (fl oz) = 2 tbsp

1 cup (c) = 8 fl oz

1 pint (pt) = 2 c

1 quart (qt) = 2 pt

1 gallon (gal) = 4 qt

A container that holds 2 gal will hold more than 2 qt. A container that holds 20 c will hold less than 20 pt.

Choose the most appropriate unit or units to measure the capacity of each. Write tsp, tbsp, fl oz, c, pt, qt, or gal.

1. eye dropper _____

2. bathtub _____

3. milk carton _____

4. water tower _____

5. teacup _____

6. flour in a recipe _____

7. **Reasoning** Would a teaspoon be a good tool for measuring the amount of water in a bathtub? Explain why or why not.

_____

_____

Blood The adult human body contains about 5 qt of blood.

8. Are there more or less than 5 pt of blood in a human adult?

_____

9. Are there more or less than 5 gal of blood in a human adult?

_____

Name _____

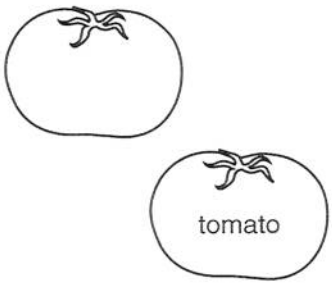
Weight and Customary Units

R 10-10

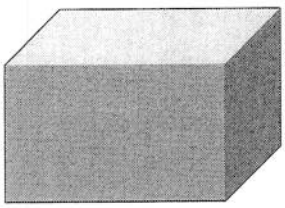
There are 16 ounces (oz) in 1 pound (lb).

There are 2,000 lb in 1 ton (T).

You use ounces to weigh smaller things, like a tomato.



You use pounds to weigh things like a heavy box.



You use tons to weigh very large or heavy things, like a rocket.

Choose the most appropriate unit to measure the weight of each. Write oz, lb, or T.

1. car _____

2. computer _____

3. bowling ball _____

4. onion _____

5. dinosaur _____

6. vacuum cleaner _____

7. **Reasoning** A hippo weighs about 5,000 lb. Does the same hippo weigh more or less than 5,000 oz?

_____

8. Would you most likely measure a leaf using ounces, pounds, or tons? Explain.

_____

_____

_____

_____

Name _____

Changing Units and Comparing Measures

R 10-11

How to change customary units:

To change larger units to smaller units, multiply.

12 yd = ☐ ft

Think: 1 yd = 3 ft

12 × 3 = 36

So, 12 yd = 36 ft.

To change smaller units to larger units, divide.

20 qt = ☐ gal

Think: 1 gal = 4 qt

20 ÷ 4 = 5

So, 20 qt = 5 gal.

How to compare measures:

Compare 2 mi ◯ 11,000 ft.

Step 1
Change to the same units.

2 mi ☐ 11,000 ft

1 mi = 5,280 ft

Think: 5,280 × 2 = 10,560

2 mi = 10,560 ft

Step 2
Compare.

10,560 ft < 11,000 ft

So, 2 mi < 11,000 ft.

Find each missing number.

1. 50 pt = _____ qt
2. 10 tbsp = _____ fl oz
3. 2 lb 1 oz = _____ oz
4. 9 yd = _____ ft
5. 3 gal = _____ qt
6. 12 tsp = _____ tbsp

Compare. Write > or < for each ◯.

7. 8 qt ◯ 3 gal
8. 10 lb ◯ 100 oz
9. 2 mi ◯ 5,000 yd

10. **Reasoning** The heart of a giraffe is 2 ft long and can weigh as much as 24 lb. How many ounces can the heart of a giraffe weigh? _____

Name _____

PROBLEM-SOLVING SKILL **R 10-12**

Exact Answer or Estimate

The Fund-raiser There are 296 students signed up to attend a fund-raiser at the school gym. Each student will receive an 8 oz bag of popcorn and a drink. Sheri is making the popcorn, and has made 3,000 oz so far. Does she need to make more?

What are you trying to find?

Is 3,000 oz enough popcorn for 296 students to each receive 8 oz?

Do you need an exact answer or an estimate?

You need to know the amount of popcorn needed for 296 students. You just need to know if there is enough already, so an estimate is OK.

Tell whether an exact answer is needed or if an estimate is enough. Then solve.

1. A picture measures 11 in. × 14 in. Michael wants to make a frame for the picture out of wood. He has a 5 ft piece of wood he would like to use. Is the wood long enough to make a frame?

_____

_____

2. Theo is a schoolteacher. He needs to order buses for a third-grade field trip. Each bus can hold 70 students. There are a total of 97 third graders. If Theo ordered 2 buses for the trip, will all of the students be able to fit?

_____

_____

3. Jane bought 7 notebooks. If each notebook costs $2, how much did Jane spend?

_____

Name_____

PROBLEM-SOLVING APPLICATION **R 10-13**

Facts Galore!

A full-sized whale needs to eat more than 2 T of food every day. Is 3,750 lb of food a day enough for a full-sized whale?

Remember, to compare measures you must first change to the same units.

1 T = 2,000 lb, so 2 T = 4,000 lb.

3,750 lb < 4,000 lb

So, 3,750 lb is not enough food for the whale.

Solve.

The Eiffel Tower is 984 ft tall and weighs 7,300 T.

1. How many yards tall is the Eiffel Tower? _____

2. How many pounds does the Eiffel Tower weigh?

_____

3. Presidents Cleveland, Coolidge, Eisenhower, Lincoln, and Nixon were from the states of California, Kentucky, New Jersey, Texas, and Vermont. Coolidge and Cleveland were not from California, Kentucky, or Texas. Lincoln was from Kentucky. Nixon was not from Texas. Cleveland's home state was New Jersey. Complete the chart to find out what state Eisenhower was from.

_____

	CA	NJ	TX	VT	KY
Cleveland					
Coolidge					
Eisenhower					
Lincoln					
Nixon					