# Fractions: Numbers and Words

There are only four (4) operations you can do in Math: Addition, Subtraction, Multiplication, and Division. Always check your answer to see if it can be reduced and simplified. When reducing fractions, look for 4 possibilities.

1) If both the numerator and the denominator are even numbers, they can be reduced by 2.
2) If they end in 5 and/or 0, they can be reduced by 5.
3) Check to see if they are divisible by 3.
4) Check to see if one will go evenly into the other.

Those 4 will cover most situations.

A) Multiplication

1) Multiplying fractions. Whenever we multiply fractions, we **multiply straight across.**

$\frac{1}{2} x \frac{3}{5} = \frac{3}{10}$ Multiply the numerators together (1 times 3) and multiply the denominators together (2 times 5).

2) Multiplying mixed numbers. We want to multiply fractions because that is easy. So, convert mixed numbers into improper fractions. To convert mixed numbers, multiply the denominator times the whole number and then add the numerator.

$5\frac{2}{3}$ becomes $\frac{17}{3}$ because we multiply the 3 times the 5 and then add the 2. Notice that we keep 3 as our denominator. So, $5\frac{2}{3} x 4\frac{1}{2}$ becomes $\frac{17}{3} x \frac{9}{2}$. Now, we **multiply straight across** and get $\frac{153}{6}$. This can be reduced by 3 to get $\frac{51}{2}$ which simplifies to $25\frac{1}{2}$.

We could have reduced first and then **multiplied straight across.** In the problem $\frac{17}{3} x \frac{9}{2}$, notice that the 3 goes into the 9... 3 times. We now have $\frac{17}{1} x \frac{3}{2}$. **Multiply straight across** to get $\frac{51}{2}$ which simplifies to $25\frac{1}{2}$.

B) Division

1) We do not divide by fractions. We multiply by the reciprocal (flip the divisor) and **multiply straight across.** $\frac{1}{5} \div \frac{1}{3}$ becomes $\frac{1}{5} x \frac{3}{1} = \frac{3}{5}$.

2) A whole number becomes a fraction by dividing it by 1. 8 is the same as $\frac{8}{1}$. So, the reciprocal of 8 would be $\frac{1}{8}$.

3) When we divide mixed numbers, convert them to improper fractions and then flip the divisor. $4\frac{2}{5} \div 3\frac{1}{5}$ becomes $\frac{22}{5} \div \frac{16}{5}$ which equals $\frac{22}{5} \times \frac{5}{16}$. The 5's cancel each other out, leaving us with $\frac{22}{16}$. Reducing by 2 gives us $\frac{11}{8}$ which simplifies to $1\frac{3}{8}$.

So, we do not divide by fractions. We multiply by the reciprocal and all of the multiplication steps now apply. Notice we do not flip the first fraction. Only the second fraction.

C) Addition and Subtraction

There are two situations: Like Denominators and Unlike Denominators **You must have like denominators in order to add or subtract fractions.**

1) Like Denominators

Fractions with the same denominator are called **Like Fractions**.
- To add like fractions, add the numerators. Use the same denominator in the sum.
- To subtract like fractions, subtract the numerators. Use the same denominator in the difference.

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

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

If you are adding mixed numbers with the same denominator, add the whole numbers and then add the fractions. $3\frac{2}{7} + 2\frac{1}{7} = 5\frac{3}{7}$. If your fraction sum creates an improper fraction, simplify it. $6\frac{5}{9} + 4\frac{6}{9} = 10\frac{11}{9} = 11\frac{2}{9}$.

2) Unlike Denominators

We need to have like denominators, so we must change the fraction without changing its value. This is when we find the Least Common Denominator (LCD) which is just like the Least Common Multiple.

a) Let's consider $\frac{1}{2} + \frac{3}{4}$. It is easy when the smaller denominator goes evenly into the larger denominator. In this case, 4 is the LCD, so we need to change $\frac{1}{2}$ to fourths. To make the 2 a 4, we must multiply it times 2. Whatever you multiply the denominator by, you must also multiply the numerator by. $\frac{1}{2} x \frac{2}{2} = \frac{2}{4}$. Notice that when we multiply the numerator **and** the denominator by the same number, we are multiplying by "1", which never changes the value of a number.

b) If both denominators are prime numbers, just multiply them together to find your LCD.

$\frac{3}{5} - \frac{1}{7}$ has two prime numbers, 5 and 7, as

denominators. The LCD will be 5x7 =35. To convert $\frac{3}{5}$ to

35ths, you multiply by 7. To convert $\frac{1}{7}$ to 35ths, you

multiply by 5. So, now we have $\frac{7}{7} x \frac{3}{5} - \frac{1}{7} x \frac{5}{5}$ to change our

problem to 35ths. This gives us $\frac{21}{35} - \frac{5}{35} = \frac{24}{35}$.

c) Now, if we have a problem like $\frac{1}{6} + \frac{4}{9}$, we can check the

multiples of each to find the LCD. The multiples of 6 are 6, 12, 18, 24, 30, etc. The multiples of 9 are 9, 18, 27, 36, etc. Notice that 18 is the least common multiple. We will now change our problem to 18ths.

$\frac{1}{6} + \frac{4}{9}$ becomes $\frac{3}{3} x \frac{1}{6} + \frac{4}{9} x \frac{2}{2}$ which converts to

$\frac{3}{18} + \frac{8}{18} = \frac{11}{18}$.

d) If your problem includes mixed numbers, convert them to improper fractions and follow the above steps. If your answer is an improper fraction, remember to simplify back to a mixed number.

Word Problems
With word problems, you will have to set up your own problem. Remember, there are only four operations that can be performed in math. You need to read the problem and understand what type of problem it is. Here are some key words that give you hints as to what operation to perform.

| Addition | Subtraction | Multiplication | Division |
|---|---|---|---|
| Sum | Difference | Times | Each |
| Total | Fewer | Of | Per |
| Altogether | How much more | At this rate | Go into |
| In all | How many more | Double, triple | |
| Both | Left | | |
| Add | Less | | |
| | Remains | | |

1. First, read the problem and ask yourself if it is multiplication, division, addition or subtraction.
2. Then, determine if you need to convert mixed numbers into improper fractions.
3. Set up your problem and solve.
4. Check to see if your answer makes since.

Example 1: Mr. Magoo is making chocolate chip cookies and the recipe calls for $3\frac{2}{3}$ cups of chocolate chips. How many cups are needed if he wants to **double** the recipe?

- To **double** the recipe means to multiply by 2.
- When we multiply fractions we cannot have mixed numbers, so we will change $3\frac{2}{3}$ into the improper fraction $\frac{11}{3}$ and multiply by $\frac{2}{1}$.
- Our problem is now $\frac{11}{3} x \frac{2}{1} = \frac{22}{3} = 7\frac{1}{3}$.

Example 2: Popeye ate $4\frac{1}{2}$ cans of spinach on Monday, $3\frac{1}{3}$ cans on Tuesday, $4\frac{5}{6}$ cans on Wednesday. What is the **total** number of cans he ate?

- The key word here is total. This is an addition problem.

- The mixed numbers will need to be converted into improper fractions.
- We will need common denominators in order to add fractions. Since 6 is a multiple of 2 and 3, 6 is our LCD. When we change our fractions to 6ths, the problem becomes

$$4\frac{3}{6} + 3\frac{2}{6} + 4\frac{5}{6} = 11\frac{10}{6} = 12\frac{4}{6} = 12\frac{2}{3}.$$

Example 3: Timmy Tall is $7\frac{3}{4}$ feet tall. Sherlock Short is $4\frac{1}{4}$ feet tall. **How much shorter than** Timmy is Sherlock?

- **How much shorter than** is asking for a comparison. We want to find the difference in their heights. This means subtraction.

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

Example 4: Jocelyn made $18\frac{3}{5}$ pounds of fudge. She has 6 containers to put it in. If **each** container should have an equal amount, how much fudge should there be **per** container?

- **Each** and **per** tell us this is a division problem. The full amount of fudge is going to be divided evenly into 6 containers.

- Our problem is $18\frac{3}{5} \div 6.$

- Remember, we do not divide fractions. We multiply by the reciprocal. Also, the mixed number must be changed to an improper fraction.

- $18\frac{3}{5}$ becomes $\frac{93}{5}$ and our problem is $\frac{93}{5} \div 6.$

- When we multiply by the "flip", we get $\frac{93}{5} x \frac{1}{6} = \frac{93}{30}.$

- Reduce by 3. $\frac{93}{30} = \frac{31}{10} = 3\frac{1}{10}.$

So, ask yourself:
1) What type of problem is it?
2) Are there mixed numbers I can convert to improper fractions?
3) Do I need to find a common denominator?
4) Can my answer be reduced or simplified?

*I hope you find this helpful !*

Name _____

# Colorful Spotlights

Rename each fraction in lowest terms. Then, on page 43, find the shape(s) with each answer, and color them as directed below. (Hint: Look carefully—some of the answers are written in more than one shape!) Finally, fill in any remaining shapes with colors of your choice.

Color the shapes orange.

$\frac{2}{4} =$ _____     $\frac{5}{20} =$ _____     $\frac{9}{12} =$ _____     $\frac{10}{15} =$ _____

$\frac{14}{16} =$ _____     $\frac{18}{20} =$ _____     $\frac{6}{15} =$ _____     $\frac{2}{14} =$ _____

Color the shapes red.

$\frac{9}{81} =$ _____     $\frac{9}{15} =$ _____     $\frac{4}{32} =$ _____     $\frac{12}{21} =$ _____

$\frac{14}{49} =$ _____     $\frac{9}{24} =$ _____     $\frac{16}{18} =$ _____     $\frac{20}{25} =$ _____

Color the shapes green.

$\frac{9}{27} =$ _____     $\frac{24}{56} =$ _____     $\frac{10}{24} =$ _____     $\frac{6}{30} =$ _____

$\frac{3}{39} =$ _____     $\frac{35}{56} =$ _____     $\frac{30}{35} =$ _____     $\frac{18}{81} =$ _____

Color the shapes blue.

$\frac{12}{40} =$ _____     $\frac{15}{18} =$ _____     $\frac{16}{36} =$ _____     $\frac{5}{35} =$ _____

$\frac{42}{54} =$ _____     $\frac{2}{12} =$ _____     $\frac{15}{27} =$ _____     $\frac{5}{50} =$ _____

Name _____

# Colorful Spotlights

| $\frac{3}{10}$ | $\frac{1}{3}$ | $\frac{3}{10}$ | | $\frac{3}{10}$ | $\frac{1}{3}$ | $\frac{5}{6}$ | | $\frac{5}{6}$ | $\frac{3}{7}$ | $\frac{5}{6}$ |
| $\frac{1}{9}$ | $\frac{3}{10}$ | $\frac{1}{9}$ | | | $\frac{3}{5}$ | $\frac{5}{6}$ | $\frac{3}{5}$ | | | |

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

$\frac{1}{8}$  $\frac{4}{9}$  $\frac{1}{8}$  $\frac{4}{7}$  $\frac{1}{7}$  $\frac{4}{7}$

$\frac{4}{9}$  $\frac{5}{12}$  $\frac{4}{9}$  $\frac{4}{9}$  $\frac{1}{5}$  $\frac{1}{7}$  $\frac{1}{7}$  $\frac{1}{5}$  $\frac{1}{7}$

$\frac{1}{8}$  $\frac{4}{9}$  $\frac{1}{8}$  $\frac{4}{7}$  $\frac{1}{7}$  $\frac{4}{7}$

$\frac{2}{3}$  $\frac{1}{13}$  $\frac{7}{8}$  $\frac{1}{13}$  $\frac{9}{10}$

$\frac{2}{7}$  $\frac{1}{6}$  $\frac{2}{7}$  $\frac{3}{8}$  $\frac{5}{9}$  $\frac{3}{8}$

$\frac{1}{6}$  $\frac{5}{8}$  $\frac{1}{6}$  $\frac{1}{6}$  $\frac{5}{8}$  $\frac{5}{9}$  $\frac{5}{9}$  $\frac{6}{7}$  $\frac{5}{9}$

$\frac{2}{7}$  $\frac{1}{6}$  $\frac{2}{7}$  $\frac{3}{8}$  $\frac{5}{9}$  $\frac{3}{8}$

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

$\frac{8}{9}$  $\frac{1}{10}$  $\frac{8}{9}$  $\frac{4}{5}$  $\frac{7}{9}$  $\frac{4}{5}$

$\frac{1}{10}$  $\frac{2}{9}$  $\frac{1}{10}$  $\frac{1}{10}$  $\frac{2}{9}$  $\frac{7}{9}$  $\frac{7}{9}$  $\frac{2}{9}$  $\frac{7}{9}$

Name _____

# Twirling Windmills

Solve the problems and rename the fractions in lowest terms. Then, on page 55, find the shape(s) with each answer, and color them as directed below. (Hint: Look carefully—some of the answers are written in more than one shape!) Finally, fill in any remaining shapes with colors of your choice.

Color the shapes light orange.

$$\frac{7}{10} - \frac{1}{2} = \underline{\hspace{2cm}}$$

$$\frac{4}{5} - \frac{1}{10} = \underline{\hspace{2cm}}$$

$$\frac{5}{6} - \frac{1}{3} = \underline{\hspace{2cm}}$$

$$\frac{5}{8} - \frac{2}{4} = \underline{\hspace{2cm}}$$

$$\frac{9}{10} - \frac{1}{2} = \underline{\hspace{2cm}}$$

$$\frac{1}{2} - \frac{2}{8} = \underline{\hspace{2cm}}$$

Color the shapes yellow.

$$\frac{12}{14} - \frac{1}{2} = \underline{\hspace{2cm}}$$

$$\frac{4}{6} - \frac{1}{2} = \underline{\hspace{2cm}}$$

$$\frac{7}{9} - \frac{1}{3} = \underline{\hspace{2cm}}$$

$$\frac{5}{6} - \frac{3}{12} = \underline{\hspace{2cm}}$$

$$\frac{3}{10} - \frac{1}{5} = \underline{\hspace{2cm}}$$

$$\frac{9}{10} - \frac{3}{5} = \underline{\hspace{2cm}}$$

Color the shapes blue.

$$\frac{2}{3} - \frac{1}{9} = \underline{\hspace{2cm}}$$

$$\frac{7}{8} - \frac{1}{4} = \underline{\hspace{2cm}}$$

$$\frac{5}{8} - \frac{1}{4} = \underline{\hspace{2cm}}$$

$$\frac{9}{12} - \frac{1}{3} = \underline{\hspace{2cm}}$$

$$\frac{15}{16} - \frac{3}{4} = \underline{\hspace{2cm}}$$

$$\frac{9}{16} - \frac{1}{2} = \underline{\hspace{2cm}}$$

Color the shapes green.

$$\frac{19}{20} - \frac{1}{2} = \underline{\hspace{2cm}}$$

$$\frac{7}{18} - \frac{1}{9} = \underline{\hspace{2cm}}$$

$$\frac{10}{15} - \frac{2}{5} = \underline{\hspace{2cm}}$$

$$\frac{5}{6} - \frac{1}{2} = \underline{\hspace{2cm}}$$

$$\frac{13}{14} - \frac{2}{7} = \underline{\hspace{2cm}}$$

$$\frac{5}{9} - \frac{1}{3} = \underline{\hspace{2cm}}$$

# Twirling Windmills

| | | | | | | |
|---|---|---|---|---|---|---|
| $\frac{5}{14}$ | $\frac{1}{5}$ | $\frac{1}{16}$ | | $\frac{1}{10}$ | $\frac{1}{2}$ | $\frac{1}{16}$ $\frac{2}{9}$ |

$\frac{5}{14}$ $\frac{1}{6}$ $\frac{2}{9}$ $\frac{1}{10}$

$\frac{1}{6}$ $\frac{7}{10}$ $\frac{5}{9}$ $\frac{5}{14}$

$\frac{9}{20}$ $\frac{5}{9}$ $\frac{5}{18}$

$\frac{5}{14}$ $\frac{7}{10}$ $\frac{1}{6}$

$\frac{3}{10}$ $\frac{1}{6}$ $\frac{7}{12}$

$\frac{2}{9}$ $\frac{5}{8}$ $\frac{2}{5}$ $\frac{3}{10}$ $\frac{3}{8}$ $\frac{1}{4}$ $\frac{7}{12}$

$\frac{4}{15}$

$\frac{3}{10}$ $\frac{2}{5}$ $\frac{5}{8}$ $\frac{7}{12}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{9}{20}$

$\frac{3}{10}$ $\frac{4}{9}$ $\frac{7}{12}$

$\frac{4}{9}$ $\frac{1}{8}$ $\frac{5}{12}$ $\frac{1}{10}$

$\frac{1}{3}$ $\frac{9}{14}$

$\frac{5}{14}$ $\frac{5}{12}$ $\frac{1}{8}$ $\frac{4}{9}$

$\frac{5}{14}$ $\frac{1}{10}$

$\frac{4}{9}$

$\frac{5}{18}$ $\frac{3}{16}$ $\frac{1}{2}$ $\frac{5}{14}$ $\frac{2}{9}$ $\frac{3}{16}$ $\frac{1}{5}$ $\frac{1}{10}$

Name _____

# Wagon Wheel

Solve the problems and rename the fractions in lowest terms. Then, on page 59, find the shape(s) with each answer, and color them as directed below. (Hint: Look carefully—some of the answers are written in more than one shape!) Finally, fill in any remaining shapes with colors of your choice.

Color the shapes dark red.

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

$6 \frac{7}{10} - 1 \frac{6}{10} =$ _____

$9 \frac{6}{7} - 4 \frac{4}{7} =$ _____

$9 \frac{4}{4} - 2 \frac{1}{4} =$ _____

$7 \frac{8}{9} - 5 \frac{5}{9} =$ _____

$8 \frac{5}{6} - 7 \frac{2}{6} =$ _____

Color the shapes blue.

$9 \frac{9}{12} - 1 \frac{8}{12} =$ _____

$7 \frac{8}{15} - 6 \frac{3}{15} =$ _____

$7 \frac{7}{8} - 4 \frac{2}{8} =$ _____

$4 \frac{4}{11} - 1 \frac{1}{11} =$ _____

$7 \frac{5}{13} - 2 \frac{5}{13} =$ _____

$7 \frac{16}{18} - 6 \frac{1}{18} =$ _____

Color the shapes red.

$9 \frac{5}{6} - \frac{4}{6} =$ _____

$4 \frac{7}{8} - 3 \frac{4}{8} =$ _____

$6 \frac{5}{9} - 3 \frac{4}{9} =$ _____

$8 \frac{9}{14} - \frac{2}{14} =$ _____

$7 \frac{9}{10} - 7 \frac{2}{10} =$ _____

$9 \frac{5}{6} - 1 \frac{3}{6} =$ _____

# Wagon Wheel

Name _____
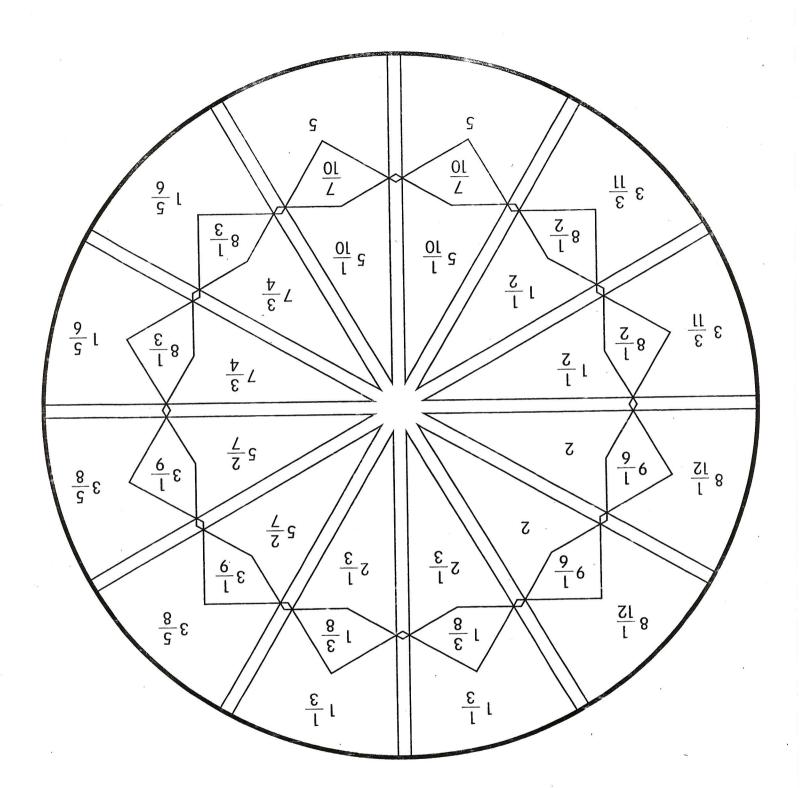
Fractions: Subtraction With
Mixed Numbers

Name _____

# Rows of Daisies

Solve the problems and rename the fractions in lowest terms. Then, on page 51, find the shape(s) with each answer, and color them as directed below. (Hint: Look carefully—some of the answers are written in more than one shape!) Finally, fill in any remaining shapes with colors of your choice.

Color the shapes light orange.

$$\frac{1}{3} + \frac{1}{2} = \underline{\hspace{1.5cm}}$$

$$\frac{5}{12} + \frac{1}{4} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{6} + \frac{2}{9} = \underline{\hspace{1.5cm}}$$

$$\frac{3}{8} + \frac{1}{2} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{2} + \frac{1}{12} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{2} + \frac{4}{10} = \underline{\hspace{1.5cm}}$$

Color the shapes blue.

$$\frac{5}{10} + \frac{1}{5} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{7} + \frac{1}{3} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{3} + \frac{1}{6} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{8} + \frac{1}{4} = \underline{\hspace{1.5cm}}$$

$$\frac{2}{12} + \frac{1}{4} = \underline{\hspace{1.5cm}}$$

$$\frac{2}{10} + \frac{3}{5} = \underline{\hspace{1.5cm}}$$

Color the shapes dark red.

$$\frac{1}{4} + \frac{3}{8} = \underline{\hspace{1.5cm}}$$

$$\frac{4}{9} + \frac{1}{3} = \underline{\hspace{1.5cm}}$$

$$\frac{5}{12} + \frac{2}{6} = \underline{\hspace{1.5cm}}$$

$$\frac{2}{7} + \frac{1}{3} = \underline{\hspace{1.5cm}}$$

$$\frac{1}{3} + \frac{2}{9} = \underline{\hspace{1.5cm}}$$

$$\frac{2}{5} + \frac{1}{3} = \underline{\hspace{1.5cm}}$$

Name _____

# Rows of Daisies

5/8 · 7/8 · 5/8 · 5/12 · 13/21 · 5/12 · 13/21 · 7/8 · 5/9

5/12 · 5/8 · 5/12 · 5/6 · 5/12 · 11/15 · 5/12

13/21 · 13/21

7/9 · 2/3 · 3/8 · 13/21 · 4/5 · 5/9 · 7/18

7/9 · 3/4 · 11/15 · 5/9

3/8 · 7/9 · 3/8 · 7/8 · 4/5 · 11/15 · 4/5

3/4 · 3/4

7/9 · 7/12 · 1/2 · 3/4 · 7/10 · 9/10 · 7/9

7/9 · 7/9 · 3/4 · 7/9

1/2 · 7/9 · 1/2 · 7/8 · 7/10 · 7/9 · 7/10

3/4 · 3/4

3/4 · 7/8 · 10/21 · 3/4 · 10/21 · 7/8 · 7/9

Name _____

# Colorful Spotlights

Rename each fraction in lowest terms. Then, on page 43, find the shape(s) with each answer, and color them as directed below. (Hint: Look carefully—some of the answers are written in more than one shape!) Finally, fill in any remaining shapes with colors of your choice.

**Color the shapes orange.**

$\frac{2}{4}$ = _____

$\frac{5}{20}$ = _____

$\frac{9}{12}$ = _____

$\frac{10}{15}$ = _____

$\frac{14}{16}$ = _____

$\frac{18}{20}$ = _____

$\frac{6}{15}$ = _____

$\frac{2}{14}$ = _____

**Color the shapes red.**

$\frac{9}{81}$ = _____

$\frac{9}{15}$ = _____

$\frac{4}{32}$ = _____

$\frac{12}{21}$ = _____

$\frac{14}{49}$ = _____

$\frac{9}{24}$ = _____

$\frac{16}{18}$ = _____

$\frac{20}{25}$ = _____

**Color the shapes green.**

$\frac{9}{27}$ = _____

$\frac{24}{56}$ = _____

$\frac{10}{24}$ = _____

$\frac{6}{30}$ = _____

$\frac{3}{39}$ = _____

$\frac{35}{56}$ = _____

$\frac{30}{35}$ = _____

$\frac{18}{81}$ = _____

**Color the shapes blue.**

$\frac{12}{40}$ = _____

$\frac{15}{18}$ = _____

$\frac{16}{36}$ = _____

$\frac{5}{35}$ = _____

$\frac{42}{54}$ = _____

$\frac{2}{12}$ = _____

$\frac{15}{27}$ = _____

$\frac{5}{50}$ = _____

Name _____

# Colorful Spotlights

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

43

## Lesson 17 Divide Decimals

### Ready Reference

**divisor** the number by which you are dividing
**dividend** the number being divided
**quotient** the answer to a division problem

$$0.3\overline{)1.203}$$

quotient → 4.01
divisor
dividend

### Think About It

Dividing by a decimal is similar to dividing whole numbers. In fact, the only difference is that before dividing, you need to change the divisor to a whole number by multiplying it by a power of ten. Then multiply the dividend by the same power of ten.

Cleo bought 0.8 yd of fabric for $4.72. How much did the material cost per yard?

### Here's How

**Divide Decimals.**

**Step 1** Use long division to find the quotient.

$$0.8\overline{)4.72}$$

**Step 2** Change the divisor to a whole number. The divisor has one decimal place, so multiply it and the dividend by _____.

*How many places to the right did the decimal move?*

$$0.8\overline{)4.72}$$

**Step 3** Divide.

$$8\overline{)47.2} = 5.9$$

Cleo bought 0.8 yd of fabric for $4.72. How much did the material cost per yard? _____

**Find the pattern.**

A pattern is created when 4.72 is divided by 0.8, 0.08, and 0.008.
Study the pattern and determine the rule.

$4.72 \div 0.8 = 5.9$        $4.72 \div 0.08 = 59$        $4.72 \div 0.008 = 590$

Apply the pattern rule to fill in the blanks.

$1.24 \div 0.4 = 3.1$        $1.24 \div 0.04 = $ _____        $1.24 \div 0.004 = $ _____

# Practice

**Divide.**

**1** $2.25 \div 0.9 =$

A 0.025

B 0.25

C 2.5

D 25

**2** $0.252 \div 0.04 =$

F 0.63

G 6.3

H 63

J 630

**3** $8.48 \div 0.008 =$

A 1,060

B 106

C 10.6

D 1.06

**4** $3.55 \div 0.05 =$

F 7100

G 710

H 71

J 7.10

**5** $16.124 \div 0.02 =$

A 0.862

B 8.62

C 80.62

D 806.2

**6** $1.08 \div 0.3 =$

F 3.6

G 36

H 360

J 3,600

**7** $0.245 \div 0.007 =$

A 0.035

B 0.35

C 3.5

D 35

**8** $3.25 \div 0.5 =$

F 6,500

G 650

H 65

J 6.5

**9** $3.636 \div 0.06 =$

A 6.06

B 60.6

C 606

D 6,060

**10** Lily uses 0.5 cup of lemon juice for each glass of lemonade. How many glasses of lemonade can she make with 2.75 cups of lemon juice?

_____

**11** There are 35 members in the marching band. They want to buy their bandleader a gift that costs $25.41. If they each contribute the same amount, what is the least amount of money that they should each give?

_____

## 6-5 Study Guide and Intervention

### Adding and Subtracting Mixed Numbers

To add or subtract mixed numbers:

**1.** Add or subtract the fractions.

**2.** Then add or subtract the whole numbers.

**3.** Rename and simplify if necessary.

---

**EXAMPLE 1** Find $2\frac{1}{3} + 4\frac{1}{4}$.

**Estimate** $2 + 4 = 6$

| The LCM of 3 and 4 is 12. | | Rename the fractions. | | Add the fractions. | | Add the whole numbers. |
|---|---|---|---|---|---|---|
| $2\frac{1}{3} \times \frac{4}{4}$ $+ 4\frac{1}{4} \times \frac{3}{3}$ | $\rightarrow$ | $2\frac{4}{12}$ $+ 4\frac{3}{12}$ | $\rightarrow$ | $2\frac{4}{12}$ $+ 4\frac{3}{12}$ $\overline{\phantom{00}\frac{7}{12}}$ | $\rightarrow$ | $2\frac{4}{12}$ $+ 4\frac{3}{12}$ $\overline{6\frac{7}{12}}$ |

$2\frac{1}{3} + 4\frac{1}{4} = 6\frac{7}{12}$. Compared to the estimate, the answer is reasonable.

**EXAMPLE 2** Find $6\frac{1}{2} - 2\frac{1}{3}$.

**Estimate** $6\frac{1}{2} - 2 = 4\frac{1}{2}$

| The LCM of 2 and 3 is 6. | | Rename the fractions. | | Subtract the fractions. | | Subtract the whole numbers. |
|---|---|---|---|---|---|---|
| $6\frac{1}{2} \times \frac{3}{3}$ $- 2\frac{1}{3} \times \frac{2}{2}$ | $\rightarrow$ | $6\frac{3}{6}$ $- 2\frac{2}{6}$ | $\rightarrow$ | $6\frac{3}{6}$ $- 2\frac{2}{6}$ $\overline{\phantom{00}\frac{1}{6}}$ | $\rightarrow$ | $6\frac{3}{6}$ $- 2\frac{2}{6}$ $\overline{4\frac{1}{6}}$ |

$6\frac{1}{2} - 2\frac{1}{3} = 4\frac{1}{6}$. Compared to the estimate, the answer is reasonable.

---

**EXERCISES**

**Add or subtract. Write in simplest form.**

**1.** $\phantom{+}3\frac{2}{3}$
$-\ 2\frac{1}{3}$

**2.** $\phantom{+}4\frac{3}{4}$
$+\ 1\frac{3}{4}$

**3.** $\phantom{+}5\frac{1}{2}$
$+\ 4\frac{1}{3}$

**4.** $\phantom{+}6\frac{7}{8}$
$-\ 3\frac{1}{2}$

**5.** $3\frac{2}{3} - 1\frac{1}{2}$

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

**7.** $5\frac{1}{3} - 2\frac{1}{4}$

# 6-4 Practice: Word Problems

## Adding and Subtracting Fractions with Unlike Denominators

**BUSINESS** For Exercises 1–4, use the table below. It lists the fractions of United States car sales held by several companies in 2001.

| Leading Car Sales in U.S. in 2001 | |
|---|---|
| Company | Fraction of Sales |
| Company A | $\frac{1}{5}$ |
| Company B | $\frac{4}{25}$ |
| Company C | $\frac{2}{5}$ |
| Company D | $\frac{3}{20}$ |

**1.** What fraction of the U.S. sales did Company C and Company B hold together?

**2.** How much greater was the fraction of the market of Company A than of Company D?

**3.** How much more than Company A's fraction of the market did Company C have?

**4.** Find the total fraction of the market that Company D and Company B hold together.

**5. TRAVEL** Gabriella's travel shampoo bottle holds $\frac{1}{2}$ cup of shampoo. Before leaving on vacation, she filled the bottle to the top with $\frac{1}{8}$ cup of shampoo. How much shampoo was already in the bottle?

**6. EXERCISE** Bill and Andy were racing to see who could run the farthest in 5 minutes. Bill ran $\frac{5}{8}$ of a mile, and Andy ran $\frac{3}{4}$ of a mile. How much farther did Andy run than Bill?

## 6-3  Practice: Skills

### Adding and Subtracting Fractions with Like Denominators

**Add or subtract. Write in simplest form.**

1. $\frac{2}{9} + \frac{4}{9}$

2. $\frac{2}{5} + \frac{4}{5}$

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

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

5. $\frac{7}{8} - \frac{3}{8}$

6. $\frac{9}{12} + \frac{3}{12}$

7. $\frac{5}{6} - \frac{1}{6}$

8. $\frac{1}{6} + \frac{5}{6}$

9. $\frac{11}{12} - \frac{7}{12}$

10. $\frac{7}{8} + \frac{3}{8}$

11. $\frac{9}{10} - \frac{4}{10}$

12. $\frac{3}{8} + \frac{1}{8}$

13. $\frac{10}{11} - \frac{2}{11}$

14. $\frac{7}{9} + \frac{2}{9}$

15. $\frac{5}{6} + \frac{4}{6}$

16. $\frac{3}{10} - \frac{1}{10}$

17. $\frac{3}{10} + \frac{3}{10}$

18. $\frac{5}{6} + \frac{3}{6}$

19. $\frac{5}{8} - \frac{3}{8}$

20. $\frac{5}{7} - \frac{2}{7}$

21. $\frac{6}{7} + \frac{5}{7}$

22.. How much is $\frac{2}{9}$ pound plus $\frac{1}{9}$ pound?

23. How much longer is $\frac{3}{8}$ foot than $\frac{1}{8}$ foot?

24. How much more than $\frac{1}{4}$ cup is $\frac{3}{4}$ cup?

25. What is the sum of $\frac{2}{11}$, $\frac{7}{11}$, and $\frac{1}{11}$?

## 6-4 Study Guide and Intervention

### Adding and Subtracting Fractions with Unlike Denominators

To find the sum or difference of two fractions with unlike denominators, rename the fractions using the least common denominator (LCD). Then add or subtract and simplify.

**EXAMPLE 1** Find $\frac{1}{3} + \frac{5}{6}$.

The LCD of $\frac{1}{3}$ and $\frac{5}{6}$ is 6.

Write the problem.

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

$\rightarrow$

Rename $\frac{1}{3}$ as $\frac{2}{6}$.

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

$\rightarrow$

Add the fractions.

$$\begin{array}{r} \frac{2}{6} \\ +\frac{5}{6} \\ \hline \frac{7}{6} \end{array} \text{ or } 1\frac{1}{6}$$

**EXAMPLE 2** Find $\frac{2}{3} - \frac{1}{4}$.

The LCD of $\frac{2}{3}$ and $\frac{1}{4}$ is 12.

Write the problem.

$$\begin{array}{r} \frac{2}{3} \\ -\frac{1}{4} \end{array}$$

$\rightarrow$

Rename $\frac{2}{3}$ as $\frac{8}{12}$ and $\frac{1}{4}$ as $\frac{3}{12}$.

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

$\rightarrow$

Subtract the fractions.

$$\begin{array}{r} \frac{8}{12} \\ -\frac{3}{12} \\ \hline \frac{5}{12} \end{array}$$

**EXAMPLE 3** Evaluate $x - y$ if $x = \frac{1}{2}$ and $y = \frac{2}{5}$.

$x - y = \frac{1}{2} - \frac{2}{5}$     Replace $x$ with $\frac{1}{2}$ and $y$ with $\frac{2}{5}$.

$\quad = \frac{1}{2} \times \frac{5}{5} - \frac{2}{5} \times \frac{2}{2}$     Rename $\frac{1}{2}$ and $\frac{2}{5}$ using the LCD, 10.

$\quad = \frac{5}{10} - \frac{4}{10}$     Simplify.

$\quad = \frac{1}{10}$     Subtract the numerators.

### EXERCISES

**Add or subtract. Write in simplest form.**

1. $\frac{1}{6} + \frac{1}{2}$

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

3. $\frac{1}{4} + \frac{7}{8}$

4. $\frac{9}{10} - \frac{3}{5}$

5. $\frac{2}{7} + \frac{1}{2}$

6. $\frac{5}{6} - \frac{1}{12}$

7. $\frac{7}{10} + \frac{1}{2}$

8. $\frac{4}{9} - \frac{1}{3}$

9. Evaluate $x + y$ if $x = \frac{1}{12}$ and $y = \frac{1}{6}$.

10. Evaluate $a + b$ if $a = \frac{1}{2}$ and $b = \frac{3}{4}$.

# S.O.L. 6.6a
## Math Vocabulary
### Fractions

1. Fraction -                    Part of a whole.

2. Improper Fraction-            A fraction which the denominator is larger than the numerator.

3. Mixed Number Fraction-        A fraction with a whole number and a fraction.

4. Numerator -                   The top number of a fraction.

5. Denominator -                 The bottom number of a fraction.

6. Like Fractions-               Fractions with the same denominators.

7. Unlike Fractions-             Fractions with denominators that are not the same.

## 7-4 Practice: Skills

### Dividing Fractions

**Find the reciprocal of each number.**

1. $\frac{1}{2}$

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

3. 7

4. $\frac{8}{11}$

5. 12

6. $\frac{9}{10}$

7. $\frac{5}{8}$

8. $\frac{3}{10}$

**Divide. Write in simplest form.**

9. $\frac{5}{6} \div \frac{1}{3}$

10. $\frac{9}{10} \div \frac{1}{2}$

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

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

13. $\frac{7}{12} \div \frac{5}{6}$

14. $\frac{9}{10} \div \frac{1}{4}$

15. $\frac{3}{8} \div 9$

16. $\frac{9}{10} \div \frac{3}{4}$

17. $\frac{2}{5} \div \frac{4}{7}$

18. $15 \div \frac{5}{9}$

19. $\frac{6}{7} \div \frac{3}{11}$

20. $\frac{1}{9} \div \frac{5}{12}$

21. $\frac{5}{6} \div \frac{5}{12}$

22. $\frac{10}{11} \div 5$

23. $\frac{7}{9} \div \frac{1}{7}$

24. $\frac{6}{7} \div \frac{8}{9}$

25. $\frac{3}{5} \div \frac{9}{11}$

26. $5 \div \frac{4}{9}$

**Find the value of each expression if $x = \frac{1}{4}$, $y = \frac{3}{5}$, and $z = \frac{2}{3}$.**

27. $x \div y$

28. $z \div 2$

29. $y \div z$

30. $z \div x$

31. $\frac{1}{3} \div x$

32. $5 \div y$

**Lesson 7-4**

## *S.O.L. 6.6a*
## *Math Vocabulary Quiz*
### *Fractions*

1. _____     Fractions with denominators that are not the same.

2. _____     The top number of a fraction.

3. _____     The bottom number of a fraction.

4. _____     Part of a whole.

5. _____     Fractions with denominators are not the same.

6. _____     A fraction with a whole number and a fraction.

7. _____     A fraction which the denominator is larger than the numerator.

Class Practice Questions
S. O. L. 6.1

1.  **What is 0.06 as a percent and a fraction?**

A    0.06%;  $\dfrac{6}{10}$

B    6%;  $\dfrac{6}{100}$

C    16%;  $\dfrac{16}{100}$

D    60%;  $\dfrac{60}{10}$

2.  **If you had 100 questions on your math exam and you got 95 of them correct, what is your grade expressed as a fraction, as a decimal, and as a percent?**

A    $\dfrac{5}{100}$; 0.05; 5%

B    $\dfrac{95}{100}$; 0.95; 9.5%

C    $\dfrac{95}{100}$; 0.05; 95%

D    $\dfrac{95}{100}$; 0.95; 95%

3. What percent of this scale is shaded?

```
|  |  | | | | | | | | | | | | | |100|
 S 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95
```

A    about 10%
B    about 15%
C    about 20%
D    about 25%

4. What fraction of this entire scale is represented by the shaded portion?

```
|  |  | | | | | | | | | | | | | |100|
 S 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95
```

A    $\dfrac{25}{4}$

B    $\dfrac{25}{10}$

C    $\dfrac{10}{25}$

D    $\dfrac{25}{100}$
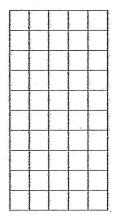
5. What fraction of this entire scale is represented by the shaded portion?

```
|  |  | | | | | | | | | | | | | |100|
 S 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95
```

A    $\dfrac{25}{4}$

B    $\dfrac{25}{10}$

C    $\dfrac{10}{25}$

D    $\dfrac{25}{100}$

6. What percent is equivalent to

   $\frac{3}{5}$?

   A   40%
   B   60%
   C   $33\frac{1}{3}$%
   D   35%

7. The school's science fair was attended by $\frac{2}{3}$ of the students. What percent of the students attended the science fair? (Round to the nearest percent.)

   A   33%
   B   60%
   C   67%
   D   80%

8. Sue's little sister was coloring the squares on a 5 × 10 grid. She had colored 25 of the squares. What percent of the squares were not yet colored?
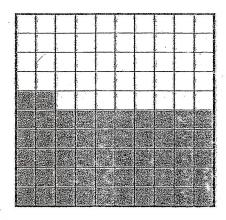
   A   10%
   B   25%
   C   40%
   D   50%

9. If the entire shaded picture represents 1 whole, which of the following represents this picture?



= 1



A  52%, 5.2, $\dfrac{2}{5}$

B  52%, 0.52, $\dfrac{13}{25}$

C  5.2%, 0.52, $\dfrac{5}{2}$

D  0.52%, 0.52, $\dfrac{13}{25}$

10. What are the decimal and percent equivalents for *one-fifth*?

A  0.02 and 2 %
B  0.2 and 20%
C  0.5 and 5%
D  0.15 and 15%

S. O. L. 6.3

Class work Practice Sheet

1. **Which is NOT a factor of 45?**

A   3
B   5
C   7
D   9

2. **When you calculate $\frac{1}{6} + \frac{1}{4}$, what is the least common multiple for the denominators?**

A   10
B   12
C   24
D   36

3. **Use the least common multiple to rewrite $3\frac{1}{4} + 1\frac{1}{6}$.**

A   $3\frac{1}{24} + 1\frac{1}{24}$

B   $3\frac{6}{24} + 1\frac{6}{24}$

C   $3\frac{3}{12} + 1\frac{2}{12}$

D   $3\frac{2}{10} + 1\frac{2}{10}$

4. Which list shows all the common factors of 6, 12, and 18?

A  1, 2, 6
B  1, 2, 3, 6
C  1, 3
D  1, 2, 6, 12, 18

5. Barbara's mom owns a beauty shop. She sells hair supplies and cosmetics. She also buys mascara in packs of 4 and eyeliner in packs of 6. What is the least number of packs of each she must buy in order to have an equal number of eyeliner pencils and mascara tubes?

A  2 packs of mascara and 3 packs of eyeliner
B  3 packs of mascara and 2 packs of eyeliner
C  6 packs of mascara and 4 packs of eyeliner
D  8 packs of mascara and 6 packs of eyeliner

6. A number whose only factors are itself and one is:

A  even
B  prime
C  composite
D  odd

7. Which is the prime factorization of 50?

A  $5 \times 10$
B  $2 \times 25$
C  $2 \times 5 \times 5$
D  $2 \times 5 \times 10$

8. Which of these numbers is NOT prime?

A  2
B  5
C  9
D  11

9. Which number is composite?

A  3
B  4
C  5
D  13

**10. What is the prime factorization of 36?**

A   $2 \times 2 \times 3 \times 3$
B   $2 \times 18$
C   $3 \times 3 \times 4$
D   $2 \times 2 \times 9$

**11. What is the prime factorization of 45?**

A   $5 \times 3 \times 3$
B   $15 \times 3$
C   $5 \times 3 \times 5$
D   $7 \times 3 \times 2$

**12. Which is NOT an example of a set of prime numbers?**

A   4, 6, 8, 10
B   3, 5, 7, 11
C   11, 13, 17, 19
D   2, 5, 7, 11

**13. How could you decide if the integer –15 were odd or even?**

A   If it will divide by two without a remainder, then it is an even integer.
B   If it will divide by three without a remainder, then it is an even integer.
C   If it will divide by two without a remainder, then it is an odd integer.
D   If it will divide by three without a remainder, then it is an odd integer.

**14. Which of the following statements is true about even integers?**

A   Even integers end in 5.
B   Even integers can be divided by 2
C   Even integers can be divided by 5
D   Even integers can only be positive.

**15. Which of the following numbers is an odd integer?**

A   7
B   8
C   –10
D   –12

## 7-2   Study Guide and Intervention

### Multiplying Fractions

| Type of Product | What To Do | Example |
|---|---|---|
| two fractions | Multiply the numerators. Then multiply the denominators. | $\dfrac{2}{3} \times \dfrac{4}{5} = \dfrac{2 \times 4}{3 \times 5} = \dfrac{8}{15}$ |
| fraction and a whole number | Rename the whole number as an improper fraction. Multiply the numerators. Then multiply the denominators. | $\dfrac{3}{11} \times 6 = \dfrac{3}{11} \times \dfrac{6}{1} = \dfrac{18}{11} = 1\dfrac{7}{11}$ |

**EXAMPLE 1** Find $\dfrac{2}{5} \times \dfrac{3}{4}$.   **Estimate:** $\dfrac{1}{2} \times 1 = \dfrac{1}{2}$

$\dfrac{2}{5} \times \dfrac{3}{4} = \dfrac{2 \times 3}{5 \times 4}$     Multiply the numerators. Multiply the denominators.

$\quad = \dfrac{6}{20}$ or $\dfrac{3}{10}$     Simplify. Compare to the estimate.

**EXAMPLE 2** Find $\dfrac{4}{9} \times 8$.   **Estimate:** $\dfrac{1}{2} \times 8 = 4$

$\dfrac{4}{9} \times 8 = \dfrac{4}{9} \times \dfrac{8}{1}$     Write 8 as $\dfrac{8}{1}$.

$\quad = \dfrac{4 \times 8}{9 \times 1}$     Multiply.

$\quad = \dfrac{32}{9}$ or $3\dfrac{5}{9}$     Simplify. Compare to the estimate.

**EXAMPLE 3** Find $\dfrac{2}{5} \times \dfrac{3}{8}$.   **Estimate:** $\dfrac{1}{2} \times \dfrac{1}{2} = \dfrac{1}{4}$

$\dfrac{2}{5} \times \dfrac{3}{8} = \dfrac{\overset{1}{2} \times 3}{5 \times \underset{4}{8}}$     Divide both the numerator and denominator by the common factor, 2.

$\quad = \dfrac{3}{20}$     Simplify. Compare to the estimate.

**EXERCISES**

**Multiply. Write in simplest form.**

1. $\dfrac{1}{4} \times \dfrac{5}{6}$     2. $\dfrac{3}{7} \times \dfrac{3}{4}$     3. $4 \times \dfrac{1}{5}$     4. $\dfrac{5}{12} \times 2$

5. $\dfrac{3}{5} \times 10$     6. $\dfrac{2}{3} \times \dfrac{3}{8}$     7. $\dfrac{1}{7} \times \dfrac{1}{7}$     8. $\dfrac{2}{9} \times \dfrac{1}{2}$

## 7-2 Practice: Word Problems

### Multiplying Fractions

**COOKING** For Exercises 1 and 2, use the recipe for chocolate frosting.

> **Chocolate Frosting Recipe**
> $\frac{1}{3}$ cup butter
> 2 ounces melted unsweetened chocolate
> 2 cups powdered sugar
> $\frac{1}{2}$ teaspoon vanilla
> 2 tablespoons milk

1. Georgia wants to cut the recipe for chocolate frosting in half for a small cake that she's making. How much of each ingredient will she need?

2. Suppose Georgia wanted to double the recipe; what would the measurements be for each ingredient?

3. **COMPUTERS** $\frac{1}{5}$ of today's college students began using computers between the ages of 5 and 8. If a college has 3,500 students, how many of the students began using computers between the ages of 5 and 8?

4. **EXERCISE** A paper published in a medical journal reported that about $\frac{11}{25}$ of girls ages 16 to 17 do not exercise at all. The entire study consisted of about 2,500 girls. About how many did not exercise?

5. **ANIMALS** Catherine walks her dog $\frac{3}{4}$ mile every day. How far does she walk each week?

6. **MUSIC** If you practice a musical instrument each day for $\frac{2}{3}$ of an hour, how many hours of practice would you get in each week?

## 7-2 Practice: Skills

### Multiplying Fractions

**Multiply. Write in simplest form.**

1. $\frac{3}{4} \times \frac{1}{2}$

2. $\frac{1}{3} \times \frac{2}{5}$

3. $\frac{1}{3} \times 6$

4. $\frac{2}{5} \times \frac{3}{7}$

5. $\frac{3}{8} \times 10$

6. $\frac{1}{6} \times \frac{3}{5}$

7. $\frac{2}{9} \times 3$

8. $\frac{9}{10} \times \frac{4}{5}$

9. $\frac{7}{8} \times \frac{2}{9}$

10. $11 \times \frac{3}{4}$

11. $\frac{5}{6} \times \frac{1}{4}$

12. $\frac{4}{9} \times \frac{2}{3}$

13. $\frac{7}{12} \times \frac{6}{11}$

14. $16 \times \frac{5}{12}$

15. $\frac{4}{9} \times \frac{1}{8}$

16. $\frac{1}{5} \times \frac{10}{11}$

17. $\frac{5}{12} \times \frac{3}{8}$

18. $\frac{1}{10} \times \frac{4}{7}$

19. $21 \times \frac{4}{7}$

20. $\frac{5}{9} \times 18$

21. $\frac{5}{6} \times \frac{8}{9}$

**For Exercises 22–24, evaluate each expression if $x = 4$, $y = \frac{2}{3}$, and $z = \frac{1}{4}$.**

22. $\frac{3}{8}x$

23. $xz$

24. $3x$

25. $xy$

26. $9y$

27. $\frac{1}{3}x$

28. $yz$

29. $8z$

30. $xyz$

31. If $a = \frac{6}{7}$, what is $\frac{2}{3}a$?

32. Evaluate $st$ if $s = \frac{3}{8}$ and $t = 24$.

Lesson 7-2

Name _____

# Mix It Up!

To multiply mixed numbers, follow these steps.

$1\frac{2}{3} \times 1\frac{1}{2}$   $\frac{5}{3} \times \frac{3}{2}$   $\frac{5}{3} \times \frac{3}{2} = \frac{15}{6}$   $\frac{15}{6} = 2\frac{3}{6} = 2\frac{1}{2}$

Change each mixed number to an improper fraction.   Multiply.   Reduce to lowest terms.

To divide mixed numbers, follow these steps.

$3\frac{1}{2} \div 2$   $\frac{7}{2} \div 2$   $\frac{7}{2} \div \frac{2}{1}$   $\frac{7}{2} \times \frac{1}{2} = \frac{7}{4} = 1\frac{3}{4}$

Change the mixed number to an improper fraction.   Change the whole number to a fraction.   Turn the division problem into a multiplication problem by finding the reciprocal of the divisor. Multiply. Reduce to lowest terms if necessary.

Multiply or divide. Reduce to lowest terms.

A.  $3\frac{1}{2} \times 3$     $4 \times 1\frac{1}{2}$     $5 \times 3\frac{1}{3}$     $2 \times 4\frac{1}{3}$

B.  $1\frac{1}{3} \times 3\frac{1}{2}$     $1\frac{4}{5} \times 1\frac{2}{3}$     $1\frac{1}{4} \times 2\frac{1}{2}$     $\frac{1}{3} \times 1\frac{4}{8}$

C.  $1\frac{3}{5} \div 4$     $2\frac{1}{2} \div 5$     $1\frac{2}{3} \div 2$     $3\frac{1}{4} \div 4$

D.  $3\frac{1}{4} \div \frac{1}{2}$     $1\frac{1}{5} \div \frac{1}{4}$     $3\frac{4}{5} \div \frac{1}{2}$     $1\frac{2}{3} \div \frac{1}{3}$

E.  $1\frac{1}{4} \times 1\frac{2}{4}$     $2\frac{1}{5} \times 1\frac{1}{2}$     $2\frac{1}{2} \div 1\frac{1}{3}$     $2\frac{1}{3} \div \frac{1}{6}$

# 7-2 Practice: Word Problems

## Multiplying Fractions

**COOKING** For Exercises 1 and 2, use the recipe for chocolate frosting.

> **Chocolate Frosting Recipe**
> $\frac{1}{3}$ cup butter
> 2 ounces melted unsweetened chocolate
> 2 cups powdered sugar
> $\frac{1}{2}$ teaspoon vanilla
> 2 tablespoons milk

1. Georgia wants to cut the recipe for chocolate frosting in half for a small cake that she's making. How much of each ingredient will she need?

2. Suppose Georgia wanted to double the recipe; what would the measurements be for each ingredient?

3. **COMPUTERS** $\frac{1}{5}$ of today's college students began using computers between the ages of 5 and 8. If a college has 3,500 students, how many of the students began using computers between the ages of 5 and 8?

4. **EXERCISE** A paper published in a medical journal reported that about $\frac{11}{25}$ of girls ages 16 to 17 do not exercise at all. The entire study consisted of about 2,500 girls. About how many did not exercise?

5. **ANIMALS** Catherine walks her dog $\frac{3}{4}$ mile every day. How far does she walk each week?

6. **MUSIC** If you practice a musical instrument each day for $\frac{2}{3}$ of an hour, how many hours of practice would you get in each week?

# 7-3 Practice: Skills

## Multiplying Mixed Numbers

**Multiply. Write in simplest form.**

1. $\frac{1}{3} \times 1\frac{1}{4}$

2. $2\frac{1}{2} \times \frac{3}{5}$

3. $\frac{3}{4} \times 3\frac{1}{3}$

4. $6\frac{1}{5} \times \frac{1}{2}$

5. $1\frac{3}{5} \times 3\frac{2}{3}$

6. $\frac{5}{7} \times 4\frac{1}{5}$

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

8. $1\frac{3}{8} \times 2\frac{2}{7}$

9. $4\frac{1}{6} \times \frac{9}{10}$

10. $3\frac{1}{3} \times 2\frac{1}{4}$

11. $\frac{8}{9} \times 5\frac{1}{7}$

12. $2\frac{5}{8} \times 6$

13. $3\frac{3}{4} \times 2\frac{4}{5}$

14. $\frac{5}{7} \times 4\frac{3}{8}$

15. $20 \times 1\frac{2}{5}$

16. $2\frac{4}{9} \times \frac{6}{11}$

17. $5\frac{3}{4} \times 1\frac{1}{11}$

18. $14 \times 2\frac{5}{7}$

**For Exercises 19–24, evaluate each expression if $r = 1\frac{2}{3}$, $s = 2\frac{1}{5}$, and $t = \frac{3}{4}$.**

19. $4t$

20. $st$

21. $\frac{1}{2}r$

22. $rs$

23. $\frac{1}{11}s$

24. $rt$

25. Evaluate $\frac{2}{3}m$ if $m = 5\frac{1}{6}$.

26. What is $ab$ if $a = 1\frac{5}{11}$ and $b = \frac{7}{8}$?

**Reteach**

LESSON 5-9

## Dividing Fractions and Mixed Numbers

Two numbers are reciprocals if their product is 1. $\frac{2}{3}$ and $\frac{3}{2}$ are

reciprocals because $\frac{2}{3} \cdot \frac{3}{2} = \frac{6}{6} = 1$.

Dividing by a fraction is the same as multiplying by its reciprocal.

$$\frac{1}{4} \div 2 = \frac{1}{8} \qquad\qquad \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}$$

So, you can use reciprocals to divide by fractions.

To find $\frac{2}{3} \div 4$, first rewrite the expression as a multiplication

expression using the reciprocal of the divisor, 4.

$$\frac{2}{3} \cdot \frac{1}{4}$$

Then use canceling to find the product in simplest form.

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

To find $3\frac{1}{4} \div 1\frac{1}{2}$, first rewrite the expression using improper

fractions.

$$\frac{13}{4} \div \frac{3}{2}$$

Next, write the expression as a multiplication expression.

$$\frac{13}{4} \cdot \frac{2}{3}$$

$$3\frac{1}{4} \div 1\frac{1}{2} = \frac{13}{4} \div \frac{3}{2} = \frac{13}{4} \cdot \frac{2}{3} = \frac{13}{2} \cdot \frac{1}{3} = \frac{13}{6} = 2\frac{1}{6}$$

**Divide. Write each answer in simplest form.**

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

$$\frac{1}{4} \div \overline{\phantom{1}}$$

**2.** $1\frac{1}{2} \div 1\frac{1}{4}$

$$\frac{3}{2} \div \overline{\phantom{4}}$$

**3.** $\frac{3}{8} \div 2$

$$\frac{3}{8} \div \overline{\phantom{1}}$$

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

$$\overline{\phantom{3}} \div \overline{\phantom{4}}$$

**5.** $\frac{1}{5} \div 2$

**6.** $1\frac{1}{6} \div 2\frac{2}{3}$

**7.** $\frac{1}{8} \div 4$

**8.** $3\frac{1}{8} \div \frac{1}{2}$

**Holt Mathematics**

Name _____ Date _____ Class _____

# Reteach
## Multiplying Mixed Numbers

To find $\frac{1}{3}$ of $2\frac{1}{2}$, first change $2\frac{1}{2}$ to an improper fraction.

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

Then multiply as you would with two proper fractions.

Check to see if you can divide by the GCF to make the problem simpler. Then multiply the numerators and multiply the denominators.

The problem is now $\frac{1}{3} \cdot \frac{5}{2}$.

$\frac{1 \cdot 5}{3 \cdot 2} = \frac{5}{6}$

So, $\frac{1}{3} \cdot 2\frac{1}{2}$ is $\frac{5}{6}$.

**Rewrite each mixed number as an improper fraction. Is it possible to simplify before you multiply? If so, what is the GCF?**

1. $\frac{1}{4} \cdot 1\frac{1}{3}$

    $= \frac{1}{4} \cdot$ ____

    _____

2. $\frac{1}{6} \cdot 2\frac{1}{2}$

    $= \frac{1}{6} \cdot$ ____

    _____

3. $\frac{1}{8} \cdot 1\frac{1}{2}$

    $= \frac{1}{8} \cdot$ ____

    _____

4. $\frac{1}{3} \cdot 1\frac{2}{5}$

    $= \frac{1}{3} \cdot$ ____

    _____

5. $1\frac{1}{3} \cdot 1\frac{2}{3}$

    $\overline{3} \cdot \overline{3}$

    _____

6. $1\frac{1}{2} \cdot 1\frac{1}{3}$

    $\overline{2} \cdot \overline{3}$

    _____

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

    $\overline{4} \cdot \overline{2}$

    _____

8. $1\frac{1}{6} \cdot 2\frac{2}{3}$

    $\overline{6} \cdot \overline{3}$

    _____

9. $3\frac{1}{3} \cdot \frac{2}{5}$

    _____

10. $2\frac{1}{2} \cdot \frac{1}{5}$

    _____

11. $1\frac{3}{4} \cdot 2\frac{1}{2}$

    _____

12. $3\frac{1}{3} \cdot 1\frac{1}{5}$

    _____

**Holt Mathematics**

## Reteach
### LESSON 5-8  *Multiplying Mixed Numbers*

To find $\frac{1}{3}$ of $2\frac{1}{2}$, first change $2\frac{1}{2}$ to an improper fraction.

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

Then multiply as you would with two proper fractions.

Check to see if you can divide by the GCF to make the problem simpler. Then multiply the numerators and multiply the denominators.

The problem is now $\frac{1}{3} \cdot \frac{5}{2}$.

$$\frac{1 \cdot 5}{3 \cdot 2} = \frac{5}{6}$$

So, $\frac{1}{3} \cdot 2\frac{1}{2}$ is $\frac{5}{6}$.

**Rewrite each mixed number as an improper fraction. Is it possible to simplify before you multiply? If so, what is the GCF?**

1. $\frac{1}{4} \cdot 1\frac{1}{3}$

   $= \frac{1}{4} \cdot \underline{\quad}$

   _____

2. $\frac{1}{6} \cdot 2\frac{1}{2}$

   $= \frac{1}{6} \cdot \underline{\quad}$

   _____

3. $\frac{1}{8} \cdot 1\frac{1}{2}$

   $= \frac{1}{8} \cdot \underline{\quad}$

   _____

4. $\frac{1}{3} \cdot 1\frac{2}{5}$

   $= \frac{1}{3} \cdot \underline{\quad}$

   _____

5. $1\frac{1}{3} \cdot 1\frac{2}{3}$

   $\frac{\quad}{3} \cdot \frac{\quad}{3}$

   _____

6. $1\frac{1}{2} \cdot 1\frac{1}{3}$

   $\frac{\quad}{2} \cdot \frac{\quad}{3}$

   _____

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

   $\frac{\quad}{4} \cdot \frac{\quad}{2}$

   _____

8. $1\frac{1}{6} \cdot 2\frac{2}{3}$

   $\frac{\quad}{6} \cdot \frac{\quad}{3}$

   _____

9. $3\frac{1}{3} \cdot \frac{2}{5}$

   _____

10. $2\frac{1}{2} \cdot \frac{1}{5}$

    _____

11. $1\frac{3}{4} \cdot 2\frac{1}{2}$

    _____

12. $3\frac{1}{3} \cdot 1\frac{1}{5}$

    _____

62

**Holt Mathematics**

## S.O.L. 6.6 Vocabulary Quiz
### Multiplication and Division with Fractions

1. _____    A number that uses place value and a decimal point to shoe tenths, hundredths, thousandths, and so on.

2. _____    The amount left over when you find a quotient.

3. _____    The number by which a dividend is divided in a division problem.

4. _____    The answer in a division problem.

5. _____    The number that is being divided in a division problem.

**Remainder    Quotient    Divisor    Dividend    Decimal**

**Lesson 7-3**

**Example 1 Multiply a Fraction and a Mixed Number**

**Find** $\dfrac{1}{3} \times 2\dfrac{5}{6}$. **Estimate** Use compatible numbers $\rightarrow \dfrac{1}{3} \times 3 = 1$

$$\dfrac{1}{3} \times 2\dfrac{5}{6} = \dfrac{1}{3} \times \dfrac{17}{6} \qquad \text{Write } 2\dfrac{5}{6} \text{ as } \dfrac{17}{6}.$$

$$= \dfrac{1 \times 17}{3 \times 6} \qquad \text{Multiply.}$$

$$= \dfrac{17}{18} \qquad \text{Simplify. Compare to the estimate.}$$

**Example 2 Multiply Mixed Numbers**

**GARDENING** Tom wants to apply fertilizer to his garden which covers $6\dfrac{3}{4}$ square meters of land. The directions on the fertilizer bag state that he needs to use $2\dfrac{1}{3}$ cups of fertilizer for each square meter of land. How many cups of fertilizer does Tom need?

**Estimate** $7 \times 2 = 14$

Each square meter uses $2\dfrac{1}{3}$ cups of fertilizer. So, multiply $6\dfrac{3}{4} \times 2\dfrac{1}{3}$.

$$6\dfrac{3}{4} \times 2\dfrac{1}{3} = \dfrac{27}{4} \times \dfrac{7}{3} \qquad \text{Write mixed numbers as improper fractions.}$$

$$= \dfrac{\overset{9}{\cancel{27}} \times 7}{4 \times \underset{1}{\cancel{3}}} \qquad \text{Divide numerator and denominator by the common factor, 3.}$$

$$= \dfrac{63}{4} \text{ or } 15\dfrac{3}{4} \qquad \text{Simplify.}$$

Tom will need $15\dfrac{3}{4}$ cups of fertilizer.

# UNDERSTANDING FRACTIONS 2 UNIT TEST

## ■ PART A

**Directions**

Solve each problem on a separate sheet of paper. Show your work.

| | |
|---|---|
| **1** Add: $6\frac{2}{3} + 3\frac{1}{2}$ | **7** Carlos worked $3\frac{1}{2}$ hours on Monday and $5\frac{3}{4}$ hours on Tuesday. How many hours did he work? |
| **2** Subtract: $\begin{array}{r} \frac{2}{3} \\ -\ \frac{3}{8} \\ \hline \end{array}$ | |
| | **8** Angela needs $3\frac{1}{2}$ yards of cloth to make a set of curtains. How many sets of curtains can she make if she has 21 yards of cloth? |
| **3** What is $\frac{3}{5}$ of 30? | |
| **4** Divide: $\frac{1}{5} \div 4$ | **9** A pie had 16 pieces. If Mrs. Guzman served $\frac{3}{4}$ of the pieces, how many pieces did she serve? |
| **5** Multiply: $2\frac{4}{5} \times \frac{2}{7}$ | |
| **6** Divide: $2\frac{2}{5} \div 2\frac{2}{3}$ | **10** $\frac{3}{4} \div \frac{5}{8}$ |

*Directions*

Read each question. Circle the correct answer.

---

**1** Which fraction has the smallest value?

(a) $\dfrac{3}{4}$  (c) $\dfrac{1}{2}$

(b) $\dfrac{2}{5}$  (d) $\dfrac{5}{6}$

---

**2** Add: $5\dfrac{3}{4}$

$+\ 2\dfrac{1}{3}$

(a) $3\dfrac{5}{12}$  (c) $7\dfrac{1}{12}$

(b) $9\dfrac{5}{12}$  (d) $8\dfrac{1}{12}$

---

**3** What is the difference between 26 and $3\dfrac{3}{4}$?

(a) $23\dfrac{3}{4}$  (c) $22\dfrac{1}{4}$

(b) $23\dfrac{1}{4}$  (d) $22\dfrac{3}{4}$

---

**4** Which fraction is equal to $3\dfrac{2}{3} \times \dfrac{2}{5}$?

(a) $\dfrac{12}{15}$  (c) $1\dfrac{7}{15}$

(b) $\dfrac{3}{5}$  (d) $1\dfrac{5}{8}$

---

**5** Divide: $\dfrac{1}{4} \div 8$

(a) $\dfrac{1}{32}$  (c) $\dfrac{1}{4}$

(b) $\dfrac{1}{12}$  (d) $32$

---

**6** Dennis spent $1\dfrac{1}{4}$ hours each day practicing basketball for 5 days. What is the total number of hours Dennis practiced?

(a) $4\dfrac{1}{2}$  (c) $6\dfrac{1}{4}$

(b) $\dfrac{5}{4}$  (d) $5\dfrac{1}{2}$

Name:_____ Date:_____

# 6.6 Multiplying and Dividing Fractions Tutorial Worksheet

**Directions: As you watch the tutorial video, fill in the blanks for questions 1-5.**

1. A mixed number is a number with an _____ part and a _____ part.

2. An _____ fraction has a value greater than 1 or less than -1. It is not written as a mixed number.

   Example: —

3. _____ are number pairs that have a product of 1.   —   — are reciprocals.

4. The simplest way to divide fractions is to change the division to _____.

5. **Rules for Multiplying and Dividing Fractions:**

   Convert mixed numbers into _____ fractions.

   Multiply across numerators and denominators.

   Convert your answer back into a mixed number.

   **For dividing fractions,** you must find the _____ of the divisor before you can multiply.

**Once the tutorial is complete, try problems 1 - 6 on your own.**

Multiply the following mixed numbers. Make sure your answer is in simplest form.

| 1. | 2. | 3. |
|---|---|---|
|   |   |   |

Divide the following mixed numbers. Make sure your answer is in simplest form.

| 4. | 5. | 6. |
|---|---|---|
|   |   |   |

**6-5** **Practice: Skills**

## Adding and Subtracting Mixed Numbers

**Add or subtract. Write in simplest form.**

**1.**     $2\frac{1}{4}$

$+\, 3\frac{3}{4}$

**2.**     $4\frac{5}{6}$

$-\, 3\frac{1}{6}$

**3.**     $8\frac{5}{12}$

$-\, 1\frac{1}{12}$

**4.**     $2\frac{3}{7}$

$+\, 4\frac{2}{7}$

**5.**     $6\frac{2}{3}$

$+\, 3\frac{4}{9}$

**6.**     $8\frac{7}{12}$

$-\, 5\frac{5}{12}$

**7.** $9\frac{3}{4} - 7\frac{1}{2}$

**8.** $2\frac{1}{8} + 5\frac{7}{8}$

**9.** $1\frac{2}{3} + 4\frac{8}{9}$

**10.** $10\frac{3}{5} - 2\frac{1}{2}$

**11.** $6\frac{5}{6} + \frac{3}{8}$

**12.** $9\frac{4}{5} + 2\frac{2}{3}$

**13.** $5\frac{2}{3} - \frac{1}{6}$

**14.** $8\frac{1}{2} - 5\frac{3}{10}$

**15.** $4\frac{3}{5} + 9\frac{1}{3}$

**16.** $7\frac{11}{12} - 3\frac{7}{12}$

**17.** $5\frac{8}{9} - 3\frac{1}{6}$

**18.** $8\frac{3}{4} + 6\frac{2}{5}$
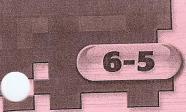
**Evaluate each expression if $a = 1\frac{2}{3}$, $b = \frac{1}{4}$, and $c = 3\frac{5}{6}$.**

**19.** $a + b$

**20.** $c + a$

**21.** $c - b$

**22.** $c - a$

# 6-5  Practice: Word Problems

## Adding and Subtracting Mixed Numbers

Solve. Write answers in simplest form.

1. **SCHOOL** Liwanu spent $2\frac{2}{5}$ hours on his math homework and $1\frac{3}{5}$ hours on his science homework. How much time did he spend doing math and science homework?

2. **FARMING** Mr. Garcia planted $4\frac{7}{8}$ acres of wheat and $1\frac{5}{8}$ acres of corn. How much more wheat did he plant than corn?

3. **COOKING** Trey wants to make biscuits and muffins. He needs $2\frac{1}{4}$ cups of flour for the biscuits and $1\frac{5}{8}$ cups of flour for the muffins. How much flour does Trey need altogether?

4. **COOKING** Gina wants to make cookies. The recipe for blueberry muffins calls for $2\frac{3}{4}$ cups of flour. The recipe for cornmeal muffins calls for $1\frac{1}{3}$ cups of flour. How many more cups of flour would Gina need for blueberry muffins than corn muffins?

5. **WEIGHT** Crystal's baby brother weighed $7\frac{1}{2}$ pounds at birth. After one month, her brother weighed $8\frac{4}{5}$ pounds. How much weight did the baby gain?

6. **BOOKS** Kyle read $3\frac{5}{6}$ books and Jan read $2\frac{1}{3}$ books. How many more books did Kyle read than Jan?

7. **ANIMALS** The average length of a Rufous hummingbird is $3\frac{1}{2}$ inches. The average length of a Broad-tailed hummingbird is $4\frac{1}{2}$ inches. How much shorter is the Rufous hummingbird?

8. **RECYCLING** The class collected $9\frac{5}{7}$ pounds of glass bottles and $6\frac{1}{2}$ pounds of aluminum cans. How many pounds of glass and aluminum did the class collect in all?

## 7-3  Study Guide and Intervention

### Multiplying Mixed Numbers

To multiply mixed numbers, write the mixed numbers as improper fractions, and then multiply as with fractions.

**EXAMPLE 1** Find $2\frac{1}{4} \times 1\frac{2}{3}$.  Estimate: $2 \times 2 = 4$.

$2\frac{1}{4} \times 1\frac{2}{3} = \frac{9}{4} \times \frac{5}{3}$   Write mixed numbers as improper fractions.

$= \frac{\overset{3}{\cancel{9}} \times 5}{4 \times \underset{1}{\cancel{3}}}$   Divide the numerator and denominator by their common factor, 3.

$= \frac{15}{4}$ or $3\frac{3}{4}$   Simplify. Compare to the estimate.

**EXAMPLE 2** If $a = 1\frac{1}{3}$ and $b = 2\frac{1}{4}$, what is the value of $ab$?

$ab = 1\frac{1}{3} \times 2\frac{1}{4}$   Replace $a$ with $1\frac{1}{3}$ and $b$ with $2\frac{1}{4}$.

$= \frac{4}{3} \times \frac{9}{4}$   Write mixed numbers as improper fractions.

$= \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{4}}}$   Divide the numerator and denominator by their common factors, 3 and 4.

$= \frac{3}{1}$ or $3$   Simplify.

### EXERCISES

**Multiply. Write in simplest form.**

1. $\frac{1}{3} \times 1\frac{1}{3}$

2. $1\frac{1}{5} \times \frac{3}{4}$

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

4. $\frac{2}{3} \times 3\frac{1}{2}$

5. $9 \times 1\frac{1}{6}$

6. $2\frac{4}{9} \times \frac{4}{11}$

7. $2\frac{1}{2} \times 1\frac{1}{3}$

8. $1\frac{1}{4} \times \frac{3}{5}$

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

10. $\frac{3}{8} \times 2\frac{1}{2}$

11. $4 \times 1\frac{1}{8}$

12. $1\frac{1}{9} \times 3$

13. Evaluate $5x$ if $x = 1\frac{2}{3}$.

14. If $t = 2\frac{3}{8}$, what is $4t$?

Lesson 7-3

## 7-3  Practice: Word Problems

### Multiplying Mixed Numbers

FOOD For Exercises 1–3, use the table. The table shows Keith's food options for a 7-day outdoor survival course.

| Food Options for 7-day Outdoor Survival Course | |
| --- | --- |
| peanut butter | 1 plastic jar = $4\frac{3}{5}$ cups |
| dried noodles/rice | $14\frac{2}{3}$ cups |
| dried fruit/nuts | $6\frac{1}{6}$ cups |
| concentrated juice boxes | 8 boxes = $16\frac{1}{4}$ cups |
| beef jerky | $3\frac{1}{3}$ cups |
| powdered milk | 1 box = $8\frac{4}{5}$ cups |
| dehydrated soup | 5 packages = $15\frac{2}{3}$ cups |
| canned tuna/meat | 4 cans = $5\frac{3}{5}$ cups |

1. Keith wants to divide his tuna over the seven-day course. How many cups of tuna meat can Keith plan on consuming each day?

2. Keith would like to bring enough concentrated juice in order to have $2\frac{1}{4}$ cups available per day. How much juice does he need and is 8 boxes of concentrated juice enough?

3. Six other students have been advised to bring the same menu on the course. How many cups of dried fruits and nuts will the students be bringing all together?

4. **MEASUREMENT** Bill wants to put a large mural on a wall that is $9\frac{1}{3}$ feet long and $8\frac{1}{8}$ feet wide. Find the area of the wall. If the mural is 100 square feet, will it fit on the wall?

5. **PAINTING** Pam is mixing $3\frac{1}{5}$ batches of paint. If one batch calls for $2\frac{3}{4}$ tablespoons of detergent to add to the tempera powder, how many tablespoons of detergent will Pam need?

6. **COOKING** To make a batch of fruit punch, Steve needs $2\frac{2}{3}$ cups blackberry juice. If he wants to make $2\frac{3}{4}$ batches of punch, how many cups of blackberry juice will he need?

Lesson 7-3

## 4-4  Practice: Word Problems

### Dividing by Decimals

**MARATHON** For Exercises 1 and 2, use the table that shows course records for the Boston Marathon.

| Course Records for the Boston Marathon | | | |
|---|---|---|---|
| Division | Record-holder | Year | Time (hours) |
| Men's Open | Cosmas Ndeti | 1994 | 2.121 |
| Women's Open | Margaret Okayo | 2002 | 2.345 |
| Men's Wheelchair | Heinz Frei | 1994 | 1.356 |
| Women's Wheelchair | Jean Driscoll | 1994 | 1.523 |

1. The Boston Marathon is 26.2 miles. Use the times shown in the table to calculate the miles per hour for each division winner. Round to the nearest thousandth.

2. To the nearest hundredth, how many times greater was the men's open time than the women's wheelchair time?

3. **DRIVING** The Martinez family drove 48.7 miles to the river. It took them 1.2 hours to get there. How fast did they drive? Round to the nearest whole number.

4. **SHOPPING** Nikki is buying some refrigerator magnets for her friends. Her total bill is $16.80. If magnets are $0.80 each, how many magnets is she buying?

5. **SCALE MODEL** Matt is making a scale model of a building. The model is 3.4 feet tall. The actual building is 41.48 feet tall. How many times smaller is the model than the actual building?

6. **COOKING** Yori has 14.25 cups of cupcake batter. If each cupcake uses 0.75 cup of batter, how many cupcakes can Yori make?

## 4-4 **Practice: Skills**

### *Dividing by Decimals*

**Divide. Round to the nearest hundredth if necessary.**

1. $0.2\overline{)4.86}$

2. $0.7\overline{)2.52}$

3. $1.2\overline{)14.4}$

4. $3.8\overline{)17.1}$

5. $1.32\overline{)3.96}$

6. $34.9\overline{)628.2}$

7. $0.105 \div 0.5$

8. $1.296 \div 0.16$

9. $3.825 \div 2.5$

10. $0.5\overline{)8.253}$

11. $0.8\overline{)0.9944}$

12. $0.32\overline{)1.50048}$

13. $0.75\overline{)13.59}$

14. $1.8\overline{)4.4208}$

15. $4.02\overline{)16.1604}$

16. $160.3639 \div 25.1$

17. $246.3293 \div 13.3$

18. $106.288 \div 6.5$

**Lesson 4-4**

## 6-4 Study Guide and Intervention

### Adding and Subtracting Fractions with Unlike Denominators

To find the sum or difference of two fractions with unlike denominators, rename the fractions using the least common denominator (LCD). Then add or subtract and simplify.

**EXAMPLE 1** Find $\frac{1}{3} + \frac{5}{6}$.

The LCD of $\frac{1}{3}$ and $\frac{5}{6}$ is 6.

Write the problem.

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

$\rightarrow$

Rename $\frac{1}{3}$ as $\frac{2}{6}$.

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

$\rightarrow$

Add the fractions.

$$\begin{array}{r} \frac{2}{6} \\ +\frac{5}{6} \\ \hline \frac{7}{6} \text{ or } 1\frac{1}{6} \end{array}$$

**EXAMPLE 2** Find $\frac{2}{3} - \frac{1}{4}$.

The LCD of $\frac{2}{3}$ and $\frac{1}{4}$ is 12.

Write the problem.

$$\begin{array}{r} \frac{2}{3} \\ -\frac{1}{4} \\ \hline \end{array}$$

$\rightarrow$

Rename $\frac{2}{3}$ as $\frac{8}{12}$ and $\frac{1}{4}$ as $\frac{3}{12}$.

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

$\rightarrow$

Subtract the fractions.

$$\begin{array}{r} \frac{8}{12} \\ -\frac{3}{12} \\ \hline \frac{5}{12} \end{array}$$

**EXAMPLE 3** Evaluate $x - y$ if $x = \frac{1}{2}$ and $y = \frac{2}{5}$.

$x - y = \frac{1}{2} - \frac{2}{5}$     Replace $x$ with $\frac{1}{2}$ and $y$ with $\frac{2}{5}$.

$\phantom{x - y} = \frac{1}{2} \times \frac{5}{5} - \frac{2}{5} \times \frac{2}{2}$     Rename $\frac{1}{2}$ and $\frac{2}{5}$ using the LCD, 10.

$\phantom{x - y} = \frac{5}{10} - \frac{4}{10}$     Simplify.

$\phantom{x - y} = \frac{1}{10}$     Subtract the numerators.

### EXERCISES

**Add or subtract. Write in simplest form.**

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

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

9. Evaluate $x + y$ if $x = \frac{1}{12}$ and $y = \frac{1}{6}$.     10. Evaluate $a + b$ if $a = \frac{1}{2}$ and $b = \frac{3}{4}$.

**6-4**

# Practice: Word Problems

## Adding and Subtracting Fractions with Unlike Denominators

BUSINESS For Exercises 1–4, use the table below. It lists the fractions of United States car sales held by several companies in 2001.
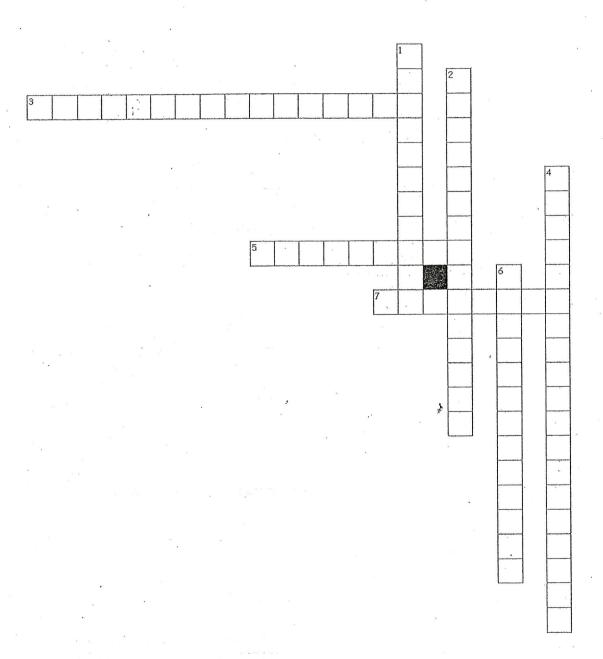
| Leading Car Sales in U.S. in 2001 | |
| --- | --- |
| Company | Fraction of Sales |
| Company A | $\frac{1}{5}$ |
| Company B | $\frac{4}{25}$ |
| Company C | $\frac{2}{5}$ |
| Company D | $\frac{3}{20}$ |

1. What fraction of the U.S. sales did Company C and Company B hold together?

2. How much greater was the fraction of the market of Company A than of Company D?

3. How much more than Company A's fraction of the market did Company C have?

4. Find the total fraction of the market that Company D and Company B hold together.

5. TRAVEL Gabriella's travel shampoo bottle holds $\frac{1}{2}$ cup of shampoo. Before leaving on vacation, she filled the bottle to the top with $\frac{1}{8}$ cup of shampoo. How much shampoo was already in the bottle?

6. EXERCISE Bill and Andy were racing to see who could run the farthest in 5 minutes. Bill ran $\frac{5}{8}$ of a mile, and Andy ran $\frac{3}{4}$ of a mile. How much farther did Andy run than Bill?

# SOL 6.6a

**Across**
3. a fraction which the denominator is larger than the numberator
5. The top number of a fraction
7. part of a whole

**Down**
1. The bottom number of a fraction
2. fractions with denominators that are not the same.
4. A fraction with a whole number and a fraction
6. Fractions with the same denominators

## 6-3 Practice: Skills

### Adding and Subtracting Fractions with Like Denominators

Add or subtract. Write in simplest form.

1. $\frac{2}{9} + \frac{4}{9}$

2. $\frac{2}{5} + \frac{4}{5}$

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

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

5. $\frac{7}{8} - \frac{3}{8}$

6. $\frac{9}{12} + \frac{3}{12}$

7. $\frac{5}{6} - \frac{1}{6}$

8. $\frac{1}{6} + \frac{5}{6}$

9. $\frac{11}{12} - \frac{7}{12}$

10. $\frac{7}{8} + \frac{3}{8}$

11. $\frac{9}{10} - \frac{4}{10}$

12. $\frac{3}{8} + \frac{1}{8}$

13. $\frac{10}{11} - \frac{2}{11}$

14. $\frac{7}{9} + \frac{2}{9}$

15. $\frac{5}{6} + \frac{4}{6}$

16. $\frac{3}{10} - \frac{1}{10}$

17. $\frac{3}{10} + \frac{3}{10}$

18. $\frac{5}{6} + \frac{3}{6}$

19. $\frac{5}{8} - \frac{3}{8}$

20. $\frac{5}{7} - \frac{2}{7}$

21. $\frac{6}{7} + \frac{5}{7}$

22. How much is $\frac{2}{9}$ pound plus $\frac{1}{9}$ pound?

23. How much longer is $\frac{3}{8}$ foot than $\frac{1}{8}$ foot?

24. How much more than $\frac{1}{4}$ cup is $\frac{3}{4}$ cup?

25. What is the sum of $\frac{2}{11}$, $\frac{7}{11}$, and $\frac{1}{11}$?

Name _____

Class Period _____

Date_____

## S.O.L. 6.6 Vocabulary Quiz
## Multiplication and Division with Fractions

1. _____   A number that uses place value and a decimal point to shoe tenths, hundredths, thousandths, and so on.

2. _____   The amount left over when you find a quotient.

3. _____   The number by which a dividend is divided in a division problem.

4. _____   The answer in a division problem.

5. _____   The number that is being divided in a division problem.

6. _____   A number that may be divided by another number with no remainder.

7. _____   An expression that indicates the quotient of two quantities, such as $^1/_3$.

8. _____   A number related to another in such a way that when multiplied together their product is 1.

9. _____   The number or quantity obtained by multiplying two or more numbers together.

10. _____   A fraction in which the numerator is larger than or equal to the denominator.

Multiple   Reciprocal   Improper Fraction   Fraction   Product

Remainder   Quotient   Divisor   Dividend   Decimal

## 6-4 Practice: Skills

### Adding and Subtracting Fractions with Unlike Denominators

**Add or subtract. Write in simplest form.**

1.  $\begin{array}{r} \frac{2}{3} \\ +\frac{5}{6} \\ \hline \end{array}$

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

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

4.  $\begin{array}{r} \frac{1}{2} \\ +\frac{7}{8} \\ \hline \end{array}$

5.  $\begin{array}{r} \frac{4}{7} \\ -\frac{1}{2} \\ \hline \end{array}$

6.  $\begin{array}{r} \frac{1}{6} \\ -\frac{1}{12} \\ \hline \end{array}$

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

8. $\frac{1}{3} + \frac{5}{7}$

9. $\frac{1}{5} + \frac{5}{6}$

10. $\frac{3}{4} + \frac{11}{12}$

11. $\frac{1}{2} - \frac{2}{5}$

12. $\frac{11}{12} - \frac{3}{4}$

13. $\frac{3}{4} - \frac{1}{12}$

14. $\frac{4}{5} + \frac{1}{2}$

15. $\frac{3}{5} + \frac{2}{3}$

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

17. $\frac{11}{12} - \frac{1}{6}$

18. $\frac{3}{5} + \frac{9}{10}$

19. How much more is $\frac{3}{8}$ gallon than $\frac{1}{4}$ gallon?

20. How much more is $\frac{3}{4}$ ounce than $\frac{1}{3}$ ounce?

21. Evaluate $x - y$ if $x = \frac{7}{10}$ and $y = \frac{3}{5}$.

22. Evaluate $s + t$ if $s = \frac{2}{3}$ and $t = \frac{5}{6}$.

Lesson 6-4

Name: _____     Date: _____

# Fractions Exercise 35: Subtracting Fractions With Unlike Denominators

Fractions with unlike denominators can be subtracted if the fractions are changed to fractions having common denominators.

Subtract the following. Change fractions to the simple form. The first one has been completed.

1.  $\dfrac{3}{4} \cdot \dfrac{2}{2} = \dfrac{6}{8}$

    $- \dfrac{1}{2} \cdot \dfrac{4}{4} = \dfrac{4}{8}$

    $\dfrac{2}{8} = \dfrac{1}{4}$

2.  $\dfrac{5}{6} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{1}{5} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

3.  $\dfrac{5}{8} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{1}{3} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

4.  $\dfrac{2}{3} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{1}{2} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

5.  $\dfrac{3}{4} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{2}{3} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

6.  $\dfrac{9}{10} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{1}{5} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

7.  $\dfrac{3}{4} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{5}{8} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

8.  $\dfrac{2}{3} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{4}{9} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

9.  $\dfrac{8}{10} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{2}{5} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

10. $\dfrac{2}{4} \cdot \phantom{x} = \phantom{xx}$

    $- \dfrac{1}{5} \cdot \phantom{x} = \underline{\phantom{xx}}$

    $\underline{\phantom{xx}}$

Fractions, Decimals, and Percentages

Name: _____  Date: _____

## Fractions Exercise 36: Subtracting Mixed Numbers and Fractions

Subtract the following mixed numbers. Change the mixed numbers to improper fractions with common denominators and subtract. Change the answer to a mixed number with a simple fraction. The first one has been completed for you.

1. $7\frac{1}{2} = \frac{15}{2} \cdot \frac{3}{3} = \frac{45}{6}$

   $- 5\frac{1}{3} = \frac{16}{3} \cdot \frac{2}{2} = \frac{32}{6}$

   $\frac{13}{6} = 2\frac{1}{6}$

2. $1\frac{2}{3} = \quad \bullet \quad =$

   $- \frac{1}{2} = \quad \bullet \quad = \underline{\quad\quad}$

   $\underline{\quad\quad} = \underline{\quad\quad}$

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

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

4. $4\frac{4}{5} =$

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

5. $9\frac{1}{8}$

   $- 8\frac{1}{2}$

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

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

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

   $- 1\frac{3}{7}$

8. $2\frac{3}{4}$

   $- \frac{5}{8}$

9. $7\frac{1}{2}$

   $- 6\frac{1}{3}$

10. $13\frac{7}{8}$

    $- 5\frac{1}{6}$

SOL 6.6 Multiplication and Division with Fractions

1. _____     An expression that indicates the quotient of
                              two quantities.
                              Example 1/3

2. _____     A number that may be divided by another
                              number with no remainder.
                              Example 3/2

3. _____     A number related to another in such a way
                              that when multiplied together their product
                              is 1.
                              Example  The reciprocal of 7 is 1/7;
                                      The reciprocal of 2/3 is 3/2

4. _____     The number or quantity obtained by
                              multiplying two or more numbers together.
                              Example 6 x6 = 42.  42 is the product of 6x7

5. _____     A fraction in which the numerator is larger
                              than or equal to the denominator.
                              Example 12 ÷ 4 = 3 equivalent 4 x 3 = 12

Word Bank

Reciprocal
Product
Improper Fraction
Multiple
Fraction

# • Dividing Numbers

## Teacher's Guide

## Vocabulary:

Dividend, divisior, quotient

"**A group of** (dividend) **divided into** (divisor) **equal parts has** (quotient) members **in each part.**"

> **Example:** "A group of 63, divided into 9 equal parts, has 7 members in each part."

## Operation:

Perform basic division on a calculator by entering the dividend (number to be divided), the division key (÷), the divisor number and finally the equal key (=).

## Tips:

You can continue to divide by the same number without entering it again. Press the = key for as many times as you wish to divide.

### Enter 5000 ÷ 5 =

| ⑤ ⓪ ⓪ ⓪ ÷ ⑤ [Enter] | 1000 |

Enter =

| [Enter =] | 200 |

Enter =

| [Enter =] | 40 |

Enter =

| [Enter =] | 8 |

The calculator will continue to divide by **5** each time the = key is pressed.

*Saxon Math*

## Guided Practice

### Dividing

To divide 2 numbers, enter the digits of the first number as the dividend (the number to be divided), then press the ($\div$) key, enter the digits of the second number as the divisor (the number you will divide by) and then press the = key.

**Example:**

Divide: 25 $\div$ 5

2 5 $\div$ 5 Enter =               | 5 |

### Repeated Division

The number that will be used repeatedly to divide must be entered **last**. Repeated division works just like repeated addition and subtraction.

Divide: 3125 $\div$ 5, four times and view results

**Step 1:**

3 1 2 5 $\div$ 5 Enter =       | 625 |

**Step 2:** Enter:

Enter =       | 125 |

**Step 3:** Enter:

Enter =       | 25 |

**Step 4:** Enter:

Enter =       | 5 |

1. **Decimal**: A number that uses <u>place value</u> and a <u>decimal point</u> to show tenths, hundredths, thousandths, and so on.

2. **Dividend**: The number that is being divided in a division problem.

   *Example*:

   $$35 \div 5 = 7$$

   dividend  divisor  quotient

   The dividend is 35

3. **Divisor**: The number by which a <u>dividend</u> is divided in a division problem.

   *Example*:

   $$35 \div 5 = 7$$

   dividend  divisor  quotient

   The divisor is 5.

4. **Quotient**: The answer in a division problem.

   *Example*:

   $$35 \div 5 = 7$$

   dividend  divisor  quotient

   The quotient is 7.

5. **Remainder**: The amount left over when you find a <u>quotient</u>.

# Dividing Fractions by Whole Numbers

## To Divide Fractions by Whole Numbers:

* Treat the integer as a fraction (i.e. place it over the denominator 1)
* Invert (i.e. turn over) the denominator fraction and multiply the fractions
* Multiply the numerators of the fractions
* Multiply the denominators of the fractions
  * Place the product of the numerators over the product of the denominators
* Simplify the Fraction

## Example: Divide 2/9 by 2

* The integer divisor (2) can be considered to be a fraction (2/1)
* Invert the denominator fraction and multiply (2/9 ÷ 2/1 = 2/9 * 1/2)
* Multiply the numerators (2*1=2)
* Multiply the denominators (9*2=18)
* Place the product of the numerators over the product of the denominators (2/18)
* Simplify the Fraction if possible (2/18 = 1/9)

## Division of Decimals by Decimals

The procedure for the division of decimals is very similar to the division of whole numbers. Make the divisor into a whole number by multiplying both it and the dividend by the same number (such as 10, 100, 1000 etc.). An easy way to do this is to move the decimal point to the right end of the divisor and move the decimal point of the dividend the same number of places.

**Example 1 Find Reciprocals**
**Find the reciprocal of 9.**

Since $9 \times \dfrac{1}{9} = 1$, the reciprocal of 9 is $\dfrac{1}{9}$.

**Example 2 Find Reciprocals**
**Find the reciprocal of $\dfrac{13}{15}$.**

Since $\dfrac{13}{15} \times \dfrac{15}{13} = 1$, the reciprocal of $\dfrac{13}{15}$ is $\dfrac{15}{13}$.

**Example 3 Divide by a Fraction**
**Find $\dfrac{1}{6} \div \dfrac{2}{3}$.**

$\dfrac{1}{6} \div \dfrac{2}{3} = \dfrac{1}{6} \times \dfrac{3}{2}$  Multiply by the reciprocal, $\dfrac{3}{2}$.

$\qquad = \dfrac{1 \times \cancel{3}^{1}}{\cancel{6}_{2} \times 2}$  Divide 3 and 6 by the GCF, 3.

$\qquad = \dfrac{1}{4}$  Multiply the numerators and multiply the denominators.

Name _____     Date _____

## S.O.L. 6.6b Division with Decimals
### Find the Quotient

1. What is 8.652 ÷ 0.2?

    **A** 4.326           **C** 2310
    **B** 0.4326       **D** 0.0231

2. 0.357 ÷ 0.007 =

    **F** 0.051          **H** 0.51
    **G** 5.1           **J** 51

3. $0.8\overline{)5.28}$

    **A** .066         **C** 6.6
    **B** 0.066      **D** 66

4. What is 0.261 ÷ 0.009?

    **F** 0.029         **H** 2.9
    **G** 0.29         **J** 0.029

5. 12.8 ÷ 0.4 =

    **A** 42           **C** 32
    **B** 31           **D** 22

6. 9.825 ÷ 0.005 =

    **F** 1,965       **H** 196.5
    **G** 19.65      **J** 1.965

7. $0.9\overline{)2.736}$

    **A** 0.34         **C** 3.4
    **B** 30.4        **D** 3.04

8. 42.54 ÷ 0.6 =

    **F** 70.3         **H** 70.5
    **G** 70.7        **J** 70.9

9. $0.2 \overline{)4.86}$

    A 0.243              C 0.0411

    B 24.3               D .04116

10. $6.09 \div 0.3 =$

    F 0.0203           H 2.03

    G 0.203            J 20.3

11. $0.7 \overline{)2.52}$

    A 3.6               C 0.277

    B .36               D 27.77

12. What is $0.237 \div 0.06$?

    F 0.0395           H 39.5

    G 0.395            J 3.95

# Least Common Denominator

The Least Common Denominator (LCD) is the Least Common Multiple of two or more denominators.

## How to find the Least Common Denominator:

* Find the Greatest Common Factor of the denominators.
* Multiply the denominators together.
* Divide the product of the denominators by the Greatest Common Factor.

### Example: Find the LCD of 2/9 and 3/12

* Determine the Greatest Common Factor of 9 and 12 which is 3
* Either multiply the denominators and divide by the GCF (9*12=108, 108/3=36)
* OR – Divide one of the denominators by the GCF and multiply the quotient times the other denominator (9/3=3, 3*12=36)

## How to rename fractions and use the Least Common Denominator:

* Divide the LCD by one denominator.
* Multiply the numerator times this quotient.
* Repeat the process for the other fraction(s)

### Example: Add 2/9 + 3/12

* LCD is 36
* First fraction (2/9): 36/9 = 4, 4*2 = 8, first fraction is renamed as 8/36
* Second fraction (3/12): 36/12 = 3, 3*3 = 9, second fraction is renamed as 9/36
* It is possible to add or subtract fractions that have the same denominator
  * 8/36 + 9/36 = 17/36

Name _____  Date _____ Class _____
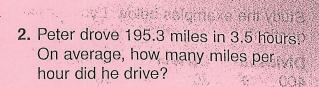
# Problem Solving
## *Dividing by Decimals*

**Write the correct answer.**

1. Jamal spent $6.75 on wire to build a rabbit hutch. Wire costs $0.45 per foot. How many feet of wire did Jamal buy?

_____

2. Peter drove 195.3 miles in 3.5 hours. On average, how many miles per hour did he drive?

3. Lisa's family drove 830.76 miles to visit her grandparents. Lisa calculated that they used 30.1 gallons of gas. How many miles per gallon did the car average?

_____

4. A chef bought 84.5 pounds of ground beef. He uses 0.5 pound of ground beef for each hamburger. How many hamburgers can he make?

_____

**Circle the letter of the correct answer.**

5. Mark earned $276.36 for working 23.5 hours last week. He earned the same amount of money for each hour that he worked. What is Mark's hourly rate of pay?

   A $1.17
   B $10.76
   C $11.76
   D $117.60

6. Alicia wants to cover a section of her wall that is 2 feet wide and 12 feet long with mirrors. Each mirror tile is 2 feet wide and 1.5 feet long. How many mirror tiles does she need to cover that section?

   F 4 tiles
   G 6 tiles
   H 8 tiles
   J 12 tiles

7. John ran the city marathon in 196.5 minutes. The marathon is 26.2 miles long. On average, how many miles per hour did John run the race?

   A 7 miles per hour
   B 6.2 miles per hour
   C 8 miles per hour
   D 8.5 miles per hour

8. Shaneeka is saving $5.75 of her allowance each week to buy a new camera that costs $51.75. How many weeks will she have to save to have enough money to buy it?
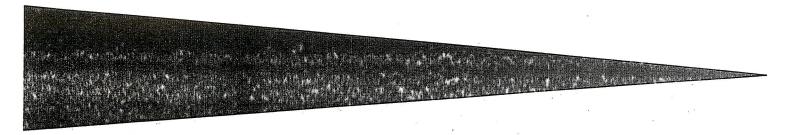
   F 9 weeks
   G 9.5 weeks
   H 8.1 weeks
   J 8 weeks

**Holt Mathematics**

# Converting from smaller unit to a larger unit

Meters

Liters

Grams

kilo     hecto     deca     deci     centi     milli

larger to smaller

smaller to larger

Move the decimal in the same direction as above the same amount of places.

# Converting from larger unit to a smaller unit
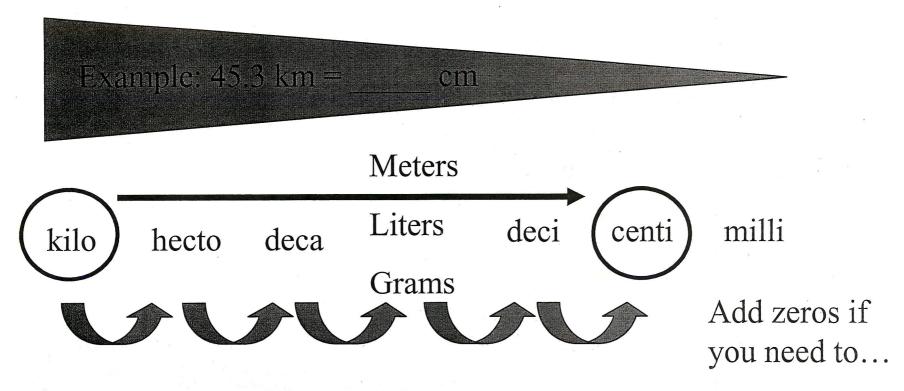
Meters

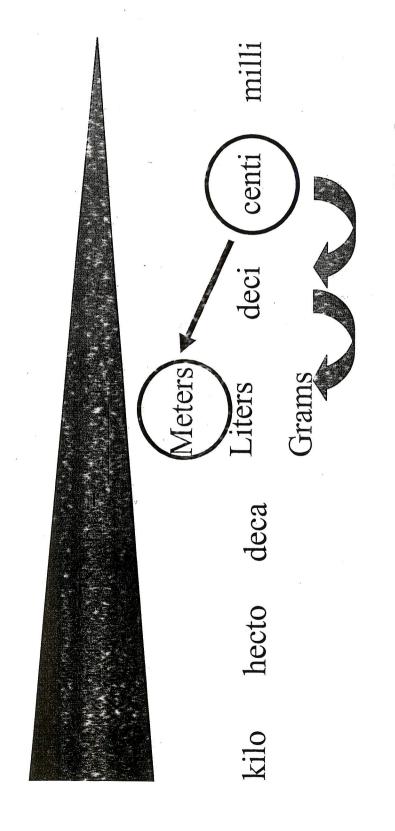kilo     hecto     deca     Liters     deci     centi     milli

Grams

Move the decimal in the same direction
as above the same amount of places.

# Example 1

Example: 45.3 km = _____ cm

Meters
kilo    hecto    deca    Liters    deci    centi    milli
Grams

Add zeros if you need to…

For example: to convert from kilometers to centimeters, count how many places. Then, move the decimal place in the same direction the same amount of spaces.

45.30000.

4,530,000 cm
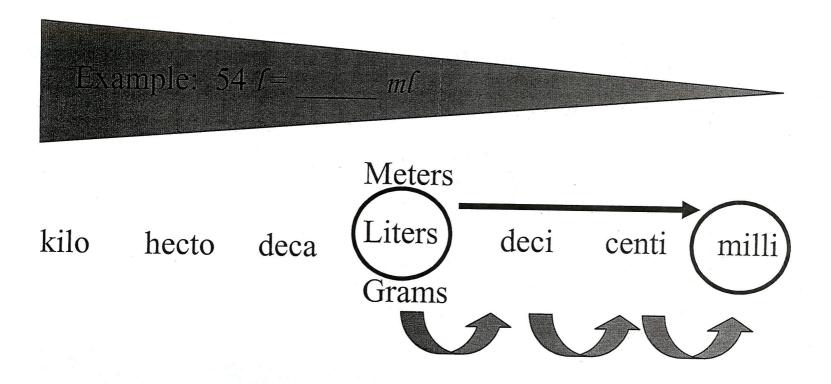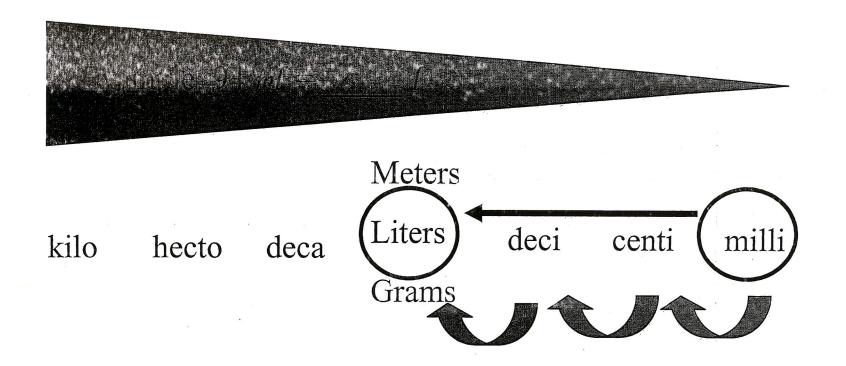
# Example 2

kilo    hecto    deca

Meters    Liters    Grams

deci    centi    milli

5.78.

5.78 m

For example: to convert from centimeters
to meters, count how many places.
Then, move the decimal place in the
same direction the same amount of
spaces.

# Example 3

Example: 54 *l* = _____ *ml*

Meters
Liters
Grams

kilo    hecto    deca    deci    centi    milli

To convert liters to milliliters, count how many places. Then, move the decimal place in the same direction the same amount of spaces.

54.000.

54,000 ml

# Example 4

kilo     hecto     deca     **Meters / Liters / Grams**     deci     centi     milli

For example: to convert from centimeters to meters, count how many places. Then, move the decimal place in the same direction the same amount of spaces.

Add zeros if you need to…

.094

.094 liters
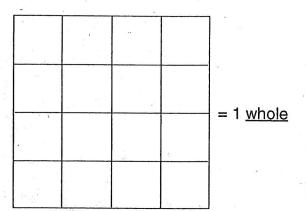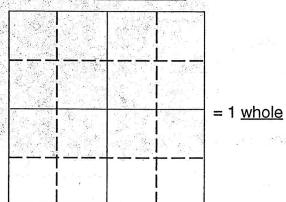
Let's learn some more things about fraction parts of a whole square.

= 1 whole

Answer the following:

1. How many fraction parts are there in the square at the left? _____

2. What fraction part does each small square equal? _____

3. Color $\frac{8}{16}$ of the square.

4. How many more of the small squares must be colored to have $\frac{11}{16}$ of the large square colored? _____

5. How many squares are not colored after you have colored $\frac{11}{16}$? _____

6. Add the colored squares ($\frac{11}{16}$) and the squares not colored. How many sixteenths did you get for an answer when you added the colored squares and those not colored? _____

7. Now color the squares not already colored. How many total squares have you colored on the square? _____

= 1 whole

8. Color $\frac{8}{16}$ of the square at the left. Circle the fraction that is the same as $\frac{8}{16}$.

$\frac{1}{4}$   $\frac{1}{16}$   $\frac{1}{2}$   $\frac{1}{3}$

9. Color $\frac{12}{16}$ of the square at the left. Circle the fraction that is the same as $\frac{12}{16}$.

$\frac{1}{4}$   $\frac{1}{16}$   $\frac{2}{4}$   $\frac{3}{4}$   $\frac{1}{3}$   $\frac{1}{2}$

10. Color $\frac{16}{16}$ of the square. Circle the answer that is the same as $\frac{16}{16}$.

$\frac{1}{4}$   1   $\frac{1}{16}$   $\frac{2}{4}$   $\frac{3}{4}$   2   $\frac{1}{2}$

# Subtraction of Fractions: Exercises

When subtracting fractions, you subtract the numerators and keep the denominator the same. For example, to subtract $\frac{5}{8} - \frac{3}{8}$, you subtract the numerator 3 from the numerator 5. In subtracting $\frac{5}{8} - \frac{3}{8}$, the answer is $\frac{2}{8}$.

$$\frac{5}{8} - \frac{3}{8} = \frac{2}{8} \quad \leftarrow \text{subtract the numerators}$$
$$\leftarrow \text{keep the denominators the same}$$

$-\frac{1}{2}$

Solve these:

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

2. $\frac{4}{7} - \frac{3}{7} = \frac{}{7}$

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

4. $\frac{5}{16} - \frac{2}{16} = \frac{}{16}$

5. $\frac{7}{10} - \frac{5}{10} = \frac{}{}$

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

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

8. $\frac{8}{12} - \frac{3}{12} = \frac{}{}$

9. $\frac{4}{5} - \frac{3}{5} =$

10. $\frac{20}{64} - \frac{19}{64} =$

11. $\frac{11}{12} - \frac{3}{12} =$

12. $\frac{7}{8} - \frac{2}{8} =$

Like addition, you cannot subtract fractions unless the denominators are the same. For example, to subtract $\frac{6}{8} - \frac{1}{4}$, the denominators must be the same. The $\frac{6}{8}$ can be changed to fourths, or the $\frac{1}{4}$ can be changed to eighths. Let's change the $\frac{1}{4}$ to eighths. Looking at the fraction chart on page 36, find $\frac{1}{4}$, and look directly below to find $\frac{2}{8}$. Now, in the problem $\frac{6}{8} - \frac{1}{4}$, replace the $\frac{1}{4}$ with $\frac{2}{8}$. Now the problem is $\frac{6}{8} - \frac{2}{8}$. Subtract the numerators.

$$\frac{6}{8} - \frac{2}{8} = \frac{4}{8} \quad \leftarrow \text{subtract the numerators}$$
$$\leftarrow \text{keep the denominators the same}$$

Use the fraction chart on page 36 to solve the following problems:

1. $\frac{2}{4} - \frac{2}{8} = \frac{2}{4} - \frac{}{4} = \frac{}{}$

2. $\frac{10}{16} - \frac{4}{8} = \frac{10}{16} - \frac{}{16} = \frac{}{16}$

3. $\frac{7}{8} - \frac{5}{8} = \frac{}{8}$

4. $\frac{3}{4} - \frac{2}{8} = \frac{}{4} - \frac{}{4} = \frac{}{4}$

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

6. $\frac{1}{8} - \frac{1}{16} = \frac{}{16} - \frac{}{16} = \frac{}{16}$

7. $\frac{7}{8} - \frac{2}{4} = \frac{}{8} - \frac{}{8} = \frac{}{8}$

8. $\frac{11}{16} - \frac{5}{8} = \frac{11}{16} - \frac{}{16} = \frac{}{16}$

# How to divide a four digit decimal number by a two digit decimal number (e.g 0.4131 ÷ 0.17).

    * Place the divisor before the division bracket and place the dividend (0.4131) under it.

0.17 $\overline{)0.4131}$

    * Multiply both the divisor and dividend by 100 so that the divisor is not a decimal but a whole number. In other words move the decimal point two places to the right in both the divisor and dividend

17 $\overline{)41.31}$

    * Proceed with the division as you normally would except put the decimal point in the answer or quotient exactly above where it occurs in the dividend. For example:

      2.43
17 $\overline{)41.31}$

# Sixth Grade
# Math Vocabulary
## S. O. L. 6.6 - Multiplication and Division with Fractions

1. Reciprocal             A number related to another in such a way that when multiplied together their product is 1.

### Example:
The reciprocal of 7 is $1/7$; the reciprocal of $2/3$ is $3/2$.

2. Product             The number or quantity obtained by multiplying two or more numbers together.

### Example:
6 x 7 = <u>42</u>. <u>42</u> is the product of 6x 7.

3. Improper Fraction       A fraction in which the numerator is larger than or equal to the denominator.

### Example:

$$3/2$$

4. Multiple            A number that may be divided by another number with no remainder.

### Example:
$12 \div 4 = 3$ equivalent to 4 x 3 = 12

5. Fraction             An expression that indicates the quotient of two quantities.

### Example:
$$1/3$$

SOL 6.6 Multiplication and Division with Fractions

1. _____ An expression that indicates the quotient of
two quantities.
Example 1/3

2. _____ A number that may be divided by another
number with no remainder.
Example 3/2

3. _____ A number related to another in such a way
that when multiplied together their product
is 1.
Example  The reciprocal of 7 is 1/7;
         The reciprocal of 2/3 is 3/2

4. _____ The number or quantity obtained by
multiplying two or more numbers together.
Example 6 x6 = 42.  42 is the product of 6x7

5. _____ A fraction in which the numerator is larger
than or equal to the denominator.
Example 12 ÷ 4 = 3 equivalent 4 x 3 = 12

Word Bank

Reciprocal
Product
Improper Fraction
Multiple
Fraction

## 6-3  Study Guide and Intervention

### Adding and Subtracting Fractions with Like Denominators

Fractions with the same denominator are called **like fractions**.
- To add like fractions, add the numerators. Use the same denominator in the sum.
- To subtract like fractions, subtract the numerators. Use the same denominator in the difference.

**EXAMPLE 1** Find the sum of $\frac{3}{5}$ and $\frac{3}{5}$.

Estimate $\frac{1}{2} + \frac{1}{2} = 1$

$\frac{3}{5} + \frac{3}{5} = \frac{3+3}{5}$     Add the numerators.

$\quad\quad = \frac{6}{5}$     Simplify.

$\quad\quad = 1\frac{1}{5}$     Write the improper fraction as a mixed number.

Compared to the estimate, the answer is reasonable.

**EXAMPLE 2** Find the difference of $\frac{3}{4}$ and $\frac{1}{4}$.

Estimate $1 - 0 = 1$

$\frac{3}{4} - \frac{1}{4} = \frac{3-1}{4}$     Subtract the numerators.

$\quad\quad = \frac{2}{4}$ or $\frac{1}{2}$     Simplify.

Compared to the estimate, the answer is reasonable.

### EXERCISES

Add or subtract. Write in simplest form.

1. $\frac{1}{9} + \frac{4}{9}$     2. $\frac{9}{11} - \frac{7}{11}$     3. $\frac{9}{10} + \frac{5}{10}$     4. $\frac{11}{12} - \frac{9}{12}$

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

9. $\frac{3}{4} + \frac{3}{4}$     10. $\frac{4}{5} - \frac{1}{5}$     11. $\frac{5}{6} + \frac{1}{6}$     12. $\frac{7}{10} - \frac{1}{10}$
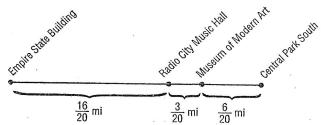
Lesson 6-3

**6-3**

# Practice: Word Problems

## Adding and Subtracting Fractions with Like Denominators

**MAPS** For Exercises 1–3, use the drawing at the right that shows distances between major sites on the Avenue of the Americas in New York City.

Empire State Building · Radio City Music Hall · Museum of Modern Art · Central Park South

$\frac{16}{20}$ mi $\qquad$ $\frac{3}{20}$ mi $\quad$ $\frac{6}{20}$ mi

**Avenue of the Americas, New York City**

| | |
|---|---|
| **1.** Carla walked from the Empire State Building to the Museum of Modern Art. How far did she walk? | **2.** Julie walked from Central Park South to the Museum of Modern Art. Jolene walked from Radio City Music Hall to the Museum. How much farther did Julie walk than Jolene? |
| **3.** Dion walked from Central Park South to the Empire State Building. How far did he walk? | **4. COOKING** Tiffany made a glass of punch from fruit juice concentrate. She used $\frac{1}{4}$ cup concentrate and $\frac{3}{4}$ cup water. How much more water than concentrate did Tiffany use? |
| **5. ART** Beng is creating a painting. He has $\frac{5}{8}$ of a tube of red paint and $\frac{3}{8}$ of a tube of green paint. How much more red paint does he have than green paint? | **6. CONSTRUCTION** Mr. Hayashi is repairing his sidewalk. He mixed $\frac{5}{9}$ pound of cement with sand and water to make concrete. The next day he mixed $\frac{7}{9}$ pound of cement with sand and water. How many pounds of cement altogether did Mr. Hayashi use? |

**Lesson 6-3**