

Drop It!

Example:

To divide dividends and divisors that end with zeros, use this quick trick to make it easier.

$$6,400,000 \div 80,000$$

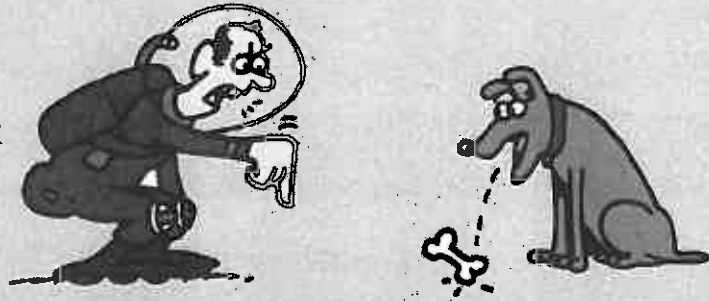
Steps:

1. Count the number of zeros in the divisor. Cross off that number of zeros in both the dividend and the divisor.
2. Divide the numbers.
3. The quotient of the new problem will be the quotient of the original.

$$4,800,000 \div 80,000 \quad \text{Cross off 4 zeros from each number.}$$

$$= 480 \div 8$$

$$= 60$$



Directions: Cross off the correct number of zeros in each number. Then, divide.

$45,000 \div 90 = \underline{\hspace{2cm}}$

$280,000 \div 400 = \underline{\hspace{2cm}}$

$64,000 \div 8,000 = \underline{\hspace{2cm}}$

$300,000 \div 6,000 = \underline{\hspace{2cm}}$

$4,900,000 \div 7,000 = \underline{\hspace{2cm}}$

$3,300,000 \div 1,100 = \underline{\hspace{2cm}}$

$9,600,000 \div 120 = \underline{\hspace{2cm}}$

$56,000,000 \div 800,000 = \underline{\hspace{2cm}}$

$42,000,000 \div 60,000 = \underline{\hspace{2cm}}$

$200,000,000 \div 500,000 = \underline{\hspace{2cm}}$

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Exercise 2.12

Write the mathematical expression for each situation and solve these problems.

1. Divide 1,628 by 37.
2. Find the quotient of 2,660 and 28.
3. How many sets of 6 are there in 252?
4. Divide 1,005 by 15.
5. Find the quotient of 1,792 and 28.
6. How many equal groups of 7 are there in 343?
7. Find the quotient of 384 and 12.

Changing Improper Fractions to Mixed Numbers

Change the improper fractions to mixed or whole numbers.



$\frac{14}{3}$ can be rewritten as $14 \div 3$ or $3 \overline{)14}$

$\frac{14}{3}$ is an improper fraction.

$$\begin{array}{r} 4 \text{ R}2 \\ 3 \overline{)14} \\ \underline{-12} \\ 2 \end{array} \quad \frac{14}{3} = 4 \frac{2}{3}$$

2 becomes the numerator; the denominator stays 3.

$4 \frac{2}{3}$ is a mixed number.

1.

$\frac{15}{2}$

$\frac{7}{4}$

$\frac{20}{7}$

2.

$\frac{43}{5}$

$\frac{23}{8}$

$\frac{21}{5}$

3.

$\frac{31}{12}$

$\frac{5}{2}$

$\frac{13}{8}$

4.

$\frac{11}{4}$

$\frac{49}{9}$

$\frac{41}{6}$

5.

$\frac{23}{3}$

$\frac{45}{4}$

$\frac{60}{5}$

6.

$\frac{23}{7}$

$\frac{72}{6}$

$\frac{16}{2}$

Changing Mixed Numbers to Improper Fractions



$$\begin{aligned} 3\frac{1}{3} &= \frac{(3 \times 3) + 1}{3} \\ &= \frac{9 + 1}{3} \\ &= \frac{10}{3} \end{aligned}$$

To change mixed numbers to improper fractions:

1. Multiply the denominator by the whole number.
2. Add the numerator.
3. Keep the denominator.

$$\begin{aligned} 4\frac{5}{8} &= \frac{(8 \times 4) + 5}{8} \\ &= \frac{32 + 5}{8} \\ &= \frac{37}{8} \end{aligned}$$

Change the mixed numbers to improper fractions.

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

$6\frac{3}{4}$

$1\frac{1}{12}$

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

$7\frac{3}{5}$

$1\frac{9}{10}$

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

$9\frac{4}{11}$

$3\frac{6}{7}$

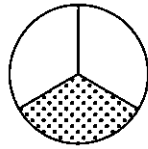
4. $5\frac{4}{5}$

$4\frac{5}{12}$

$6\frac{7}{11}$



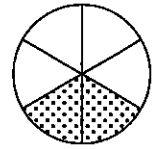
Renaming Fractions



$\frac{1}{3}$ of the circle is shaded.

To rename a fraction, multiply the numerator and denominator by the same number.

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



$\frac{2}{6}$ of the circle is shaded.

$$\frac{4}{5} \Rightarrow \frac{8}{10}$$

Think: To get from 5 to 10, multiply by 2.

$$\text{So, } \frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{8}{10}$$

$$\frac{2}{3} \Rightarrow \frac{8}{12}$$

Think: To get from 3 to 12, multiply by 4.

$$\text{So, } \frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

Rename the following fractions using the denominator given.

1. $\frac{3}{4} = \frac{\quad}{12}$

$\frac{4}{5} = \frac{\quad}{15}$

$\frac{2}{3} = \frac{\quad}{6}$

2. $\frac{1}{4} = \frac{\quad}{16}$

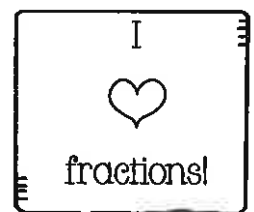
$\frac{5}{6} = \frac{\quad}{18}$

$\frac{3}{5} = \frac{\quad}{20}$

3. $\frac{5}{8} = \frac{\quad}{24}$

$\frac{2}{7} = \frac{\quad}{14}$

$\frac{5}{6} = \frac{\quad}{12}$



Simplifying Fractions

$$\frac{4}{8} = \frac{4 \div 4}{8 \div 4}$$

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



A fraction is simplified when 1 is the only number that divides into both the numerator and the denominator.

To simplify, you must divide the numerator and denominator by the same number.

$$\frac{12}{18} = \frac{12 \div 2}{18 \div 2}$$

$$= \frac{6}{9}$$

$\frac{6}{9}$ is not simplified.

$$\frac{6}{9} = \frac{6 \div 3}{9 \div 3}$$

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

Simplify.

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

$\frac{6}{15}$

$\frac{8}{24}$

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

$\frac{5}{15}$

$\frac{6}{10}$

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

$\frac{2}{24}$

$\frac{8}{12}$

4. $\frac{3}{9}$

$\frac{6}{24}$

$\frac{10}{12}$

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

$\frac{5}{20}$

$\frac{14}{14}$

Adding Fractions

Add. Simplify if possible.



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

When adding fractions with like denominators:

1. Add the numerators.
2. Keep the same denominator.
3. Simplify if possible.

$$\begin{array}{r} \frac{5}{12} \\ + \frac{5}{12} \\ \hline \frac{10}{12} = \frac{5}{6} \end{array}$$

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

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

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

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

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

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

$$\begin{array}{r} \frac{1}{12} \\ + \frac{4}{12} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{3}{10} \\ + \frac{4}{10} \\ \hline \end{array}$$

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

$$\begin{array}{r} \frac{1}{11} \\ + \frac{3}{11} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{3}{8} \\ + \frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{4}{9} \\ + \frac{3}{9} \\ \hline \end{array}$$

4.
$$\begin{array}{r} \frac{2}{9} \\ + \frac{2}{9} \\ \hline \end{array}$$

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

$$\begin{array}{r} \frac{5}{11} \\ + \frac{2}{11} \\ \hline \end{array}$$

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

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Subtracting Fractions

Subtract. Simplify if possible.

To subtract fractions with like denominators:



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

1. Subtract the numerators.
2. Keep the same denominator.
3. Simplify if possible.

$$\begin{array}{r} \frac{7}{8} \\ - \frac{3}{8} \\ \hline \frac{4}{8} = \frac{1}{2} \end{array}$$

1.
$$\begin{array}{r} \frac{3}{8} \\ - \frac{1}{8} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{7}{12} \\ - \frac{5}{12} \\ \hline \end{array}$$

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

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

2.
$$\begin{array}{r} \frac{11}{12} \\ - \frac{1}{12} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{9}{10} \\ - \frac{3}{10} \\ \hline \end{array}$$

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

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

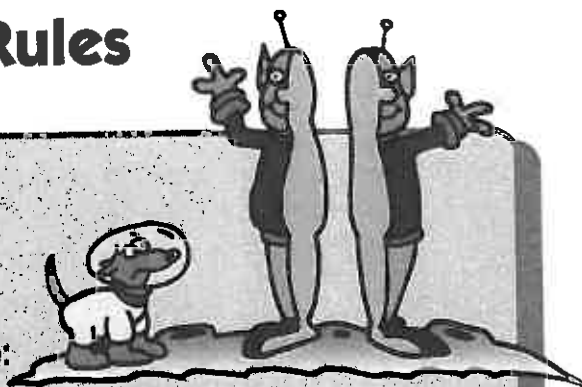
3.
$$\begin{array}{r} \frac{3}{4} \\ - \frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{11}{12} \\ - \frac{5}{12} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{10}{11} \\ - \frac{3}{11} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{13}{16} \\ - \frac{3}{16} \\ \hline \end{array}$$

Divisibility Rules



One number is divisible by another if it can be divided evenly without a remainder.

A number is divisible by:

Test:

- 2 If the number is even (ends in 0, 2, 4, 6, or 8)

Example:

7,598 is an even number, so it is divisible by 2

- 3 If the sum of the digits is divisible by 3

5,415 $\rightarrow 5 + 4 + 1 + 5 = 15$
 $15 \div 3 = 5$, so 5,415 is divisible by 3

- 4 If the last 2 digits form a number that is divisible by 4

85,724 $\rightarrow 24 \div 4 = 6$, so 85,724 is divisible by 4

- 5 If the number ends in 0 or 5

7,095 ends in 5, so it is divisible by 5

- 6 If the number is divisible by 2 and 3

7,944 is divisible by 2 and 3, so it is divisible by 6

- 9 If the sum of the digits is divisible by 9

8,775 $\rightarrow 8 + 7 + 7 + 5 = 27$
 $27 \div 9 = 3$, so 8,775 is divisible by 9

- 10 If the number ends in 0

5,090 ends in 0 so it is divisible by 10

Challenge: 6,520 is divisible by 2, 4, 5, and 10. Can you show why?

Directions: Look at each number below. Then, list the number or numbers by which it is divisible.

4,612

3,048

2,217

5,320

8,316

45,693

34,134

21,545

81,396

55,004

7,690

90,300

Multiply or Divide?

These key words will help you know when to multiply and when to divide.

Multiplication key words: **in all**, **altogether**, **times**, and **each**

Division key words: **per** and **each**



Directions: Circle the key words and solve the story problems.

1. There are 9 classrooms at the vocational school. The average number of students per classroom is 27 students. How many students altogether are there in the school?
- _____

2. Thirty-five students are studying auto mechanics. Three times that many are studying business. How many students are studying business?
- _____

3. The semester is 16 weeks long. Students attend class 5 days a week. How many days in all must a student attend class each semester?
- _____

4. In one class of 27 students, each student used \$30.00 worth of materials. Altogether, how much did materials cost this class?
- _____

5. Lunch cost each student \$11.50 for a 5-day week. How much does each lunch cost?
- _____

6. The average student drives a total of 8 miles per day to attend classes. How many miles in all does a student drive during the 80-day semester?
- _____

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Changing Mixed Numbers to Improper Fractions

Change the following mixed numbers to improper fractions.

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

$2 \frac{3}{8}$

$1 \frac{5}{12}$

2. $2 \frac{5}{8}$

$5 \frac{3}{4}$

$8 \frac{1}{9}$

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

$6 \frac{1}{2}$

$12 \frac{5}{9}$

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

$1 \frac{5}{7}$

$4 \frac{8}{11}$

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

$3 \frac{2}{5}$

$7 \frac{11}{12}$

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

$2 \frac{7}{12}$

$5 \frac{3}{10}$



Changing Improper Fractions to Mixed Numbers

Change the improper fractions to mixed or whole numbers.

1. $\frac{5}{4}$ $\frac{7}{2}$ $\frac{6}{5}$

2. $\frac{8}{3}$ $\frac{9}{2}$ $\frac{12}{5}$

3. $\frac{9}{5}$ $\frac{62}{7}$ $\frac{14}{3}$

4. $\frac{12}{5}$ $\frac{80}{10}$ $\frac{89}{12}$

5. $\frac{10}{3}$ $\frac{71}{9}$ $\frac{61}{6}$

6. $\frac{13}{2}$ $\frac{54}{5}$ $\frac{9}{7}$

7. $\frac{49}{12}$ $\frac{100}{10}$ $\frac{82}{11}$

8. $\frac{47}{12}$ $\frac{58}{9}$ $\frac{97}{10}$



aming Fractions

$$\frac{2}{5} = \frac{\quad}{15}$$

→

$$4 = \frac{\quad}{2} \text{ Think of 4 as } \frac{4}{1}$$

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

→

$$\text{So, } \frac{4}{1} = \frac{4 \times 2}{1 \times 2} = \frac{8}{2}$$



$$\text{So, } \frac{2}{5} = \frac{2 \times 3}{5 \times 3} = \frac{6}{15}$$

Rewrite each fraction using the denominator given.

1. $\frac{1}{2} = \frac{\quad}{8}$

$\frac{2}{3} = \frac{\quad}{30}$

$\frac{3}{4} = \frac{\quad}{20}$

2. $\frac{3}{5} = \frac{\quad}{15}$

$\frac{1}{5} = \frac{\quad}{50}$

$\frac{11}{12} = \frac{\quad}{48}$

3. $\frac{1}{4} = \frac{\quad}{12}$

$\frac{4}{9} = \frac{\quad}{81}$

$\frac{5}{9} = \frac{\quad}{18}$

4. $\frac{1}{3} = \frac{\quad}{15}$

$\frac{2}{7} = \frac{\quad}{21}$

$\frac{3}{4} = \frac{\quad}{16}$



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Simplifying Fractions

Simplify.

1. $\frac{15}{30}$ $\frac{55}{66}$ $\frac{16}{48}$

2. $\frac{10}{24}$ $\frac{6}{72}$ $\frac{24}{36}$

3. $\frac{10}{35}$ $\frac{2}{18}$ $\frac{8}{24}$

4. $\frac{4}{8}$ $\frac{54}{54}$ $\frac{9}{27}$

5. $\frac{7}{21}$ $\frac{15}{25}$ $\frac{25}{50}$

6. $\frac{6}{18}$ $\frac{9}{12}$ $\frac{2}{16}$

7. $\frac{18}{27}$ $\frac{14}{40}$ $\frac{9}{18}$

8. $\frac{6}{15}$ $\frac{12}{36}$ $\frac{6}{9}$

MULTIPLYING FRACTIONS BY WHOLE NUMBERS

When multiplying a whole number and a fraction:

$$\begin{aligned} 8 \times \frac{3}{8} &= \frac{8}{1} \times \frac{3}{8} \\ &= \frac{8 \times 3}{1 \times 8} \\ &= \frac{24}{8} \\ &= 3 \end{aligned}$$

1. Rewrite the whole number as a fraction. (Write a denominator of 1.)
2. Multiply the numerators.
3. Multiply the denominators.
4. Simplify if possible.

$$\begin{aligned} \frac{3}{4} \times 6 &= \frac{3}{4} \times \frac{6}{1} \\ &= \frac{3 \times 6}{4 \times 1} \\ &= \frac{18}{4} \\ &= 4 \frac{2}{4} = 4 \frac{1}{2} \end{aligned}$$

Solve each problem. Simplify if possible.

A. $3 \times \frac{2}{3} =$

$\frac{4}{5} \times 2 =$

$1 \times \frac{6}{7} =$

$2 \times \frac{4}{7} =$

B. $\frac{2}{5} \times 6 =$

$3 \times \frac{3}{10} =$

$9 \times \frac{3}{4} =$

$6 \times \frac{3}{10} =$

C. $8 \times \frac{1}{6} =$

$2 \times \frac{6}{7} =$

$6 \times \frac{1}{10} =$

$\frac{3}{8} \times 4 =$

D. $\frac{3}{10} \times 5 =$

$5 \times \frac{2}{9} =$

$\frac{3}{7} \times 2 =$

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

Multiplying Fractions

Multiply. Simplify if possible.



$$\begin{aligned}\frac{1}{3} \times \frac{3}{8} &= \frac{1 \times 3}{3 \times 8} \\ &= \frac{3}{24} \\ &= \frac{1}{8}\end{aligned}$$

When multiplying fractions:

1. Multiply the numerators.
2. Multiply the denominators.
3. Simplify if possible.

$$\begin{aligned}\frac{3}{4} \times \frac{4}{5} &= \frac{3 \times 4}{4 \times 5} \\ &= \frac{12}{20} \\ &= \frac{3}{5}\end{aligned}$$

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

$\frac{4}{5} \times \frac{1}{2} =$

$\frac{1}{3} \times \frac{6}{7} =$

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

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

$\frac{1}{3} \times \frac{3}{10} =$

$\frac{4}{9} \times \frac{3}{4} =$

$\frac{5}{6} \times \frac{3}{10} =$

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

$\frac{2}{3} \times \frac{6}{7} =$

$\frac{5}{6} \times \frac{1}{10} =$

$\frac{3}{8} \times \frac{4}{9} =$

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

$\frac{3}{5} \times \frac{2}{9} =$

$\frac{3}{7} \times \frac{2}{3} =$

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

5. $\frac{1}{2} \times \frac{2}{7} =$

$\frac{5}{8} \times \frac{2}{5} =$

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

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



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Multiplying Fractions

Multiply. Simplify if possible.

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

$\frac{4}{5} \times \frac{1}{4} =$

$\frac{1}{2} \times \frac{6}{7} =$

$\frac{1}{4} \times \frac{4}{7} =$

2. $\frac{1}{3} \times \frac{6}{11} =$

$\frac{5}{12} \times \frac{3}{4} =$

$\frac{2}{9} \times \frac{3}{4} =$

$\frac{5}{9} \times \frac{3}{5} =$

3. $\frac{4}{9} \times \frac{1}{6} =$

$\frac{1}{6} \times \frac{6}{7} =$

$\frac{5}{12} \times \frac{3}{5} =$

$\frac{5}{6} \times \frac{4}{9} =$

4. $\frac{2}{3} \times \frac{6}{7} =$

$\frac{1}{4} \times \frac{2}{5} =$

$\frac{3}{4} \times \frac{4}{5} =$

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

5. $\frac{5}{9} \times \frac{3}{10} =$

$\frac{6}{7} \times \frac{7}{9} =$

$\frac{5}{8} \times \frac{2}{5} =$

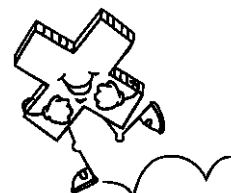
$\frac{7}{8} \times \frac{5}{7} =$

6. $\frac{8}{15} \times \frac{5}{8} =$

$\frac{11}{12} \times \frac{6}{7} =$

$\frac{3}{10} \times \frac{5}{7} =$

$\frac{5}{12} \times \frac{3}{10} =$



SUBTRACTING FRACTIONS WITH UNLIKE DENOMINATORS

When subtracting fractions with unlike denominators:

$$\begin{array}{r} \frac{3}{4} \rightarrow \frac{3 \times 3}{4 \times 3} \rightarrow \frac{9}{12} \\ - \frac{1}{6} \rightarrow \frac{1 \times 2}{6 \times 2} \rightarrow \frac{2}{12} \\ \hline \frac{7}{12} \end{array}$$

1. Find the least common denominator.
2. Rewrite fractions using the LCD.
3. Subtract.
4. Simplify if possible.

$$\begin{array}{r} \frac{7}{12} \longrightarrow \frac{7}{12} \\ - \frac{1}{4} \rightarrow \frac{1 \times 3}{4 \times 3} \rightarrow \frac{3}{12} \\ \hline \frac{4}{12} = \frac{1}{3} \end{array}$$

Solve each problem. Simplify if possible.

A.

$$\begin{array}{r} \frac{3}{4} \\ - \frac{7}{10} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{9} \\ - \frac{1}{6} \\ \hline \end{array} \qquad \begin{array}{r} \frac{1}{2} \\ - \frac{3}{8} \\ \hline \end{array} \qquad \begin{array}{r} \frac{2}{3} \\ - \frac{2}{9} \\ \hline \end{array}$$

B.

$$\begin{array}{r} \frac{7}{12} \\ - \frac{1}{4} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{10} \\ - \frac{1}{2} \\ \hline \end{array} \qquad \begin{array}{r} \frac{3}{4} \\ - \frac{3}{8} \\ \hline \end{array} \qquad \begin{array}{r} \frac{3}{10} \\ - \frac{1}{5} \\ \hline \end{array}$$

C.

$$\begin{array}{r} \frac{5}{8} \\ - \frac{1}{6} \\ \hline \end{array} \qquad \begin{array}{r} \frac{5}{6} \\ - \frac{3}{10} \\ \hline \end{array} \qquad \begin{array}{r} \frac{3}{4} \\ - \frac{1}{6} \\ \hline \end{array} \qquad \begin{array}{r} \frac{7}{8} \\ - \frac{5}{6} \\ \hline \end{array}$$

SUBTRACTING FRACTIONS WITH UNLIKE DENOMINATORS

Solve each problem. Simplify if possible.

$$\begin{array}{r} \text{A.} \quad \frac{1}{2} \\ - \frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{4}{5} \\ - \frac{1}{6} \\ \hline \end{array}$$

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

$$\begin{array}{r} \frac{3}{5} \\ - \frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} \text{B.} \quad \frac{3}{4} \\ - \frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{1}{2} \\ - \frac{3}{10} \\ \hline \end{array}$$

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

$$\begin{array}{r} \frac{7}{8} \\ - \frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} \text{C.} \quad \frac{5}{8} \\ - \frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{4}{5} \\ - \frac{3}{10} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{2}{3} \\ - \frac{2}{9} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{5}{6} \\ - \frac{4}{9} \\ \hline \end{array}$$

$$\begin{array}{r} \text{D.} \quad \frac{5}{8} \\ - \frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{11}{12} \\ - \frac{3}{4} \\ \hline \end{array}$$

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

$$\begin{array}{r} \frac{5}{6} \\ - \frac{1}{2} \\ \hline \end{array}$$

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

$$\begin{array}{r} \frac{3}{4} \\ - \frac{2}{5} \\ \hline \end{array}$$

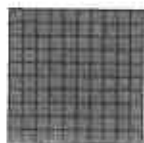
$$\begin{array}{r} \frac{5}{12} \\ - \frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{4}{5} \\ - \frac{2}{3} \\ \hline \end{array}$$

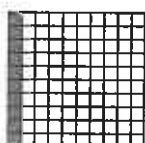
Name _____

Decimals

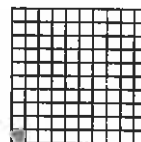
A **decimal** is a number that includes a period called a **decimal point**. The digits to the right of the decimal point are a value less than one.



one whole



one tenth



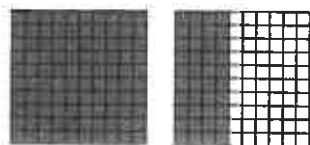
one hundredth

The place value chart below helps explain decimals.

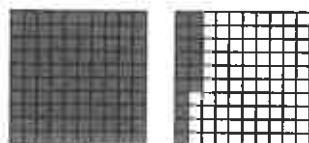
hundreds	tens	ones	tenths	hundredths	thousandths
6	3	2	. 4		
	4	7	. 0	5	
		8	. 0	0	9

A decimal point is read as "and." The first number, 632.4, is read as "six hundred thirty-two and four tenths." The second number, 47.05, is read as "forty-seven and five hundredths." The third number, 8.009, is read as "eight and nine thousandths."

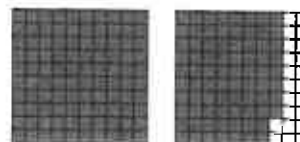
Directions: Write the decimals shown below. Two have been done for you.



1. 1.4



2. _____



3. _____

4. six and five tenths 6.5
5. twenty-two and nine tenths _____
6. thirty-six and fourteen hundredths _____
7. forty-seven hundredths _____
8. one hundred six and four tenths _____
9. seven and three hundredths _____
10. one tenth less than 0.6 _____
11. one hundredth less than 0.34 _____
12. one tenth more than 0.2 _____

READING DECIMALS

Just like there are place value names for numbers larger than 0, there are also names for place values after the decimal point.

thousands	hundreds	tens	ones	.	tenths	hundredths	thousandths
1	2	4	5	.	1	7	6

Decimal**Read As****Equivalent Fraction**

0.7

seven tenths

$$\frac{7}{10}$$

0.23

twenty-three hundredths

$$\frac{23}{100}$$

0.045

forty-five thousandths

$$\frac{45}{1000}$$

15.01

fifteen and one hundredth

$$15\frac{1}{100}$$

Hint:
"and" separates
the whole number
from the fraction.

Fill in each blank with the correct equivalent.

	Decimal	Read As	Equivalent Fraction
A.	0.3	three-tenths	_____
B.	1.12	_____	_____
C.	_____	two hundred twenty-one thousandths	_____
D.	_____	_____	$\frac{53}{100}$
E.	0.871	_____	_____
F.	_____	_____	$\frac{5}{100}$
G.	0.783	_____	_____
H.	_____	two and six tenths	_____
I.	_____	_____	$\frac{115}{1000}$

Comparing Decimals

Put the correct sign (>, <, =) in each problem.

Comparing decimals is similar to comparing whole numbers.

1. Line up the numbers by place value.
2. Compare the digits left to right.

Example 1 $0.08 \bigcirc 0.8$

1. Line up:

0.08
0.8

2. Compare.

After the decimal point, you have a 0 and an 8. 8 is bigger than 0, so 0.8 is bigger.

$0.08 < 0.8$



Example 2 $11.13 \bigcirc 11.03$

11.13
11.03

The 11's before the decimal point are the same. After the decimal point, is 1 or 0 bigger? 1 is.

$11.13 > 11.03$

1. $0.007 \bigcirc 0.07$

2. $2.159 \bigcirc 2.259$

3. $10.05 \bigcirc 10.005$

4. $0.99 \bigcirc .009$

5. $30.249 \bigcirc 30.429$

6. $0.004 \bigcirc 4.00$

7. $6.041 \bigcirc 6.401$

8. $92.001 \bigcirc 92.001$

9. $263.08 \bigcirc 263.81$

10. $0.08 \bigcirc 0.8$

11. $101.05 \bigcirc 101.005$

12. $9.50 \bigcirc 7.05$

13. $214.01 \bigcirc 214.001$

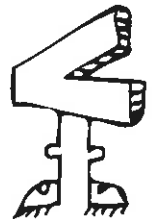
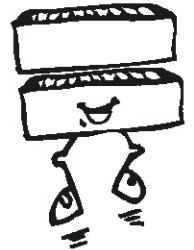
14. $9.008 \bigcirc 9.08$

15. $614.05 \bigcirc 614.05$

16. $8.26 \bigcirc 8.026$

17. $43.014 \bigcirc 43.104$

18. $0.83 \bigcirc 0.63$



COMPARING AND ORDERING DECIMALS

Write the prices on the menu in order from least to greatest.

A. \$1.25 \$2.03 \$1.07 \$2.51 \$1.10 \$2.15 \$2.21 \$1.05

Item:	Price:
Soda	
Milk	
Fries	
Salad	
Cheese Sandwich	
Tuna Sandwich	
Hamburger	
Cheeseburger	

Circle the largest decimal in each row.

B. 4.05 4.50 4.005 4.15 4.55 4.5

C. 10.57 10.49 10.005 10.057 10.75 10.094

D. 2.5 2.15 2.52 2.005 2.095 2.51

E. 1.8 1.84 1.48 1.847 1.75 1.5

F. 89.90 88.19 8.90 89.09 89.5 89.01



Adding and Subtracting Decimals

When adding or subtracting decimals, place the decimal points under each other. That way, you add tenths to tenths, for example, not tenths to hundredths. Add or subtract beginning on the right, as usual. Carry or borrow numbers in the same way. Adding 0 to the end of decimals does not change their value, but sometimes makes them easier to add and subtract.

Examples:	$\begin{array}{r} 39.40 \\ + 6.81 \\ \hline 46.21 \end{array}$	$\begin{array}{r} 0.064 \\ + 0.470 \\ \hline 0.534 \end{array}$	$\begin{array}{r} 3.56 \\ - 0.09 \\ \hline 3.47 \end{array}$	$\begin{array}{r} 6.83 \\ - 2.14 \\ \hline 4.69 \end{array}$
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Directions: Solve the following problems.

1. Write each set of numbers in a column and add them.

a. $2.56 + 0.6 + 76 =$ _____

b. $93.5 + 23.06 + 1.45 =$ _____

c. $3.23 + 91.34 + 0.85 =$ _____

2. Write each pair of numbers in a column and subtract them.

A. $7.89 - 0.56 =$ _____ B. $34.56 - 6.04 =$ _____ C. $7.6 - 3.24 =$ _____

3. In a relay race, Alice ran her part in 23.6 seconds, Cindy did hers in 24.7 seconds, and Erin took 20.09 seconds. How many seconds did they take altogether?

4. Although Erin ran her part in 20.09 seconds today, yesterday it took her 21.55 seconds. How much faster was she today?

5. Add this grocery bill:

potatoes—\$3.49; milk—\$2.09; bread—\$0.99; apples—\$2.30

6. A yellow coat cost \$47.59, and a blue coat cost \$36.79. How much more did the yellow coat cost?

7. A box of Oat Boats cereal has 14.6 ounces. A box of Sugar Circles has 17.85 ounces. How much more cereal is in the Sugar Circles box?

8. The Oat Boats cereal has 4.03 ounces of sugar in it. Sugar Circles cereal has only 3.76 ounces. How much more sugar is in a box of Oats Boats?
