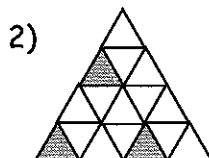


Directions: Please read very carefully. Complete all of the problems.  
Show all of your work. You may NOT use a calculator.

A fraction represents a part out of a whole. Normally the **numerator** (top half) of the fraction is smaller than the **denominator** (bottom half). This is called a **proper fraction**, a number less than 1.

Practice: Represent the shaded portion of each shape with a fraction.



Sometimes the numerator is equal to or larger than the denominator. This is called an **improper fraction**, a number equal to or greater than 1.



Each small portion above represents one-fourth of a rectangle. There are 13 fourths, which can be written as the **improper fraction**  $\frac{13}{4}$  or as the **mixed number**  $3\frac{1}{4}$ .

Convert the following improper fractions to a mixed number.

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

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

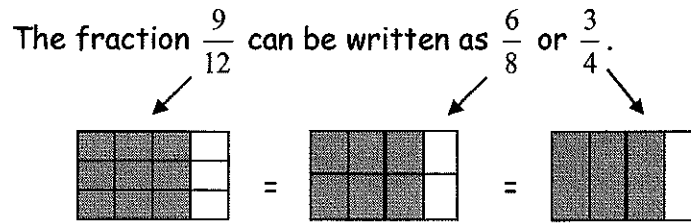
6)  $\frac{12}{11} =$

Convert the following mixed numbers to improper fractions.

7)  $2\frac{1}{2} =$

8)  $9\frac{3}{5} =$

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



All three fractions represent the same piece of the rectangle. There is an **infinite** (endless amount) of fractions equivalent to any given fraction.

For example, the fraction  $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \dots \frac{10}{20} \dots \frac{500000}{1000000} \dots$

Practice: Determine the value of the question mark that would create an equivalent fraction.

10)  $\frac{6}{10} = \frac{?}{30}$

? = \_\_\_\_\_

11)  $\frac{3}{9} = \frac{?}{3}$

? = \_\_\_\_\_

12)  $\frac{4}{5} = \frac{?}{100}$

? = \_\_\_\_\_

Fractions can also be written in **simplest form** (reduced). For example, 50/100 can be reduced to  $\frac{1}{2}$ .

Practice: Reduce the following fractions.

13)  $\frac{3}{15} =$

15)  $\frac{25}{75} =$

14)  $\frac{6}{36} =$

16)  $\frac{15}{50} =$

When adding or subtracting fractions you need to find change each fraction by creating equivalent fractions with the same denominator. Next, you add or subtract the numerators, keeping the common denominator. Always make sure that your solution is written in simplest form and in proper form. For example,

$$\frac{2}{5} + \frac{3}{4} = \frac{8}{20} + \frac{15}{20} = \frac{23}{20} = 1\frac{3}{20}$$

Practice: Find the **sum** (answer to an addition problem) or the **difference** (answer to a subtraction problem).

$$17) \frac{3}{5} + \frac{1}{3} =$$

$$19) \frac{5}{6} + \frac{4}{8} =$$

$$18) \frac{2}{9} - \frac{1}{10} =$$

$$20) \frac{4}{6} - \frac{2}{3} =$$

When multiplying fractions you do not need a common denominator. To find the new numerator, you simply multiply the numerators. To find the new denominator, you simply multiply the denominators. Finally, always reduce your answer. For example,

$$\frac{3}{10} \times \frac{4}{7} = \frac{12}{70} \text{ which reduces to } \frac{6}{35}.$$

$$21) \frac{4}{5} \times \frac{1}{4} =$$

$$23) \frac{5}{8} \times \frac{4}{11} =$$

$$22) \frac{2}{7} \times \frac{1}{5} =$$

$$24) \frac{5}{6} \times \frac{2}{3} =$$

Dividing fractions is trickier. Always remember to **KEEP, CHANGE, and REARRANGE**. You **KEEP** the first fraction the way it is. You **CHANGE** the division sign to a multiplication sign. **REARRANGE** the second fraction by taking the **reciprocal** of the fraction (flipping it). Finally, multiply like you did above. Make sure to reduce.

$$\text{For example, } \frac{2}{6} \div \frac{5}{7} = \frac{2}{6} \times \frac{7}{5} = \frac{14}{30} \text{ which reduces to } \frac{7}{15}.$$

$$25) \frac{3}{5} \div \frac{1}{4} =$$

$$27) \frac{5}{9} \div \frac{8}{11} =$$

$$26) \frac{2}{9} \div \frac{3}{5} =$$

$$28) \frac{5}{11} \div \frac{2}{5} =$$

Directions: Please read very carefully. Complete all of the problems.  
Show all of your work. You may use a calculator.

There are different ways to write the same number. For example, the fraction  $\frac{1}{2}$  can be written as the decimal, 0.5, or the percent, 50%.

A fraction is also a division problem. To convert a fraction to a decimal, you must divide the numerator by the denominator.

For example,  $\frac{1}{4}$  is equal to  $1 \div 4$  which is equal to 0.25.

To convert a decimal to a percent, you simply multiply the decimal by 100 (moving the decimal place to the right two places).

For example, 0.25 is equal to 25%.

Practice: Convert the following fractions to decimals, rounding the decimal to the nearest hundredth place. Then, convert the decimal to a percent.

29)  $\frac{3}{8} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

31)  $\frac{11}{7} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

30)  $\frac{5}{12} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

32)  $\frac{8}{15} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

Fraction/Percent Word Problems:

33) Mr. Wagner's class contains 18 girls out of 29 students. What percent of Mr. Wagner's class are girls? Show your work.

34) An orange juice mixture contains 20% concentrate and 80% water. If the mixture contains a total of 50 ounces of liquid, how many ounces of concentrate are in the mix? How many ounces of water are in the mix? Show your work.

Important Formulas

Area = the amount (in units squared) to cover a shape.

Rectangle =  $L \times W$

Triangle =  $\frac{1}{2} \times \text{Base Length} \times H$

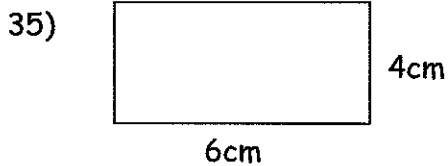
Circle =  $\pi r^2$

Perimeter/Circumference = the distance (in units) around a shape.

Circle =  $d\pi$  (diameter =  $2r$ )

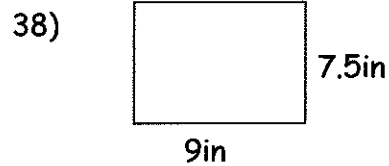
Use the correct formula from above to help you answer the following questions.

Find the area, perimeter, or circumference of the following shapes.



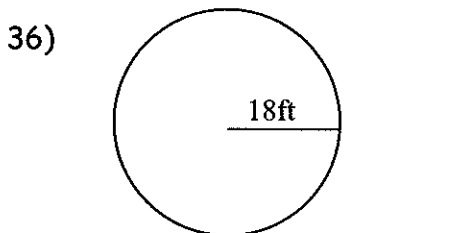
Area - \_\_\_\_\_

Perimeter - \_\_\_\_\_



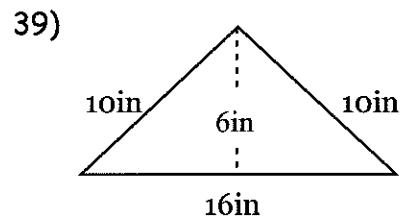
Area - \_\_\_\_\_

Perimeter - \_\_\_\_\_



Area - \_\_\_\_\_

Perimeter - \_\_\_\_\_



Area - \_\_\_\_\_

Perimeter - \_\_\_\_\_

37) A square with a length of 12cm.

Area - \_\_\_\_\_

Perimeter - \_\_\_\_\_

40) A circle with a diameter of 20ft.

Area - \_\_\_\_\_

Perimeter - \_\_\_\_\_

## SUMMER MATH – PRE-ALGEBRA 7

This section can be completed with the use of a calculator. Please show all work necessary so you will know what you did when we review this in September.

- 41) The local youth group has decided to run a summer baby-sitting program to earn money for the club and for the individuals in the club. The baby-sitting program will run from 9:00 A.M. to 4:30 P.M. Monday through Friday. The youth-group leader and student officers must develop a plan for the program. (When answering the following questions, show enough of your work so that someone reading it can follow how you solved the problems.)
- Jin Lee, Sarah, Jesse, and Alex are assigned to the toddler room for the month of July. Two students must work in this room at all times. They decide to share the workload equally. How many hours will each of them work each week?
  - If students are paid \$3.75 an hour, how much will each of these students be paid for a week of work?
  - Jin Lee and Sarah decide to make a pancake breakfast for the six morning workers who work in the toddler room, the preschool room, and the kindergarten room. They found a recipe that will make 12 silver-dollar pancakes per batch. They figure that they need 30 silver-dollar pancakes, 5 per person. How much of each ingredient will they need to make 30 silver-dollar pancakes?

### Silver-Dollar Pancakes

$1\frac{1}{4}$  cups flour

1 egg

3 teaspoons baking powder

$1\frac{1}{2}$  tablespoons sugar

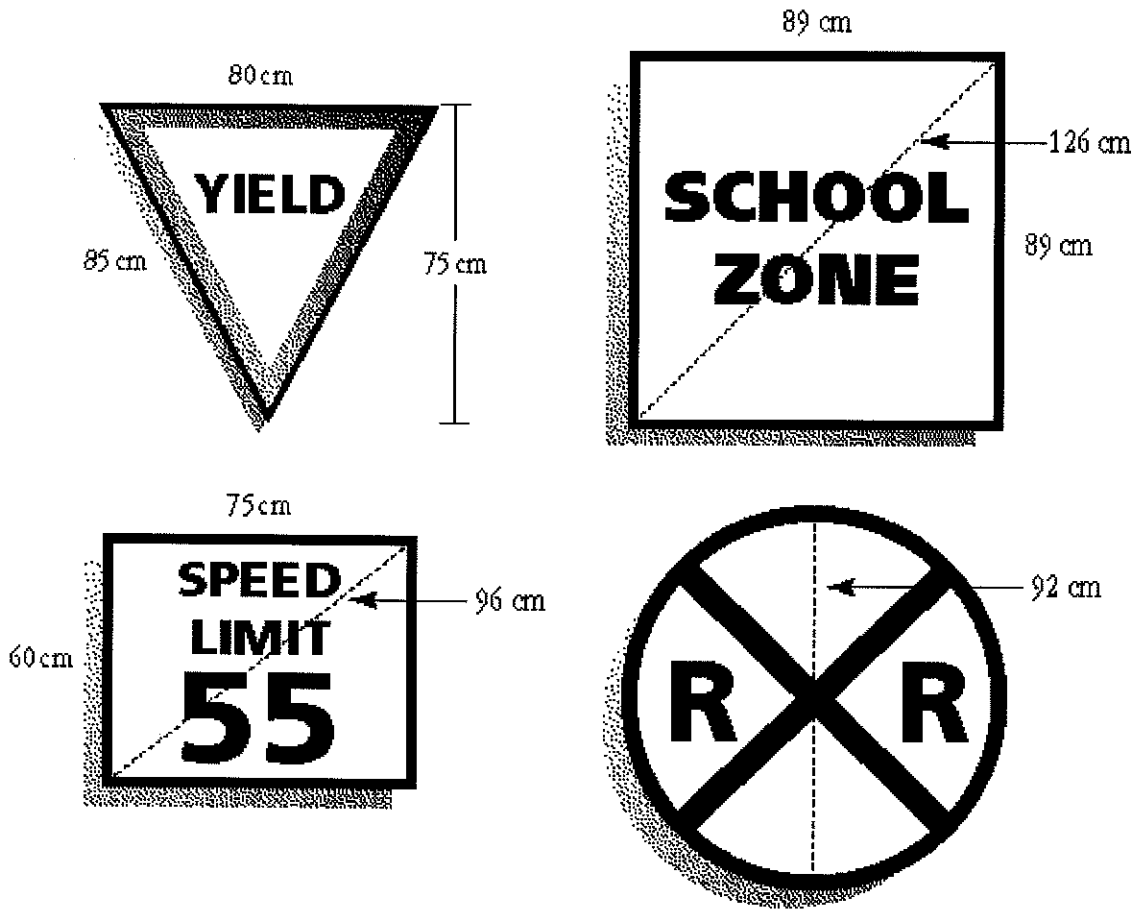
$\frac{1}{2}$  teaspoon salt

$\frac{3}{4}$  cup milk

2 tablespoons salad oil

*Makes 12 silver-dollar pancakes.*

42) The Acme sign company makes traffic signs for the state road commission. A model of the signs and their approximate measurements are given below.



a. One of the costs that Acme must consider is the cost of metal. If metal costs \$1.00 for every 1000 square centimeters, what is the cost of the metal for each sign?

Yield sign:

School zone sign:

Speed limit sign:

Railroad crossing sign:

b. After the signs are cut, the edges must be sanded to prevent metal splinters. If the cost of sanding is 2 cents for every centimeter, what will it cost to sand each sign?

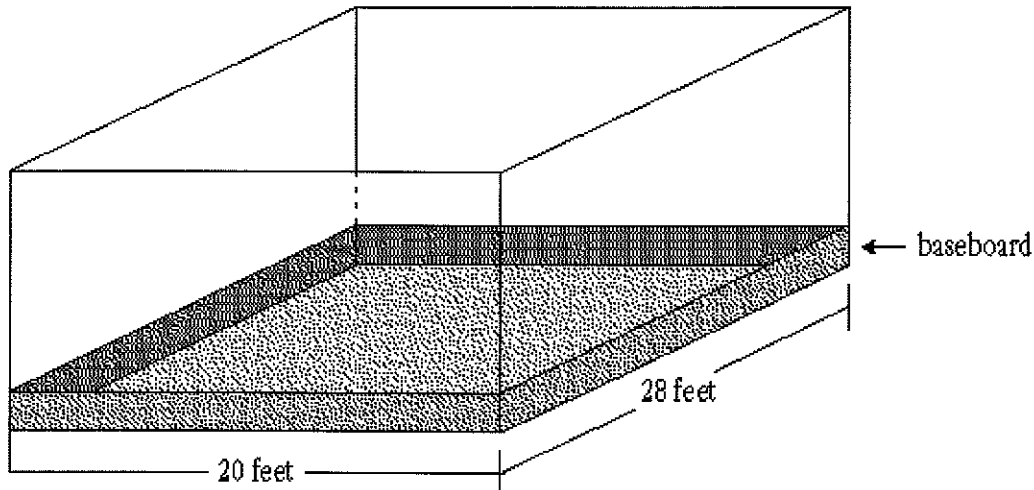
Yield sign:

School zone sign:

Speed limit sign:

Railroad crossing sign:

4 3) Lara is helping her family build a recreation room in their basement. The room will be 28 feet by 20 feet. They have already put up the walls.



- The family wants to tile the floor. Lara decides to buy 1-foot-square tiles. How many tiles will she need? Show your work.
- The tiles Lara has chosen cost \$0.75 each. How much will the tile floor cost? Show how you found your answer.
- Lara needs to buy baseboard to put along the wall. How much baseboard does she need? Show how you found your answer.
- The baseboard comes in 10-foot and 16-foot lengths. How many boards of each length should Lara buy? Show how you found your answer.

When you encounter problems like this in the real world, you will often have to consider several factors. Questions e–g look at conditions that Lara might think are important.

- Suppose these are the prices of the baseboard.

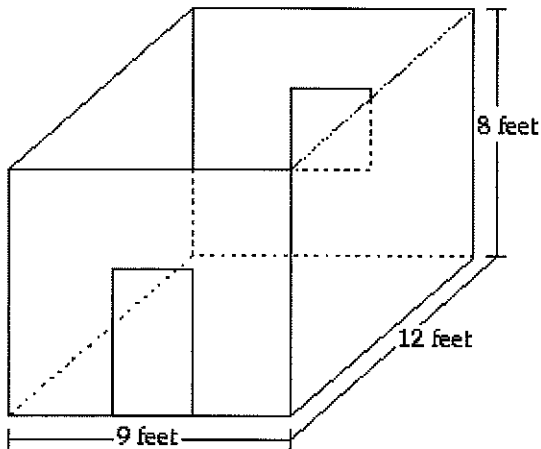
| Baseboard       |                 |
|-----------------|-----------------|
| 16-foot lengths | \$1.25 per foot |
| 10-foot lengths | \$1.10 per foot |

How many boards of each length should Lara buy if she wants to spend the least amount of money? Explain your answer.

44) Suppose that the Pizza Pirate ate  $\frac{1}{3}$  of a pizza the first night and  $\frac{1}{4}$  of what remained every night after that.

How many nights would it take until the pizza was half gone? Drawing a picture might help you explain your reasoning.

45) Jason is planning to redecorate his bedroom. He measured the room and made this rough sketch.

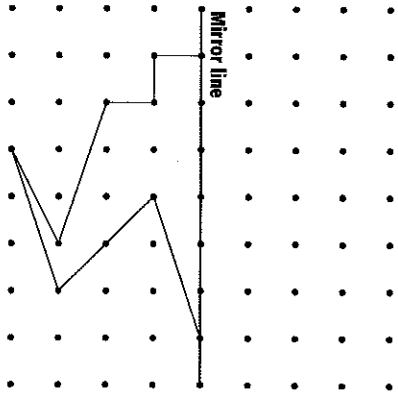


- Jason is planning to buy paint for the walls and ceiling. Will he need to find the perimeter or area to figure out how much paint to buy? What unit of measure should he use?
- To determine how much new carpet to buy, will Jason need to find the perimeter or area? What unit of measure should he use?
- Jason also needs baseboard for around the bottom of the walls. Will he need to find the perimeter or area to figure out how much baseboard to buy? What unit of measure should he use?
- How much carpeting does Jason need? Show how you found your answer.
- How much baseboard does Jason need? Show how you found your answer.
- If a gallon of paint covers 350 square feet, how much paint does Jason need for the walls and ceiling?

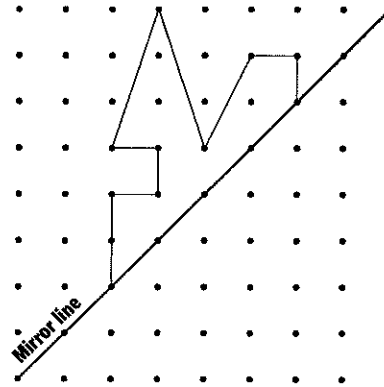
46) Find out what your local sales tax is. Ingrid purchased a product in your area and was charged 63¢ for sales tax. Give three possible amounts the product could have cost.

47) Draw the mirror image of the figure on the other side of the mirror line.

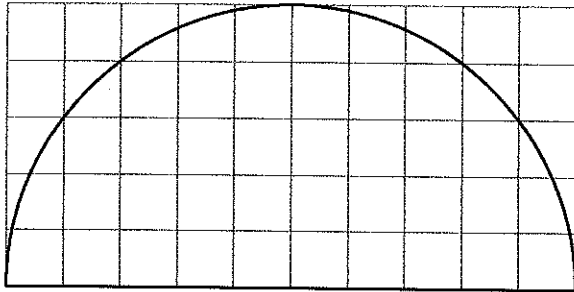
a.



b.



48) Lydia's stepmother decided to paint the semicircular patio in their back yard. Here is Lydia's sketch of the patio, drawn on a grid. Each grid square represents 1 square foot.



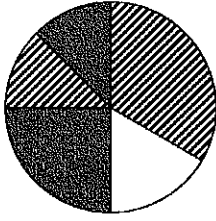
- What is the area of the patio? Explain how you found the area.
- Each quart of nonslip paint covers 32 square feet. How much paint should Lydia's stepmother buy if she plans to put one coat of paint on the patio? Keep a record of your work.
- To keep grass from growing onto the patio, Lydia wants to plant a border around the patio. Since the patio is against the house, she only needs a border around the curved edge. How long will the border be? Show how you found your answer.

49) For the distribution below, tell how many people are represented and identify the mode, median, and range.

**Lengths of First Names**

|                   |   |   |   |   |   |  |
|-------------------|---|---|---|---|---|--|
|                   |   | X |   |   |   |  |
|                   |   | X | X |   |   |  |
|                   |   | X | X | X |   |  |
|                   |   | X | X | X | X |  |
|                   |   |   |   |   |   |  |
| 3                 | 4 | 5 | 6 | 7 | 8 |  |
| Number of letters |   |   |   |   |   |  |

50) Use the spinner below to answer the following questions.



- a. What fraction of the spinner is shaded gray?
- b. What fraction of the spinner is unshaded?
- c. What fraction of the spinner is shaded with diagonal lines?
- d. Suppose you spin the spinner 72 times.
  - i. How many times would you expect to spin gray?
  - ii. How many times would you expect to spin the unshaded region?
  - iii. How many times would you expect to spin diagonals?

Use the coordinate grid below.

51) If a line segment connecting  $(4, 3)$  and  $(7, 6)$  forms one *side* of a square, what might be the coordinates of the other corners of that square?

