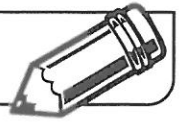


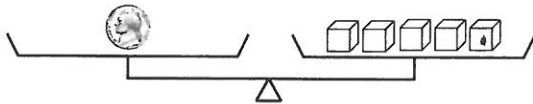
**LESSON**  
**10•1**

## Exploring Pan Balances

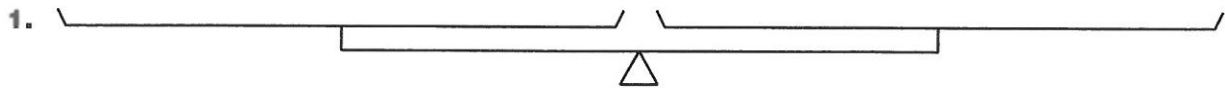


Find combinations of objects where the weights balance the pans.  
 Record the combinations below using pictures and words.

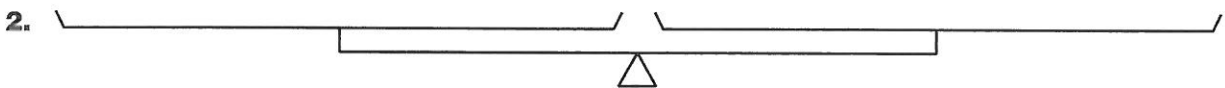
**Example:**



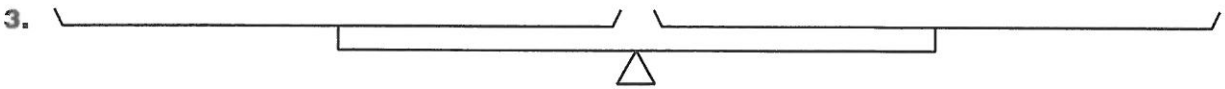
One nickel weighs about as much as 5 blocks.



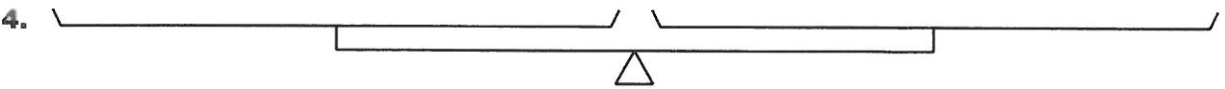
One \_\_\_\_\_ weighs about as much as \_\_\_\_\_.



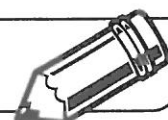
One \_\_\_\_\_ weighs about as much as \_\_\_\_\_.



One \_\_\_\_\_ weighs about as much as \_\_\_\_\_.



One \_\_\_\_\_ weighs about as much as \_\_\_\_\_.

**LESSON**  
**10·4**
**“What’s My Rule?”**


Complete each table below according to the rule.



1. Rule: Subtract the
- in*
- number from 15.

in ( <i>n</i> )	out ( $15 - n$ )
1	
2	
8	
	5
18	
	0

2. Rule: Triple the
- in*
- number.

in ( <i>d</i> )	out ( $3 * d$ )
7	
12	
	24
0.3	
	1
$\frac{1}{2}$	

3. Rule: Double the
- in*
- number and add 3.

in ( <i>x</i> )	out ( $(2 * x) + 3$ )
2	
4	
6	
	19
12	
	3

Complete each table below. Write the rule in words or as a formula. On the back of the page, graph the data in Problems 4 and 5.

4. Rule: \_\_\_\_\_
- 
- \_\_\_\_\_
- 
- \_\_\_\_\_

in	out
4	2
12	6
16	8
2	
	$3\frac{1}{2}$
310	

5. Rule: \_\_\_\_\_
- 
- \_\_\_\_\_
- 
- \_\_\_\_\_

in	out
1	1
2	3
3	5
4	
5	
	19

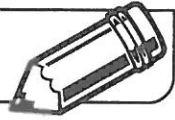
6. Make up your own.

 Rule: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

in	out

**LESSON**  
**10•3**

# “What’s My Rule?”



1. Write a rule in words for the “What’s My Rule?” table.

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in	out

2. Work with a partner to complete the table. Take turns: one partner enters an *in* value, and the other partner follows the rule to enter an *out* value.

3. Write the rule as an algebraic expression.

---

4. Think of a rule for the “What’s My Rule?” table. Then use your rule to complete 3 rows in the table. Have your partner find the rule and complete the table.

in	out

5. Write your rule in words and as an algebraic expression.

- a. Rule in words:

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- b. Rule as an algebraic expression:

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6. What are important things to remember when writing rules or making a “What’s My Rule?” table for a partner to find the rule?

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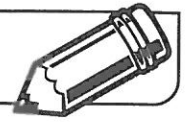
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**LESSON**  
**10•4**

# Solving Rate Problems



**Rate** describes a relationship between two quantities with different units. Rate tells how many of one type of thing there are for a certain number of another type of thing. Rates are often expressed with phrases that include the word *per*. For example, miles per hour, cost per ounce, or books per student.

One example of rate is speed. A basic formula is  $\text{distance} = \text{rate} * \text{time}$ . Multiplication can be used for many different problems involving rates. For example,  $\text{distance} = \text{rate} * \text{gallons}$ ,  $\text{total cost} = \text{rate} * \text{ounces}$ , or  $\text{total books} = \text{rate} * \text{students}$ .

To solve a problem using a formula, first replace variables with the known values.

**Example:**

Maribel can travel 5 miles per hour on her skateboard. How far will she travel in 2 hours?

<b>distance = rate * time</b>	<i>d</i>	=	<i>r</i>	*	<i>t</i>
distance = 5 miles per hour * 2 hours	10	=	5	*	2
distance = 10 miles					

Maribel can travel 10 miles.

Use the formula to solve the following problem.

- Samuel's go-kart can travel 357 miles on 14 gallons of gas. His go-kart travels how many miles per gallon?

<b>distance = rate * gallons of gas</b>	<i>d</i>	=	<i>r</i>	*	<i>g</i>
distance = miles per gallon * 14 gallons of gas	_____	=	_____	*	_____
rate = _____					

- Samuel's go-kart can travel \_\_\_\_\_ miles per gallon of gas.

Explain your solution.

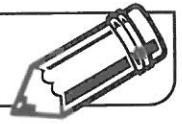
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**LESSON**  
**10•5**
**Graphing “What’s My Rule?” Tables**


Complete the “What’s My Rule?” tables. Record the rule on the lines provided, and graph the data from the tables.

1. Rule: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

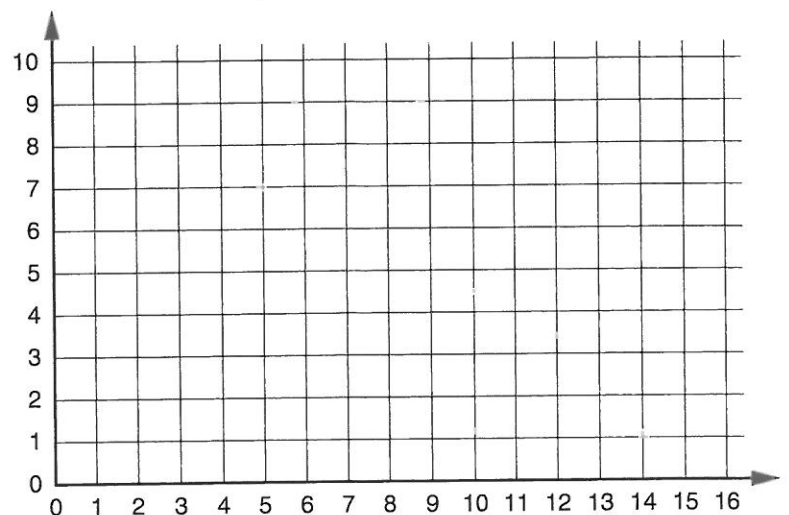
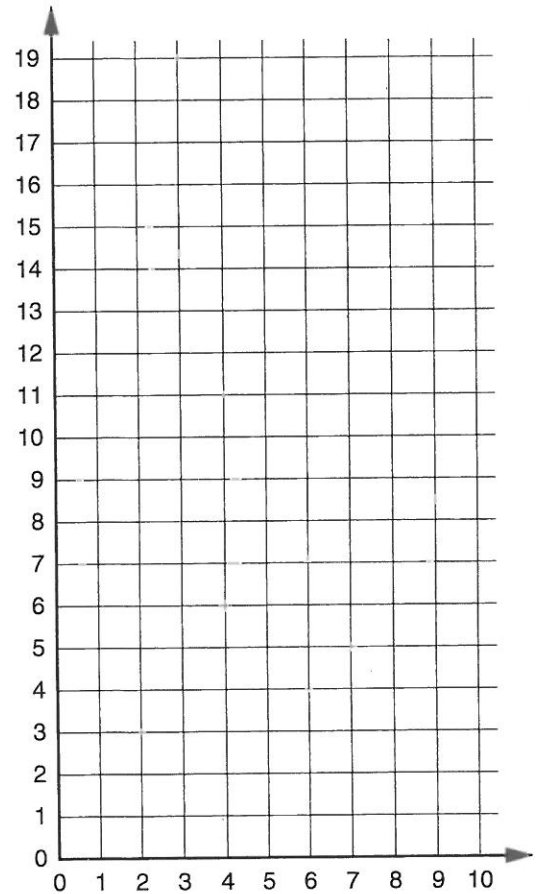
in ( $x$ )	out $((2 * x) + 3)$
1	
2	
3	
	15
8	
	3

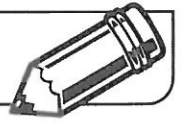
2. Rule: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

in $n$	out $n \div 2$
6	3
9	$4\frac{1}{2}$
1	0.5
12	
	8



**LESSON**  
**10•6****Interpreting Table Data**

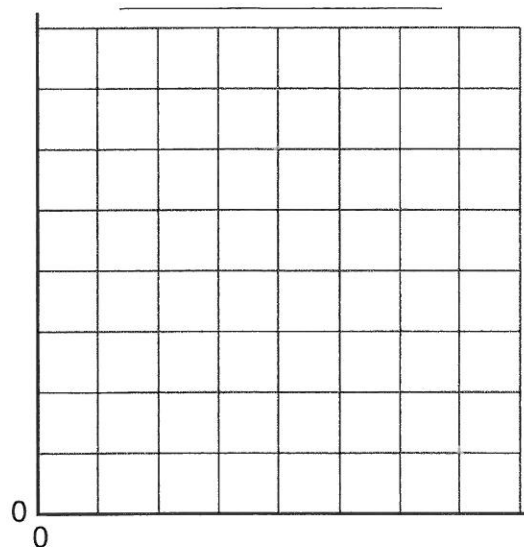
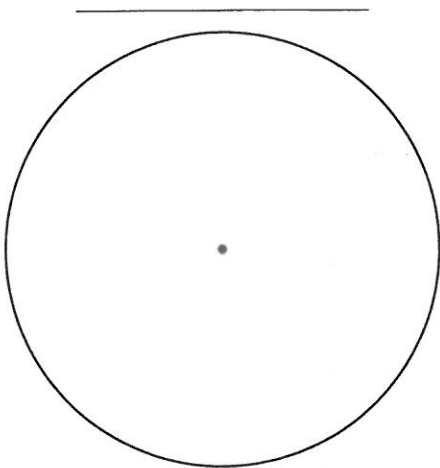
There are a number of choices when making a graph from table data.

- ◆ The type of graph is determined by the type of data represented.
- ◆ The title and labels for the graph are often the easiest to recognize from the table.
- ◆ Deciding on the scale to use for the y-axis of a line graph is more of a challenge. The intervals in the data can guide the choice of a scale.

1. Make a graph for each of the tables below.

<b>Table 1</b>	
<b>Pinto bean plants grow an average of 1.5 inches each day.</b>	
<b>Day</b>	<b>Plant Height (in.)</b>
0	0
1	1.5
2	3.0
3	4.5
4	6.0
5	7.5

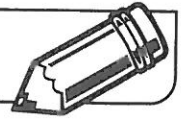
<b>Table 2</b>	
<b>Exterior colors of cars in the movie theater parking lot</b>	
<b>Exterior Color</b>	<b>Percent</b>
Silver	25%
Yellow	5%
Black	25%
Red	10%
Blue	25%
White	10%



2. On the back of this page, explain why you chose which graph to use for each table.

**LESSON**  
**10·7**

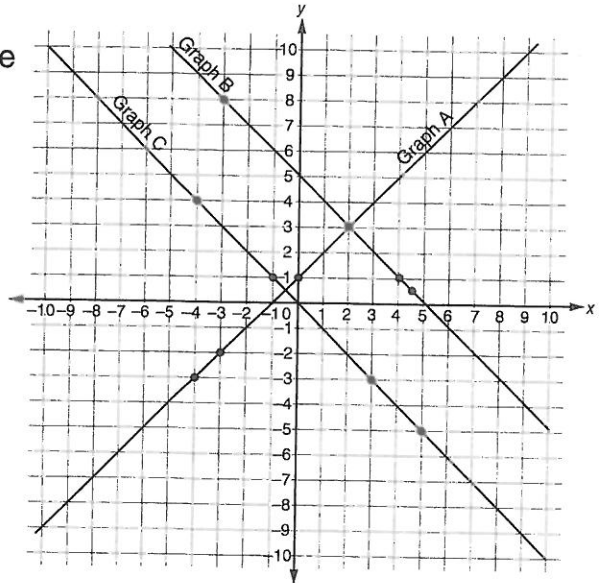
**Making Tables from Graphs**



When you plot the values of a table as coordinates on a grid and connect the points, the resulting figure can be called a **line graph**.

For each graph on the grid to the right:

- ◆ Find the coordinates of four points that lie on the graph.
- ◆ Write the four points in the “What’s My Rule?” table.
- ◆ Write the rule for the table.
- ◆ Check that your rule works for all the points on the graph.



1. Rule for Graph A: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

x	y

2. Rule for Graph B: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

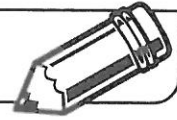
x	y

3. Rule for Graph C: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

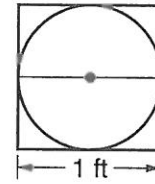
x	y





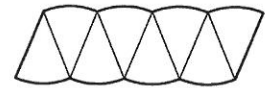
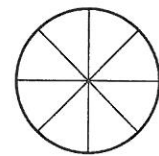
**LESSON**  
**10•9**
**Modeling  $\pi r^2$** 


The figure of a circle drawn inside a square is a model that shows how the circumference of the circle is greater than 2 lengths around, but less than 4 lengths. This makes the circumference about 3 times the circle's diameter.



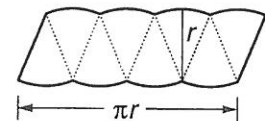
Follow the directions below to make a model that shows how the area of a circle can be found using the formula  $A = \pi r^2$ .

1. Cut along the lines of the circle to cut it into 8 pieces.
2. Arrange and glue the pieces on a sheet of construction paper so they approximate a parallelogram.
3. Use a colored pencil or marker to draw the outline of a parallelogram along the edges of your arranged circle pieces, and mark the measure of the height and the base.



The height of this figure is the same as the radius of the circle.

The base is  $\frac{1}{2}$  the circumference of the circle. The circumference is approximately  $\pi$  times the diameter. Since the radius is  $\frac{1}{2}$  of the diameter, the measure of  $\frac{1}{2}$  the diameter can be written as  $\pi$  times the radius, or  $\pi r$ .



The formula for the area of a parallelogram is  $A = b * h$ . In our model, the formula can be written as  $A = \pi r * r$ ,  $A = \pi * (r * r)$ , or  $A = \pi r^2$ .

4. Label your figure:  $A = \pi * (r * r) = \pi r^2$ .
5. Describe what you think is the most interesting thing about this model.

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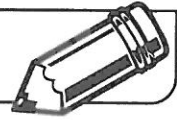
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**LESSON**  
**10•9**
**More Area and Circumference Problems**

**Circle Formulas**

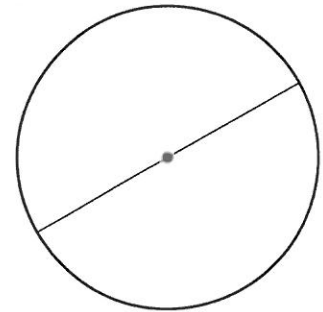
Circumference:  $C = \pi * d$

Area:  $A = \pi * r^2$

where  $C$  is the circumference of a circle,  $A$  is its area,  $d$  is its diameter, and  $r$  is its radius.

Measure the diameter of the circle at the right to the nearest centimeter.

1. The diameter of the circle is \_\_\_\_\_.
2. The radius of the circle is \_\_\_\_\_.
3. The circumference of the circle is \_\_\_\_\_.
4. The area of the circle is \_\_\_\_\_.
5. Explain the meaning of the word *circumference*. \_\_\_\_\_  
\_\_\_\_\_
6.
  - a. Use your Geometry Template to draw a circle that has a diameter of 2 centimeters.
  - b. Find the circumference of your circle. \_\_\_\_\_
  - c. Find the area of your circle. \_\_\_\_\_
7.
  - a. Use your Geometry Template to draw a circle that has a radius of  $1\frac{1}{2}$  inches.
  - b. Find the circumference of your circle. \_\_\_\_\_
  - c. Find the area of your circle. \_\_\_\_\_  
\_\_\_\_\_



Name \_\_\_\_\_

Date \_\_\_\_\_

Time \_\_\_\_\_

**LESSON**  
**10•9**

**Counting Squares to Find the Area of a Circle**

