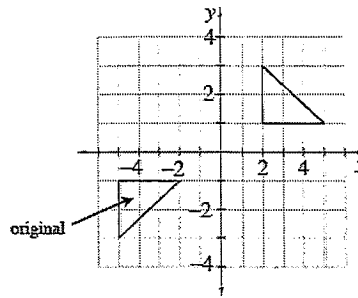


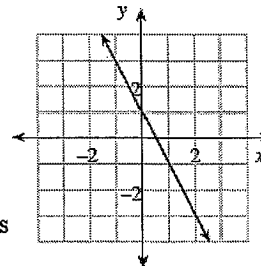
Review & Preview

- 6-2. Describe what moves you could use to create the transformation of the original image shown at right.



- 6-3. Review what you know about graphs as you complete parts (a) through (d) below.

- Find the equation of the line graphed at right.
- What are its x - and y -intercepts?
- On your own graph paper, graph the line.
- On the same set of axes, graph a line that is *parallel* to the line graphed at right and that goes through the *origin* $(0, 0)$. Find the equation of this new line.



- 6-4. Which equation below has *no* solution? Explain how you know.

- $4(x+1) = 2x+4$
- $9-5x+2 = 4-5x$

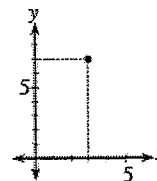
- 6-5. Rena says that if $x = -5$, the equation below is true. Her friend, Dean, says the answer is $x = 3$. Who is correct? Justify your conclusion.

$$9(x+4) = 1+2x$$

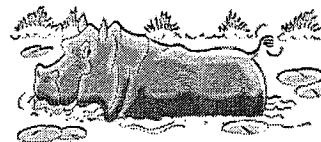
- 6-6. Find the rule for the pattern represented at right.



Figure 1



- 6-7. Homer the Hungry Hippo is munching on the lily pads in his pond. When he got to the pond, there were 30 lily pads, but he is eating 5 lily pads an hour. Henrietta the Hungrier Hippo found a better pond with 38 lily pads! She eats 7 lily pads every hour.

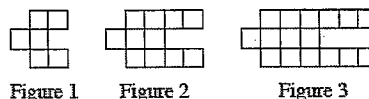


- If Homer and Henrietta start eating at the same time, when will their ponds have the same number of lily pads remaining?
- How many lily pads will be left in each pond at that time?

Review & Preview

- 6-12. On graph paper, draw a coordinate graph with x - and y -axes. Graph shapes A, B, and C as described below.
- Shape A is a triangle with vertices $(1, 1)$, $(3, 3)$, and $(2, 4)$.
 - Shape B is a square with vertices $(2, -1)$, $(4, -1)$, $(2, -3)$, and $(4, -3)$.
 - Shape C is a rectangle with vertices $(-3, 1)$, $(-3, 4)$, $(-1, 4)$, and $(-1, 1)$.
- 6-13. On the same grid you used in problem 6-12, translate triangle A four units right and three units up to create triangle D. Write the coordinates of the new vertices.
- 6-14. Graph each equation below on the same set of axes and label the point of intersection with its coordinates.
- $$y = 2x + 3 \qquad y = x + 1$$
- 6-15. Shooter Marilyn is the Spartans' best free-throw shooter. She normally makes three out of every four shots. In an upcoming charity event, Shooter will shoot 600 free-throws. If he makes over 400 baskets, the school wins \$1000. Should the Spartans expect to win the cash for the school? Show and organize your work.

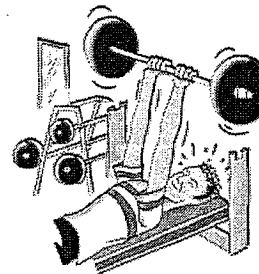
- 6-16. Examine the tile pattern shown at right.



- On graph paper, draw Figure 0 and Figure 4.
- How many tiles will Figure 10 have? Justify your answer.

6-17. GETTING IN SHAPE

Frank weighs 160 pounds and is on a diet to gain two pounds a week so that he can make the football team. John weighs 208 pounds and is on a diet to lose three pounds a week so that he can be on the wrestling team in a lower weight class.



- If Frank and John can meet these goals with their diets, when will they weigh the same, and how much will they weigh at that time?
- Clearly explain your method.

6-27. Erin started with one corner of a figure located at $(-4, 5)$ and translated it to end at $(6, 8)$. To find out how far the shape moved horizontally, she decided to find the difference between the two x -coordinates. She wrote: $6 - (-4)$.



- a. When Erin simplified $6 - (-4)$, she got 2 as her answer. Is this correct? If not, what is the correct simplification?
- b. Write another expression to find out how far the shape moved vertically (\updownarrow). Simplify both expressions and describe the translation in words.
- c. Describe each of the translations below.
 - i. $(3, -2) \rightarrow (5, -9)$
 - ii. $(-1, 4) \rightarrow (6, -2)$
 - iii. $(0, 0) \rightarrow (-4, -7)$
 - iv. $(-2, -9) \rightarrow (2, 9)$

6-28. On graph paper, set up x - and y -axes for a four-quadrant graph. Then draw a triangle with vertices at $(1, 1)$, $(5, 1)$, and $(6, 5)$. Label this triangle T.

- a. Translate (slide) the triangle left 3 units and down 4 units. Label this triangle A and list the vertices.
- b. Reflect triangle T across the y -axis. Label this triangle B and list the vertices.
- c. Are triangles T, A, and B congruent (that is, do they have the same shape and size)? Explain.

6-29. Change each equation below into $y = mx + b$ form.

- a. $y - 4x = -3$
- b. $3y - 3x = 9$
- c. $3x + 2y = 12$
- d. $2(x - 3) + 3y = 0$

6-30. Solve the problem below by defining a variable and then writing and solving an equation.

The perimeter of a triangle is 31 cm. Sides #1 and #2 have equal length, while Side #3 is one centimeter shorter than twice the length of Side #1. How long is each side?

6-31. Simplify each expression.

- a. $\frac{73}{100} \cdot (-\frac{2}{7})$
- b. $0.4 \cdot 0.3$
- c. $5\frac{1}{5} + 8\frac{2}{5}$
- d. $-1.2 + (-\frac{3}{5})$

6-32. Each part (a) through (d) below represents a different tile pattern. For each, find the growth factor and the number of tiles in Figure 0.

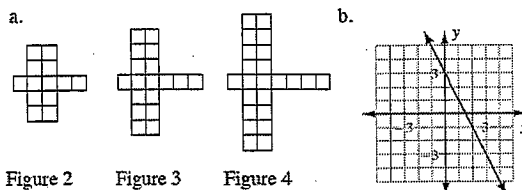


Figure 2 Figure 3 Figure 4

c. $y = 3x - 14$

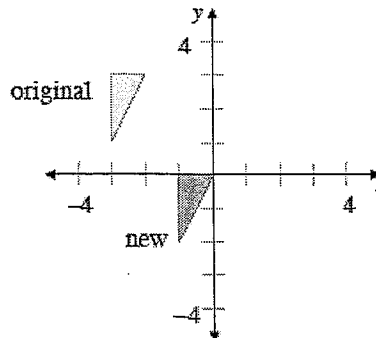
d.

x	-3	-2	-1	0	1	2	3
y	18	13	8	3	-2	-7	-12

Review & Preview

6-36. Sketch the graph at right on your paper.

- a. Write directions to translate the original triangle to make the new triangle.
- b. What are the coordinates of the vertices (corners) of the new shape?
- c. On your graph, reflect the original triangle across the y -axis. What are the coordinates of the new triangle?



6-37. Make a table and graph for the rule $y = -3x + 1$.

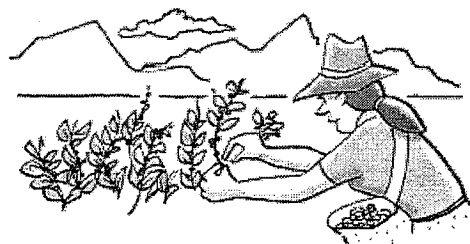
6-38. Solve the system of equations below using the Equal Values Method.

$$a = 12b + 3$$

$$a = -2b - 4$$

6-39. Ms. Cai's class is studying a tile pattern. The rule for the tile pattern is $y = 10x - 18$. Kalil thinks that Figure 12 of this pattern will have 108 tiles. Is he correct? Justify your answer.

6-40. Angel is picking mountain blueberries for a delicious pie. She can pick $\frac{1}{6}$ cup of blueberries in 2 minutes. If she needs $2\frac{1}{2}$ cups of blueberries for the pie, how long will it take her to pick the berries?



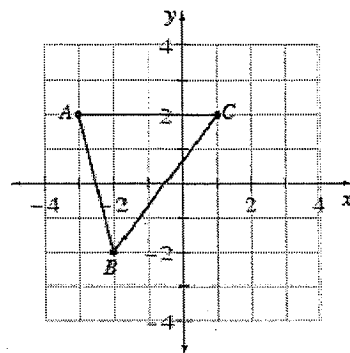
6-41. Juan thinks that the graph of $6y + 12x = 4$ is a line.

- a. Solve Juan's equation for y .
- b. Is this equation linear? That is, is its graph a line? Explain how you know.
- c. What are the growth factor and y -intercept of this graph?

Review & Preview

6-46. Louis is dilating triangle ABC at right. He multiplied each x -coordinate and y -coordinate of triangle ABC by -2 .

- What are the new coordinates of the points?
- Graph Louis' new triangle.
- Describe how triangle ABC changed.



6-47. On the same set of axes, graph the two rules shown at right. Then find the point(s) of intersection, if one (or more) exists.

$$y = -x + 2$$

$$y = 3x + 6$$

6-48. Evaluate the expression $6x^2 - 3x + 1$ for $x = -2$.

6-49. When Ms. Shreve solved an equation in class, she checked her solution and found that it did not make the equation true! Examine her work below and find her mistake. Then find the correct solution.

$$\begin{aligned} 5(2x - 1) - 3x &= 5x + 9 \\ 10x - 5 - 3x &= 5x + 9 \\ 7x - 5 &= 5x + 9 \\ 12x &= 4 \\ x &= \frac{1}{3} \end{aligned}$$



6-50. Determine if the statement below is true or false. Justify your conclusion.

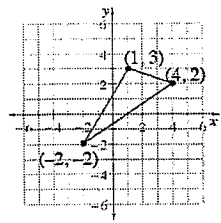
$$2(3 + 5x) = 6 + 5x$$

6-51. Complete the missing entries in the table below. Then write the rule.

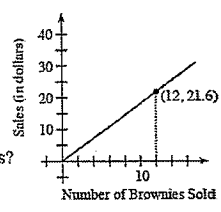
IN (x)	2	10	6	7	-3		-10	100	x
OUT (y)	4	28	16			10			

Review & Preview

6-58. Create a large coordinate graph on graph paper and graph the triangle at right. Multiply the y-coordinate of each point by 4. Then graph the new shape. Make sure you connect your points. List the points for the new shape. Are the two figures similar? Why or why not?



6-59. Lashayia is famous for her delicious brownies, which she sells at football games. The graph at right shows the relationship between the number of brownies she sells and the amount of money she earns.



- a. How much should she charge for 10 brownies? Be sure to demonstrate your reasoning.
- b. During the last football game, Lashayia made \$34.20. How many brownies did she sell? Show your work.

6-60. Figure 3 of a tile pattern has 11 tiles, while Figure 4 has 13 tiles. The pattern grows at a constant rate.

- a. Write an equation to represent this situation.
- b. Which figure number will contain 1015 tiles?

6-61. Normally, the longer you work for a company, the higher your salary per hour. Hector surveyed the people at his company and placed his data in the table below.

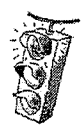
Number of Years at Company	1	3	6	7
Salary per Hour	\$7.00	\$8.50	\$10.75	\$11.50

- a. Use Hector's data to estimate how much he makes, assuming he has worked at the company for 12 years.
- b. Hector is hiring a new employee who will work 20 hours a week. How much should the new employee earn for the first week?

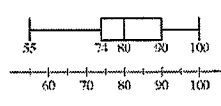


6-62. Mr. Greer solved the equation as shown below. However, when he checked his solution, it did not make the original equation true. Find his error and then find the correct solution.

$$\begin{aligned}
 4x &= 3(2x - 3) \\
 4x &= 6x - 3 \\
 -2x &= -3 \\
 x &= \frac{-3}{-2} \\
 x &= \frac{1}{4}
 \end{aligned}$$



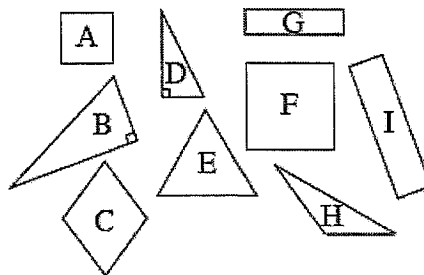
6-63. The box plot below shows the different grades (in percents) that students in Ms. Sanchez's class earned on a recent test.



- a. What was the median score on the test? What were the highest and lowest scores?
- b. Did most students earn a particular score? How do you know?
- c. If Ms. Sanchez has 32 students in her class, about how many students earned a grade of 80% or higher? About how many earned more than 90%? Explain how you know.
- d. Can you tell if the scores between 80% and 90% were closer to 80% or closer to 90%? Explain.

Review & Preview

6-70. Which of the shapes at right appear to be similar? Explain how you know.



6-71. A local deli sells 6-inch sub sandwiches for \$2.95. Now the deli has decided to sell a "family sub" that is 50 inches long. If they want to make the larger sub price comparable to the price of the smaller sub, how much should it charge? Show all work.

6-72. Represent the tile pattern below with a table, a rule, and a graph.



Figure 1

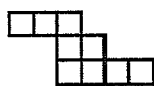


Figure 2

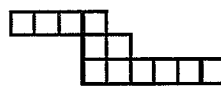


Figure 3

6-73. How many solutions does each equation below have? How can you tell?

a. $4x - 1 + 5 = 4x + 3$

b. $6t - 3 = 3t + 6$

c. $6(2m - 3) - 3m = 2m - 18 + m$

d. $10 + 3y - 2 = 4y - y + 8$

6-74. Simplify each expression below.

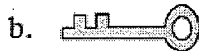
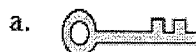
a. $-2\frac{3}{10} - 1\frac{2}{5}$

b. $3 \div -\frac{5}{4}$

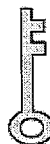
c. $\frac{3}{4} + 5\frac{7}{8}$

d. $5\frac{1}{6} \cdot (-\frac{7}{9})$

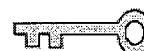
6-75. Look carefully at the key at right. Which of the keys below could you create by spinning (rotating) the original key? Which keys could you create by flipping (reflecting) the original key?



c.



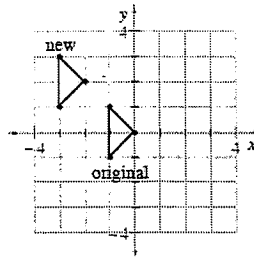
d.



Review & Preview

6-80. On your paper, sketch the graph at right.

- a. Write directions for translating the original triangle to make the new triangle.
- b. What are the coordinates of the vertices (corners) of the new shape?
- c. On your graph, reflect the original triangle over the y -axis. What are the coordinates of the new triangle?

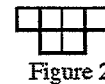


6-81. Hannah thinks the solution to the system below is $(-4, -6)$. Wirt thinks the solution is $(20, 10)$.

$$\begin{aligned} 2x - 3y &= 10 \\ 6y &= 4x - 20 \end{aligned}$$

- a. Is Hannah correct?
- b. Is Wirt correct?
- c. What do the answers to (a) and (b) tell you about the lines in the problem?

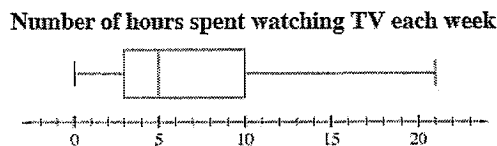
6-82. Figure 2 of a tile pattern is shown at right. If the pattern grows linearly and if Figure 6 has 18 tiles, then find a rule for the pattern.



6-83. Solve the following equations for x , if possible. Check your solutions.

- a. $-(2 - 3x) + x = 9 - x$
- b. $\frac{6}{x+2} = \frac{3}{4}$
- c. $5 - 2(x+6) = 14$
- d. $\frac{1}{2}x - 4 = -3 - \frac{1}{3}x$

6-84. Kevin found the box plot below in the school newspaper.



- a. Based on the plot, what percent of students watch more than 10 hours of television each week?
- b. Based on the plot, what percent of students watch less than 5 hours of television each week?
- c. Can Kevin use the box plot to find the mean (average) number of hours of television students watch each week? If so, what is it? Explain your reasoning.

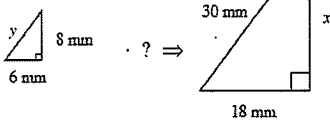
6-85. Solve each equation. Show all work.

- a. $0.85x = 200$
- b. $\frac{7}{6}x = 140$

Review & Preview

6-92.

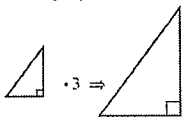
Sketch the two similar triangles at right on your own paper. Find the scale factor and the missing side lengths.



6-93.

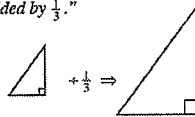
Alex and Maria were trying to find the side labeled x in problem 6-92. Their work is shown below.

Alex: "I noticed that when I multiplied by 3, the sides of the triangle got longer."



$$8 \cdot 3 = 24$$

Maria: "I remember that when we were dilating shapes in Lesson 6.2.2, my shape got bigger when I divided by $\frac{1}{3}$."



$$8 \div \frac{1}{3} = 24$$

- Look at each student's work. Why do both multiplying by 3 and dividing by $\frac{1}{3}$ make the triangles larger?
- Use Alex and Maria's strategy to write two expressions to find the value of y in problem 6-92.

6-94.

Consider these two equations:

$$\begin{aligned} y &= 3x - 2 \\ y &= 4 + 3x \end{aligned}$$

- Graph both equations on the same set of axes.
- Solve this system using the Equal Values Method.
- Explain how the answer to part (b) agrees with the graph you made in part (a).

6-95.

Hollyhocks are tall, slender, flowering plants that grow in many areas of the U.S. Here are the heights (in inches) of hollyhocks that are growing in a park: 10, 39, 43, 45, 46, 47, 48, 48, 49, 50, and 52.

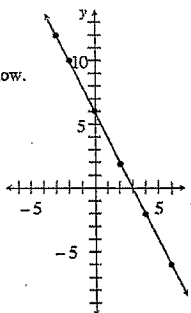


- Find the median.
- Find the quartiles.
- Make a box plot of the data.

6-96.

Use the graph at right to add points to the table below.

x							
y							



- Write the rule in words.
- Explain how to use the table to predict the value of y when x is -8 .

6-97.

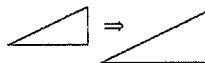
Use these following directions to create a mystery letter. On a piece of graph paper, draw a four-quadrant graph. Scale each axis from 6 to -6 . Plot these points and connect them in order to create a rectangle: $(2,1)$, $(2,4)$, $(3,4)$, $(3,1)$. Be sure to connect the last point to the first point. Then follow the directions in parts (a) through (c) below.

- Rotate the rectangle 90° clockwise (\odot) about the point $(2,1)$ and draw the rotated rectangle.
- Reflect the new rectangle over the line $y=2$ and draw the reflected rectangle.
- Name the letter of the alphabet that your graph resembles.

Review & Preview

6-103. For each expression below:

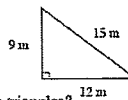
- Sketch and label a pair of similar shapes (like those at right or in problem 6-92) that would result in each calculation.
- Rewrite the expression so that the operation is multiplication.
- Calculate the value of the expression.



- a. $6 \div \frac{1}{2}$ b. $4 \div \frac{2}{3}$

6-104. Sketch the triangle below. Then redraw it with sides that are $\frac{1}{3}$ as long as the sides of the original.

- a. Calculate the perimeters of both triangles.
 b. Calculate the areas of both triangles.
 c. What is the relationship between the perimeters of the triangles?



6-105. Lucy and Marissa each designed a box plot to represent this data set:

16 18 19 19 25 26 27 32 35

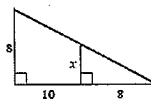
Their plots are shown below. Which plot is scaled correctly and why? Explain the mistakes in the incorrect plot.



6-106. Draw a coordinate graph, and then plot and connect the following points: $A(-3,1)$, $B(-1,3)$, $C(4,2)$, $D(2,0)$.

- a. What is the shape you created?
 b. Reflect the shape across the x -axis. List the coordinates of the new points.
 c. Multiply each coordinate of the original shape by 3. Graph the dilated shape. What are the new coordinates of the points?

6-107. Examine the diagram at right. The smaller triangle is similar to the larger triangle. Write and solve a proportion to find x . It may be helpful to draw the two triangles separately.



6-108. SEQUENCES OF TRANSFORMATIONS

- a. A figure is rotated and reflected. What can you say about the new figure in relation to the original figure?
 b. A figure is translated, reflected, and then dilated. What can you say about the new figure in relation to the original figure?

6-109. This problem is a checkpoint for multiple representations of linear equations. It will be referred to as Checkpoint 6.



For each situation given below, complete the Representations of Patterns Web by finding the missing $x \rightarrow y$ table, graph, and/or rule. Since there are many possible patterns, it is not necessary to create one.

- a. b. $y = -3x + 7$
- Figure 1 Figure 2 Figure 3

- c.

x	0			3
y	1			10

 d.

Check your answers by referring to the Checkpoint 6 materials located at the back of your book.

If you needed help solving these problems correctly, then you need more practice. Review the Checkpoint 6 materials and try the practice problems. Also, consider getting help outside of class time. From this point on, you will be expected to do problems like these quickly and easily.