Review & Preview

4-2. For each tile pattern in problem 4-1, draw Figures 0, 4, and 5 on graph paper. If it helps, copy Figures 1, 2, and 3 onto your paper.

4-3. On graph paper, draw Figure 0 and Figure 4 for the pattern at right.

a. Represent the number of tiles in each figure in an $x \rightarrow y$ table. Let x be the figure number and y be the total number of tiles.

b. Use the table to graph the pattern.

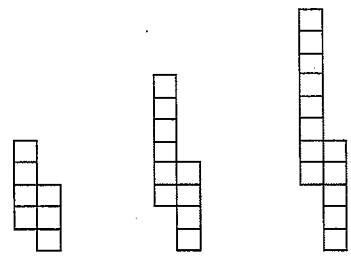


Figure 1 Figure 2 Figure 3

c. Without drawing Figure 5, predict where its point would lie on the graph. Justify your prediction.

4-4 Evaluate the expressions below for the given values.

a. $3(2x+1)$ for $x=-8$

b. $\frac{x-6}{4}-1$ for $x=-14$

c. $-2m^2+10$ for $m=-6$

d. $k \cdot k \div k \cdot k \div k$ for $k=9$

4-5. Copy and simplify the following expressions by combining like terms.

a. $x+3x-3+2x^2+8-5x$

b. $2x+4y^2-6y^2-9+1-x+3x$

c. $2x^2+30y-3y^2+4xy-14-x$

d. $20+3xy-3xy+y^2+10-y^2$

4-6. Use the Distributive Property to rewrite each expression.

a. $3(2x-7)$

b. $-2(x-7)+5x$

c. $5x+10$

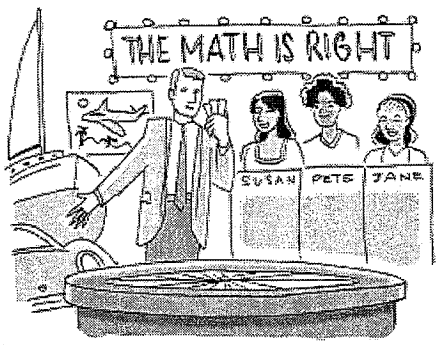
d. $8x+12y$

4-7. Make an $x \rightarrow y$ table for the rule $y = x^2 - 2x$.

a. Plot and connect the points on a complete graph.

b. Does your graph look like a full parabola? If not, add more points to your table and graph to complete the picture.

4-8. THE GAME SHOW

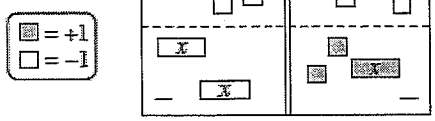


Susan had an incredible streak of good fortune as a guest on an exciting game show called "The Math Is Right." She amassed winnings of $12,500, a sports car, two round-trip airline tickets, and five pieces of furniture.

In an amazing finish, Susan then landed on a "Double Your Prize" square and answered the corresponding math question correctly. She instantly became the show's biggest winner ever, earning twice the amounts of all her previous prizes.

A week later, $25,000, a sports car, four round-trip airline tickets, and five pieces of furniture arrived at her house. Susan felt cheated. What was wrong?

4-9. Write the equation represented by the diagram at right.



a. Simplify as much as possible and then solve for x.

b. Check your solution.

4-10. Copy and simplify the following expressions by combining like terms.

a. $y + 3x - 3 + 2x^2 + 8x - 5y$

b. $2x + 4x^2 - 6x^2 - 9 + 1 - x - 3x$

c. $14 + 3y^2 + 30y - 3y^2 - 14y - 14 - 16y$

d. $-10x + 13y - 6x + 5y^2 + 10y - 5y^2$

4-11. Use your pattern-finding techniques to fill in the missing entries for the table below. Then find a rule for the pattern.

IN (x)	4	8	3	–2	–6	0	5	7
OUT (y)	17	65	10	5		1	26	

Review & Preview

4-17. Simplify each of the following equations and solve for x. Show all work and check your solution.

a. $7-3x=-x+1$

b. $-2+3x=-(x+6)$

4-18. Leala can write a 500-word essay in an hour. If she writes an essay in 10 minutes, approximately how many words do you think the essay contains?

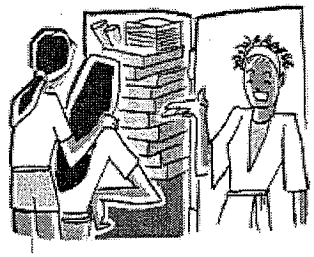
4-19. Copy and complete the table below.

IN (x)	2	10	6	7	–3		–10	1000	x
OUT (y)	9	25	17			15			

a. Explain in words what is done to the input value (x) to produce the output value (y).

b. Write the rule you described in part (a) with algebraic symbols.

4-20. When Susan's brother went to college, she and her two sisters evenly divided his belongings. Among his possessions were 3 posters, 216 books, and 24 CDs. How were these items divided?



4-21. Kelso's mom wants to put a floating blanket over the family's circular wading pool to keep the heat in and the leaves out. The pool has a diameter of 10 feet.

a. How many square feet of blanket will Kelso's mother need?

b. If the pool supply store charges \$0.10 per square foot for the blanket, how much will the material for the blanket cost?

Review & Preview

4-25. Two of the connections in your Representations of Patterns Web are pattern → table and pattern → rule. Practice these connections as you answer the questions below.

a. On graph paper, draw Figure 0 and Figure 4 for the pattern at right.

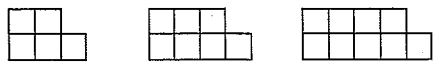


Figure 1 Figure 2 Figure 3

b. Represent the number of tiles in each figure with a table.

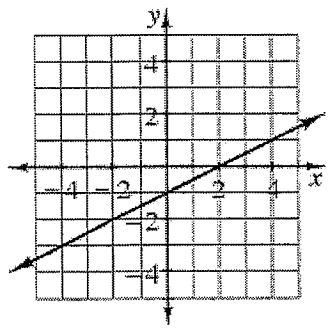
c. Represent the number of tiles in each figure with an algebraic rule.

4-26. Use the formula for the area of a circle to solve for the radius of the circle if the area is 78.5 cm^2.

4-27. For each of the equations below, solve for x. Show all work and check your solution.

a. $-2+2x=-x+2+x$ b. $2-3x=x+2$

4-28. Another one of the connections in your Representations of Patterns Web is graph → table. In Chapters 1 through 3, you developed tools to find a table from a graph. Consider this connection as you complete the table below. The table is based on the graph at right.



IN (x)	−3	−2	−1	0	1	2	3
OUT (y)							

4-29. Joe drove 100 miles from San Francisco to Gilroy and used 4 gallons of gas. How much gas should he expect to use for a 3000-mile trip to New York City? What is the unit rate (miles per gallon)? Be sure to justify your reasoning.

Review & Preview

4-37. Examine the $x \rightarrow y$ table at right.

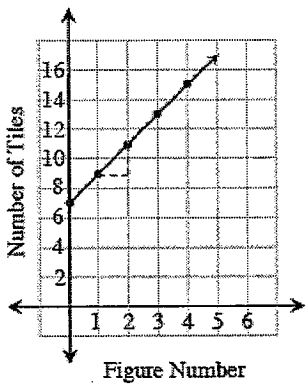
Figure Number	Number of Tiles
0	5
1	9
2	13
3	17

a. Invent a tile pattern that fits this data.

b. What is the pattern's growth factor? Show where the growth factor appears in the $x \rightarrow y$ table and the tile pattern.

c. Write a rule for this pattern.

4-38.



Look at the graph at left. What statements can you make about the tile pattern the graph represents? How many tiles are in Figure 0? Figure 1? What is the growth factor? What is the rule for the pattern?

4-39. For each equation below, solve for x. Check your solution, if possible, and show all work.

a. $3x-6+1=-2x-5+5x$ b. $-2x-5=2-4x-(x-1)$

4-40. I am thinking of a number. When I double my number and then subtract the result from five, I get negative one. What is my number? Write and solve an equation.

4-41. On your paper, copy the table below and use your pattern skills to complete it.

IN (x)	2	10				-3			x
OUT (y)	4	28	13	-17	10		2.5	148	$3x-2$

a. Explain in words what is done to the input value, x, to produce the output value, y.

b. Explain the process you used to find the missing input values.

Review & Preview

4-44. Complete a table for the rule $y = 3x - 2$.

a. Draw a complete graph for this rule.

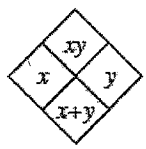
b. Is $(-50, -152)$ a point on the graph? Explain how you know.

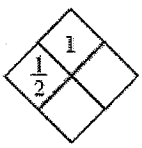
x	y
3	25
5	39
6	46
1	11

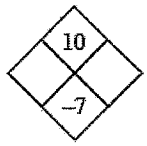
4-45. Write down everything you know about the tile pattern represented by the $x \rightarrow y$ table at right. Be as specific as possible.

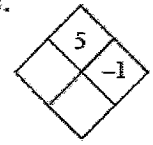
4-46. Find the area and circumference of a circle that has a diameter of 17 mm. Write your answers in terms of π and as a decimal approximation.

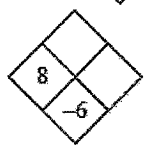
4-47. Copy and complete each of the Diamond Problems below. The pattern used in the Diamond Problems is shown at right.



a. 

b. 

c. 

d. 

4-48. Simplify each of the expressions below. You may use an Equation Mat and tiles.

a. $-(5x+1)$

b. $6x-(-5x+1)$

c. $-(1-5x)$

d. $-5x+(x-1)$

4-49. Invent a tile pattern that grows by 4 each time. Draw Figures 0, 1, 2, and 3. Use color or shading to show the growth.

4-50. Complete a table for the rule $y = 3 - x$.

a. Draw a complete graph for this rule.

b. Is (32, –29) a point on this graph? Explain why or why not.

4-51. For each equation below, solve for the given variable. Check your solutions, if possible, and show all work.

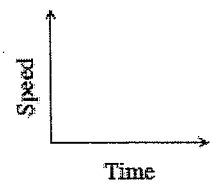
a. $3p - 7 + 9 - 2p = p + 2$, solve for p b. $-2x + 5 + (-x) - 5 = 0$, solve for x

c. $12 = r + 6 - 2r$, solve for r d. $-(y^2 - 2) = y^2 - 5 - 2y^2$, solve for y

4-52. Solve each equation below for x. Then check your solutions.

a. $\frac{x}{8} = \frac{3}{4}$ b. $\frac{2}{5} = \frac{x}{40}$ c. $\frac{1}{8} = \frac{x}{12}$ d. $\frac{x}{10} = \frac{12}{15}$

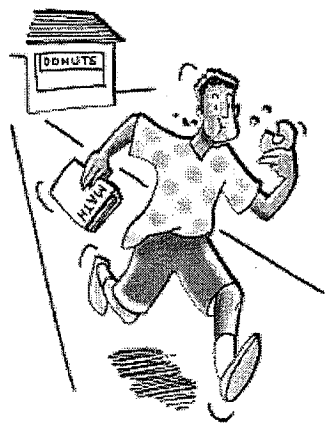
4-53. Sketch a graph to match each story below using axes labeled as shown at right.



a. Luis rides his skateboard at the same speed all the way home. It takes him ten minutes to get there.

b. Corinna jogs along at the same speed until she reaches a hill, and then she slows down until she finally stops to rest.

c. Sergei is talking with his friends at the donut shop when he realizes that it is almost time for math class. He runs toward school, but he slows to a walk when he hears the bell ring and realizes that he is already late. He sits down in class four minutes after he left the donut shop.



Review & Preview

4-59. Use what you know about m and b to graph each rule below without making a table. Draw a growth triangle for each line.

a. $y=2x-3$

b. $y=-2x+5$

c. $y=3x$

d. $y=\frac{1}{2}x+1$

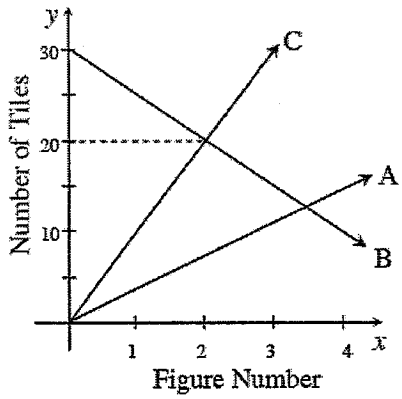
4-60. Examine the graph below, which displays three tile patterns.

a. What do you know about Figure 0 for each of the three patterns?

b. Which pattern changes most quickly? How quickly does it change? Show how you know.

c. Which figure number has the same number of tiles in patterns B and C? Explain how you know.

d. Write a rule for pattern B.



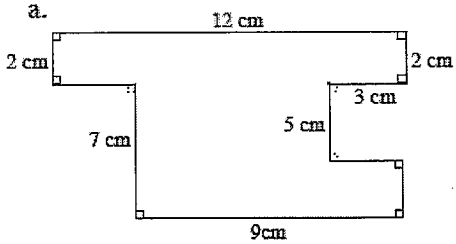
4-61. Translate these algebraic statements into words: $y=2x+5$ and $y=6x+5$.

a. What do you know about Figure 0 for each pattern?

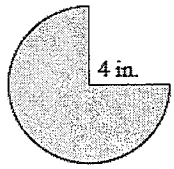
b. Which pattern grows most quickly? How do you know?

4-62. Find the area and perimeter of each shape. Show your work.

a.



b.



4-63. Ms. B is making snickerdoodle cookies. Her recipe uses one-and-a-half teaspoons of cinnamon to make two-dozen cookies. If she needs to make thirteen-dozen cookies to give one cookie to each of her students, how much cinnamon will she need? There are three teaspoons in one tablespoon. How many tablespoons and teaspoons will Ms. B need?

Review & Preview

4-67. Use what you know about m and b to graph each equation below without making a table. Show a growth triangle on each graph and label the x- and y-intercepts.

a. $y=3-2x$

b. $y=2x$

c. $y=3$

d. $y=-\frac{1}{2}x+3$

4-68. On your paper, copy and complete each $x \rightarrow y$ table below. Using what you know about m and b, write an equation that represents the data in the table.

a.

x	y
0	5
1	7
2	9
3	11
4	13
30	
200	
	505
x	

b.

x	y
0	4
1	2
2	0
3	–2
4	–4
30	
150	
300	
x	

c.

x	y
–2	7
–1	4
0	1
1	–2
2	–5
3	
100	
	70
x	

4-69. For a tile pattern with the rule $y=6x+4$ (where x represents the figure number and y represents the number of tiles), which figure number has 40 tiles in it? How do you know?

4-70. Josie and Jules are building a model car. They find that the real car is 54 inches tall and 180 inches long. They decide to make their model 3 inches tall, but now they are having a disagreement. Josie thinks that their model should be 10 inches long and Jules thinks it should be 129 inches long. Help them settle their argument by deciding if either of them is correct. Explain how you know exactly how long their model should be.

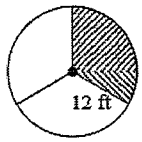
4-71. This problem is a checkpoint for area and perimeter of circles and complex figures. It will be referred to as Checkpoint 4.

Find the area and perimeter or circumference of each figure.

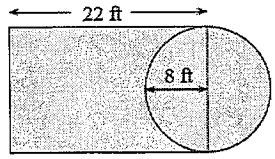
a. Circle with radius 3 cm.

b. Circle with diameter 10 feet.

c. Only the shaded region (each sector has equal area).



d.



Check your answers by referring to the Checkpoint 4 materials located at the back of your book.

If you needed help solving these problems correctly, then you need more practice. Review the Checkpoint 4 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.