Assignment

Name _____ Date _____

Functional Function: *F* of *x* it is! Functional Notation

The function $f(x) = \frac{9}{5}c + 32$ represents the temperature in degrees Fahrenheit that is equivalent to a temperature of *c* degrees Celsius.

1. What are the domain and range of this function?

2. Use the equation $f(x) = \frac{9}{5}c + 32$ to evaluate the function at each value of *c*. Explain what each means in terms of temperature, and how each of the given expressions would be read.

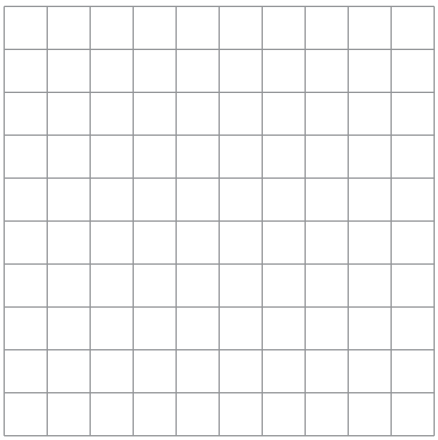
a. $f(-70) =$

b. $f(0) =$

c. $f(10) =$

d. $f(30) =$

e. $f(100) =$



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3. Calculate the value of c that makes each equation true. Explain what it means in terms of temperature.

a. $f(c) = -13$

b. $f(c) = 0$

c. $f(c) = 68$

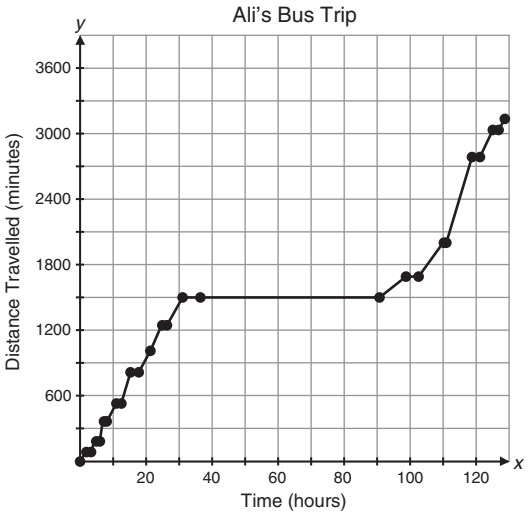
d. $f(c) = 100$

4. Complete the table to show equivalent Celsius and Fahrenheit temperatures, using all of the values you calculated in Questions 2 and 3.

Temperature (ºC)	Temperature (ºF)

2

Ali travels from Cleveland, Ohio to Houston, Texas and back by bus. She keeps track of the distance she has traveled and the time it takes along the way. The function *d*(*t*) represents Ali's total distance traveled, in miles, at a given time *t*, in hours.



5. Use the graph to evaluate the function at each value. Explain what each means in terms of Ali's bus trip.

a. $d(10) \approx$

b. $d(20) \approx$

c. $d(30) \approx$

d. $d(40) \approx$

e. $d(50) \approx$

6. Use the graph to find the value or values that makes each equation true. Explain what each means in terms of Ali's bus trip. Where do you think Ali was at each time?

a. $d(t) = 1500$

b. $d(t) = 1750$

c. $d(t) = 2200$

d. $d(t) = 2750$

e. $d(t) = 3100$

Complete the table, using the values you calculated in Questions 5 and 6.

Time (hours)	Approximate Distance Traveled (miles)
10	
20	
30	
40	
60	
70	
80	
90	
100	
110	
120	
130	

Assignment

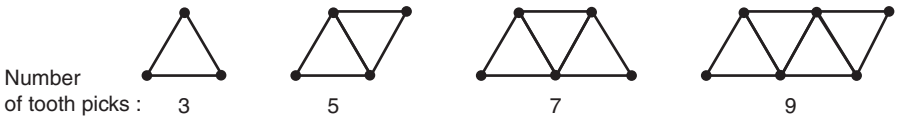
Name _____ Date _____

Numbers in a Row!
Introduction to Sequences

Use the given pattern to answer the questions.

1. The figures in the pattern below have been made from toothpicks. Use the pattern to answer the following questions.

Each figure is made from tooth picks.



a. Describe the pattern in terms of the numbers of toothpicks. Then sketch the next two terms of the pattern and the tenth term of the pattern.

b. Complete the table below. Use the table to write an explicit formula that can be used to calculate the number of toothpicks in the *n*th term of the pattern.

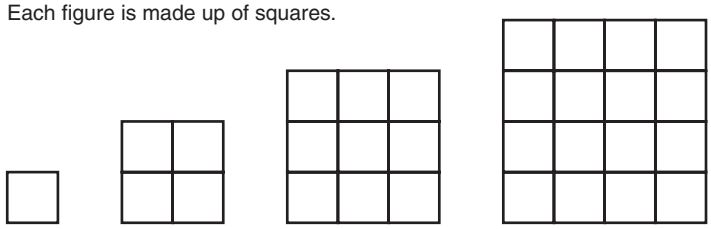
Term Number	Value of Term (number of toothpicks)
1	
2	
4	
6	
10	
n	

c. Use the formula from part (b) to calculate a_{50}.

d. Write a recursive formula for the sequence represented by the pattern.

2. Use the pattern below to answer the following questions.

Each figure is made up of squares.



Number of squres : 1 4 9 16

a. Describe the pattern in terms of the blocks. Then sketch the next two terms of the pattern and the tenth term of the pattern.

b. Complete the table below. Use the table to write an explicit formula that can be used to calculate the number of blocks in the nth term of the pattern.

Term Number	Value of Term (number of squares)
1	
2	
4	
6	
10	
n	

Name _____ Date _____

c. Use the formula from part (b) to calculate a_{25}.

d. Write a recursive formula for the sequence represented by the pattern.

3. Use the pattern of numbers below to answer the following questions.
3, 8, 13, 18, . . .

a. Describe the pattern. Then write the next two terms of the pattern and the tenth term of the pattern.

b. Complete the table below. Use the table to write an explicit formula that can be used to calculate the *n*th term of the pattern.

Term Number	Value of Term
1	
2	
4	
5	
10	
n	

c. Use the formula from part (b) to calculate a_{100}.

d. Write a recursive formula for the sequence represented by the pattern.

4. Use the pattern of numbers below to answer the following questions.
3, 9, 27, 81, . . .

a. Describe the pattern. Then write the next two terms of the pattern and the tenth term of the pattern.

b. Complete the table below. Use the table to write an explicit formula that can be used to calculate the *n*th term of the pattern.

Term Number	Value of Term
1	
2	
3	
5	
10	
n	

c. Use the formula from part (b) to calculate a_{16}.

d. Write a recursive formula for the sequence represented by the pattern.

Assignment

Name _____ Date _____

Adding or Multiplying Arithmetic and Geometric Sequences

Calculate the first four terms of each arithmetic sequence.

1. $a_n = 8n$

2. $a_1 = 5, a_n = a_{n-1} + 15$

3. $a_n = n + 3$

4. $a_1 = 0, a_n = a_{n-1} - 2$

5. $a_n = 6n - 6$

For each arithmetic sequence, identify the common difference and determine the next two terms in the sequence. Then write a recursive formula and an explicit formula for the sequence.

6. 5, 7, 9, 11,…

7. −5, 0, 5, 10,…

8. 100, 89, 78, 67,…

9. 1, 10, 19, 28,…

2

10. $\frac{1}{2}$, 2, $\frac{7}{2}$, 5,…

Calculate the first four terms of each geometric sequence.

11. $g_n = 3^{n-1}$

12. $g_1 = 4, g_n = \left(\frac{3}{4}\right) g_{n-1}$

13. $g_n = 32\left(\frac{1}{2}\right)^{n-1}$

14. $g_1 = 1, g_n = -7g_{n-1}$

15. $g_n = \frac{1}{4}(10)^{n-1}$

Name _____ Date _____

For each geometric sequence, identify the common ratio and determine the next two terms in the sequence. Then write a recursive formula and an explicit formula for the sequence.

16. 5, 15, 45, 135,…

17. 320, 160, 80, 40,…

18. 1, −7, 49, −343,…

19. −2, 2, −2, 2,…

20. $\frac{1}{27}, \frac{1}{9}, \frac{1}{3}, 1,\ldots$

Classify each sequence as arithmetic, geometric, or neither. For each arithmetic sequence, identify the common difference. For each geometric sequence, identify the common ratio. If the sequence is neither, describe the pattern.

21. 100, 20, 4, $\frac{4}{5}$,...

22. 1, 13, 25, 37,...

23. 10, 20, 40, 80,...

24. 2, 4, 16, 256,...

25. 3, -21, 147, -1029,...

26. 50, 45, 40, 35,...

27. 2, 5, 9, 14,...

28. 3, $\frac{8}{3}$, $\frac{7}{3}$, 2,...

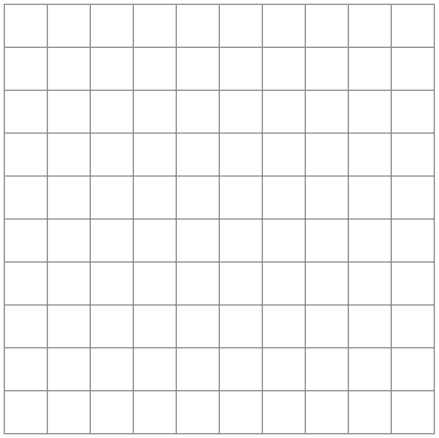
Assignment

Name _____ Date _____

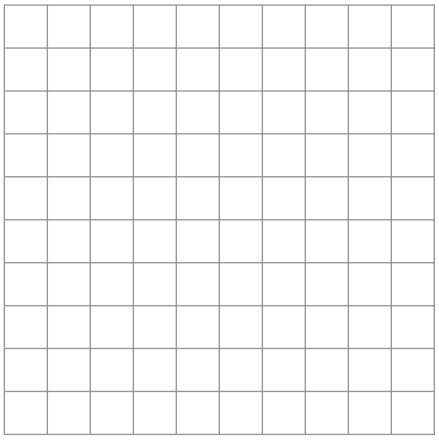
Home, Home on the Domains and Ranges
Domains and Ranges of Algebraic Functions

Graph each function. Then identify the type of function and determine the domain and range of the function.

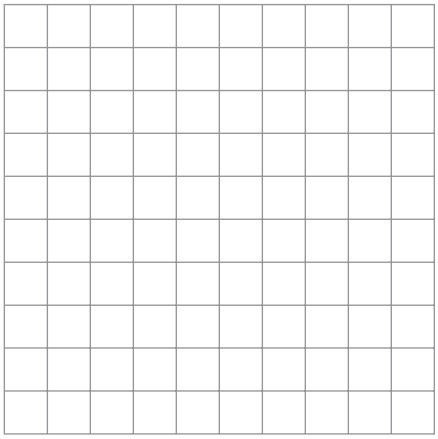
1. $a(x) = \frac{2}{3}x + 3$



2. $b(x) = -|x - 3|$



3. $c(x) = |2x| + 5$



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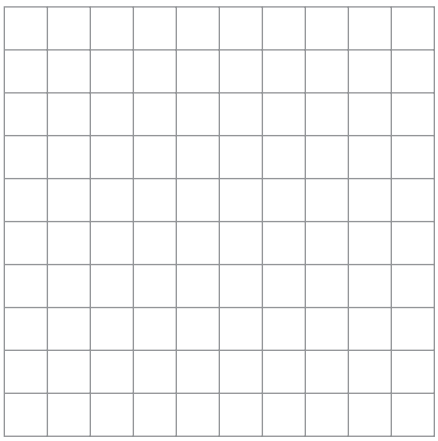
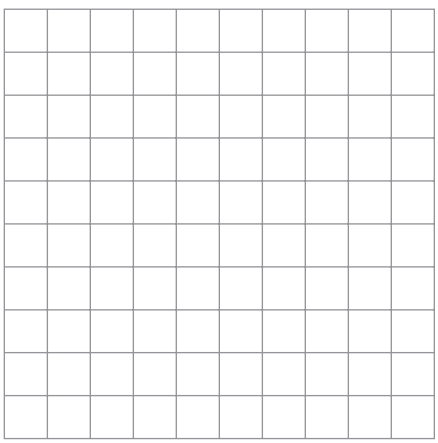
4. $d(x) = x^2 + 2x + 1$



5. $f(x) = -x^3 + 2$



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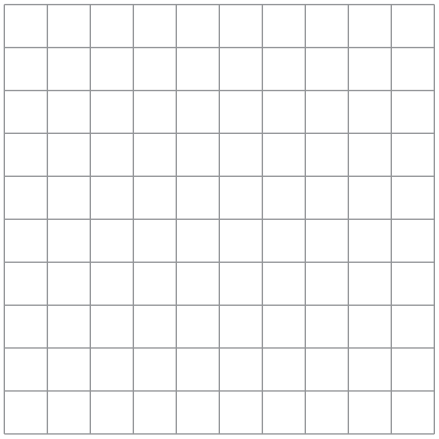
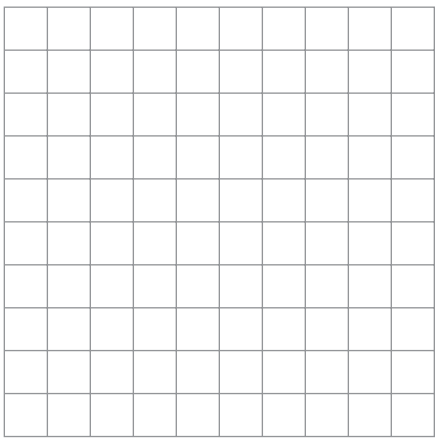
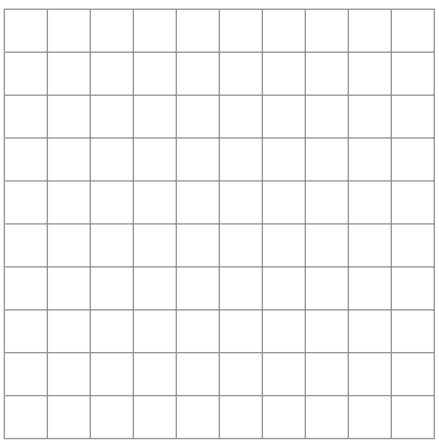
6. $g(x) = 4\sqrt{x + 3}$



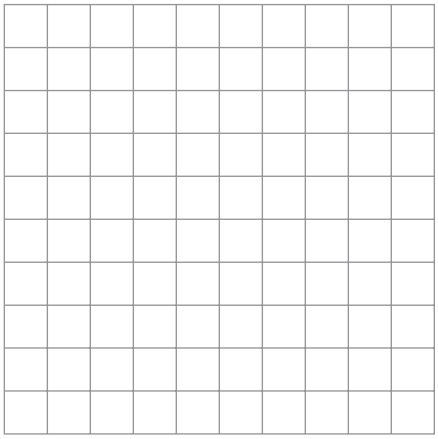
7. $h(x) = -x^2 + 10$



8. $j(x) = 3^x + 3$



9. $k(x) = \frac{2}{x + 5}$



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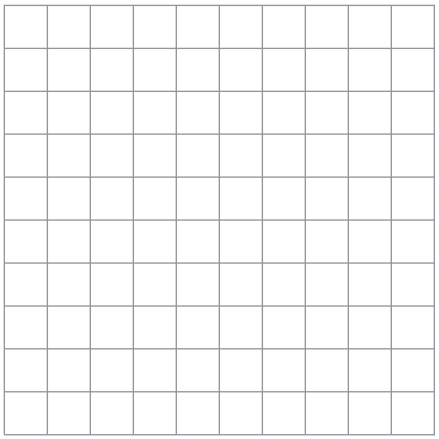
Assignment

Name _____ Date _____

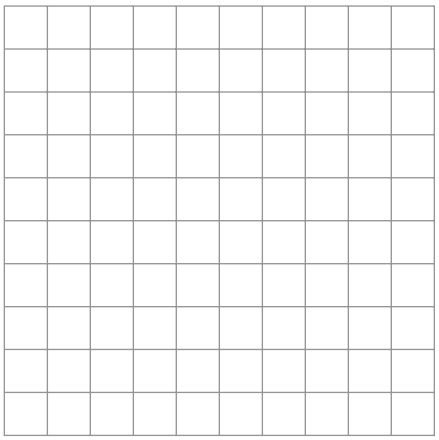
Rocket Man
Extrema and Symmetry

For each function, sketch a graph and determine the domain and range. Then determine the *x*- and *y*-intercepts, any vertical or horizontal lines of symmetry, and any extreme points, and label them on the graph.

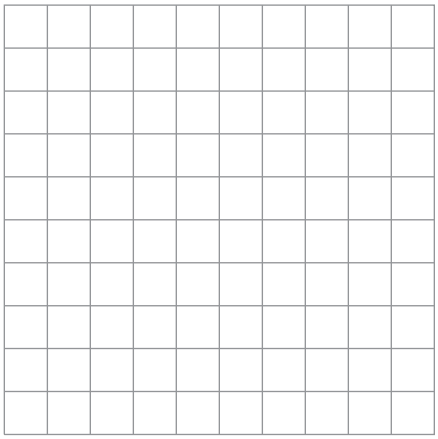
1. $l(x) = -2x$



2. $m(x) = -3|x| + 2$



3. $n(x) = \left|\frac{1}{2}x - 2\right|$



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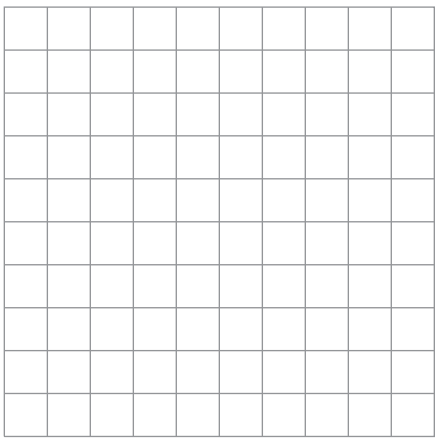
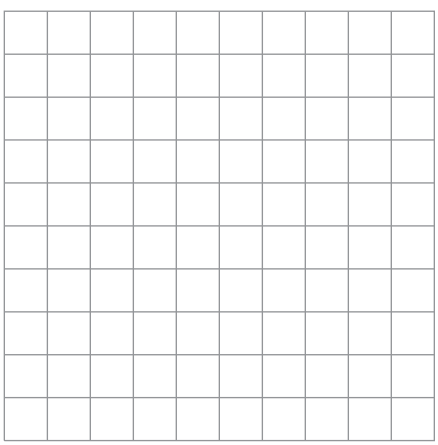
4. $p(x) = \frac{5}{x} + 3$



5. $q(x) = 2^x - 4$



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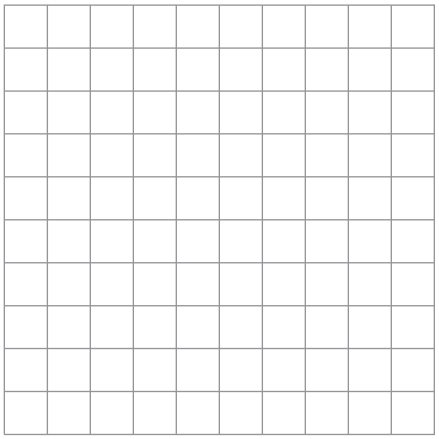
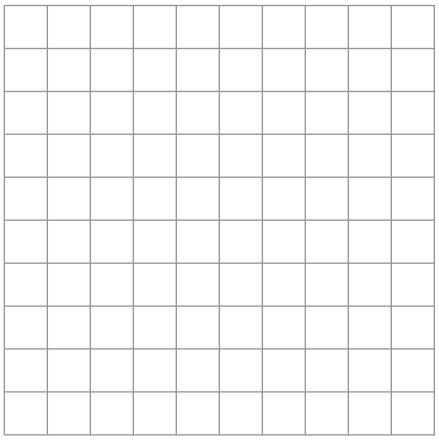
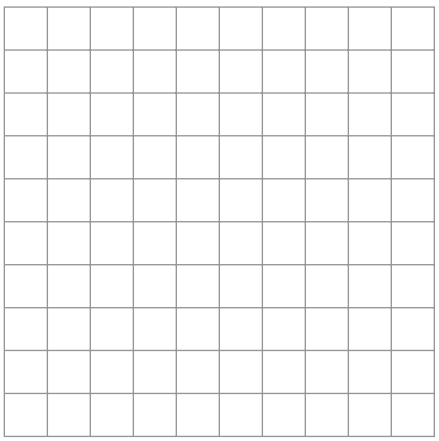
6. $r(x) = -\sqrt{2x} + 4$



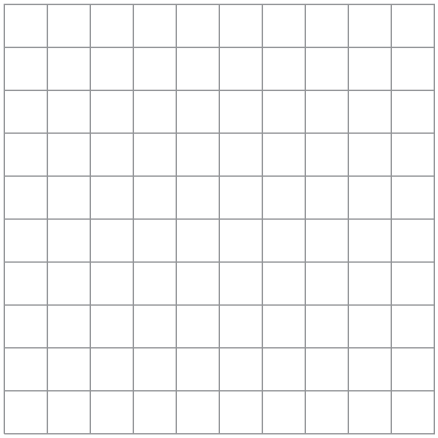
7. $s(x) = x^2 + x - 6$



8. $t(x) = -3x^2$



9. $u(x) = -x^3 + 4x$



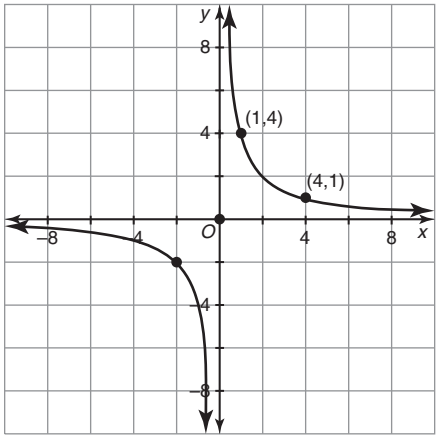
2

Assignment

Name _____ Date _____

Changing Change
Rates of Change of Functions

The graph of the function $v(x) = \frac{4}{x}$ is shown on the grid. The points (1, 4) and (4, 1) are labeled. Use this function and its graph to answer Questions 1 through 11.



1. What type of function is $v(x)$?

2. Calculate the average rate of change between the points (1, 4) and (4, 1).

3. Draw a line between the points (1, 4) and (4, 1). What is the slope of the line?

4. How does the slope of the line compare to the average rate of change between the two points?

5. Evaluate $v(x)$ for $x = 2$. Represent the result as an ordered pair.

6. Calculate each average rate of change.

a. Between the point from Question 5 and (1, 4)

b. Between the point from Question 5 and (4, 1)

7. Draw a line between the point from Question 5 and (1, 4). Draw another line between the point from Question 5 and (4, 1). What is the slope of each line?

8. How does the slope of each line compare to the average rate of change between each pair of points?

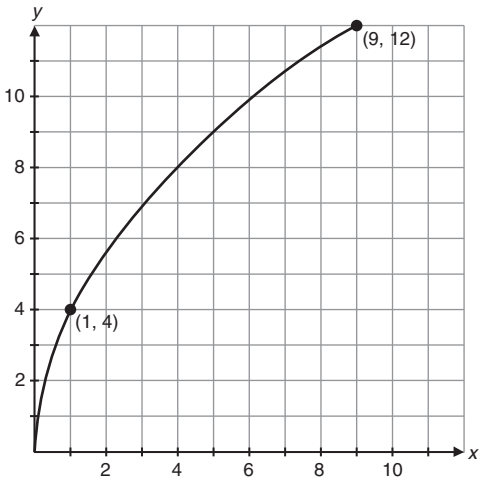
9. Describe the rates of change for the portion of the graph right of the origin.

10. What do you think will be true about the average rate of change between pairs of points to the left of the origin?

11. What can you conclude about the average rates of change for inverse variation functions?

Name _____ Date _____

The graph of the function $w(x) = 4\sqrt{x}$ is shown on the grid. The points (1, 4) and (9, 12) are labeled. Use this function and its graph to answer Questions 12 through 21.



12. What type of function is $w(x)$?

13. Calculate the average rate of change between the points (1, 4) and (9, 12).

14. Draw a line between the points (1, 4) and (9, 12). What is the slope of the line?

15. How does the slope of the line compare to the average rate of change between the two points?

16. Evaluate $w(x)$ for $x = 4$. Represent the result as an ordered pair.

17. Calculate each average rate of change.

a. Between the point from Question 16 and (1, 4)

b. Between the point from Question 16 and (9, 12)

18. Draw a line between the point from Question 16 and (1, 4). Draw another line between the point from Question 16 and (9, 12). What is the slope of each line?

19. How does the slope of each line compare to the average rate of change between each pair of points?

20. Describe the rates of change for the whole graph.

21. What can you conclude about the average rates of change for square root functions?