Develop examples of nonlinear functions by understanding various representations

Practice Set A

Name:

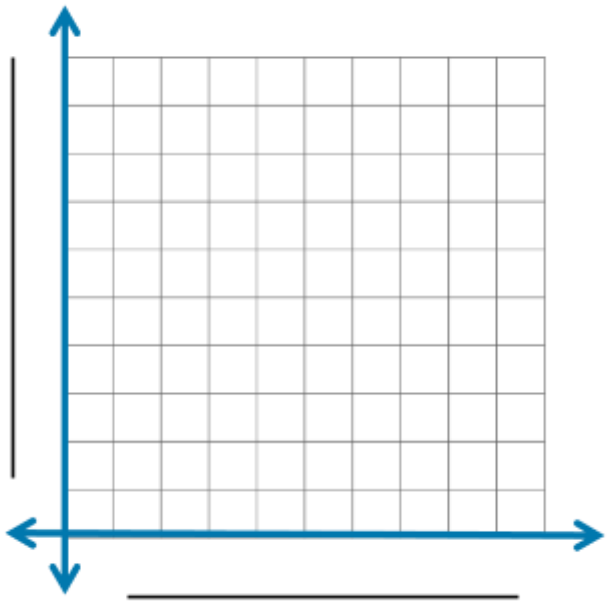
Date:

1. Given the following functions determine whether each produce a linear or nonlinear graph and explain how you know.

a. Area of a square as a function of side length ($A = s^2$).

Side Length	Area
1	
2	
3	
4	

b. Graph the function from 1a.



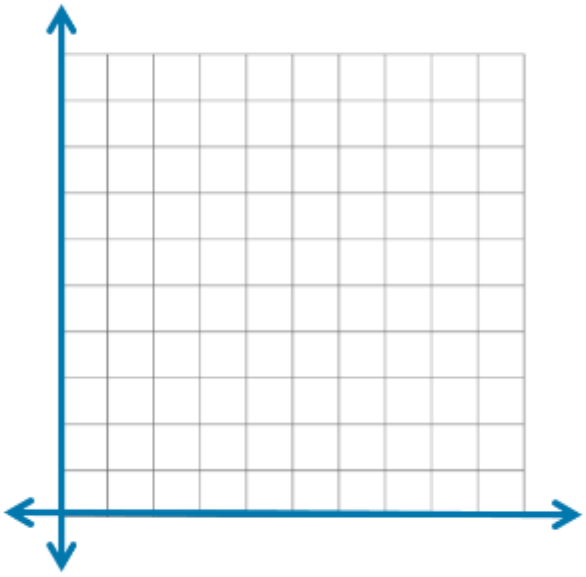
c. Explain what type of function this is and how you know.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

d. The perimeter of an isosceles triangle as a function of its side length ($P = 3s$).

Side Length	Perimeter

e. Graph the function from 1d.



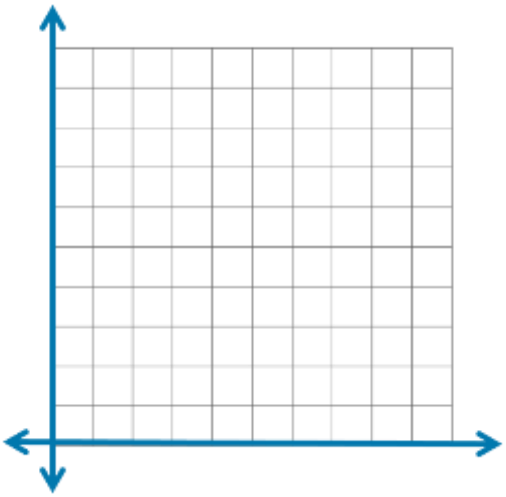
f. Explain what type of function this is and how you know.

_____
_____
_____
_____
_____
_____
_____
_____
_____

g. The area of a circle as a function of its radius ($A = 3.14r^2$).

Radius	Area

h. Graph the function from 1g.



i. Explain what type of function this is and how you know.

_____
_____
_____
_____
_____
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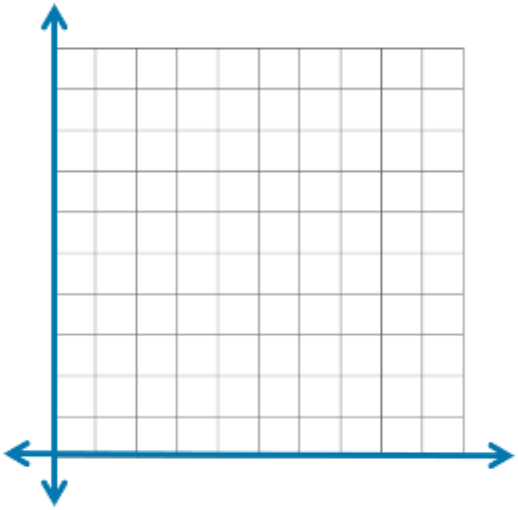
j. The circumference of a circle as a function of its diameter ($C = 3.14d$).

Diameter	Circumference

k. Graph the function from 1j.



l. Explain what type of function this is and how you know.

_____
_____
_____
_____
_____
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_____
_____
_____

2. Use the information from problems set 1 to answer the following questions

a. What did you notice about the equations of functions that were nonlinear versus the functions that were linear.

_____
_____
_____

_____
_____
_____
_____
_____

b. What prediction can you make regarding one way you might use to recognize a nonlinear function without graphing?

_____
_____
_____
_____
_____
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_____

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Practice Set A

Answer Key

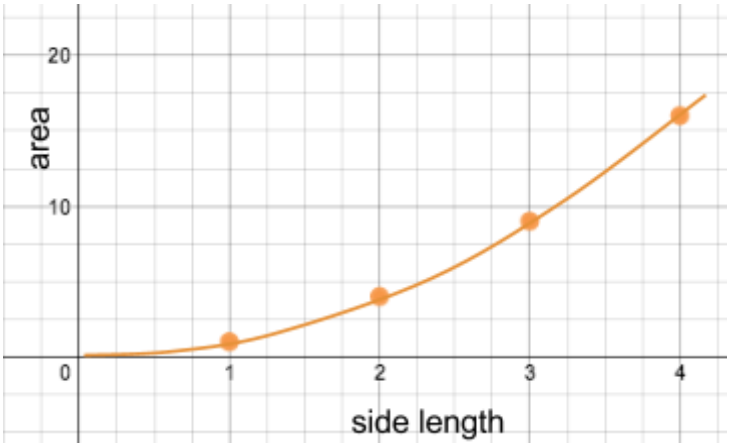
1. Given the following functions determine whether each produce a linear or nonlinear graph and explain how you know.

a. Area of a square as a function of side length ($A = s^2$).

Side Length	Area
1	1
2	4
3	9

4	16

b. Graph the function from 1a.



c. Explain what type of function this is and how you know.

This is a nonlinear function because coordinate points do not create a straight line.

or

This is a nonlinear function because graph of this equation does not produce a straight line.

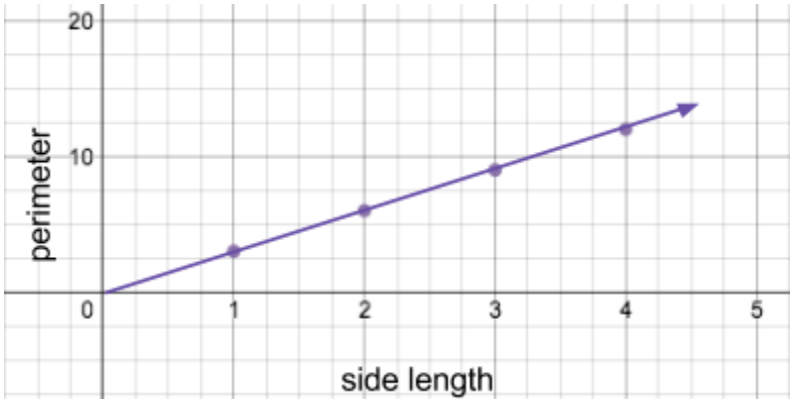
or

This is a nonlinear function because there is not a constant rate of change or constant ratio between coordinate pairs.

d. The perimeter of an isosceles triangle as a function of its side length ($P = 3s$).

Side Length	Perimeter
1	3
2	6
3	9
4	12

e. Graph the function from 1d.



f. Explain what type of function this is and how you know.

This is a linear function because coordinate points create a straight line.

or

This is a linear function because graph of this equation produces a straight line.

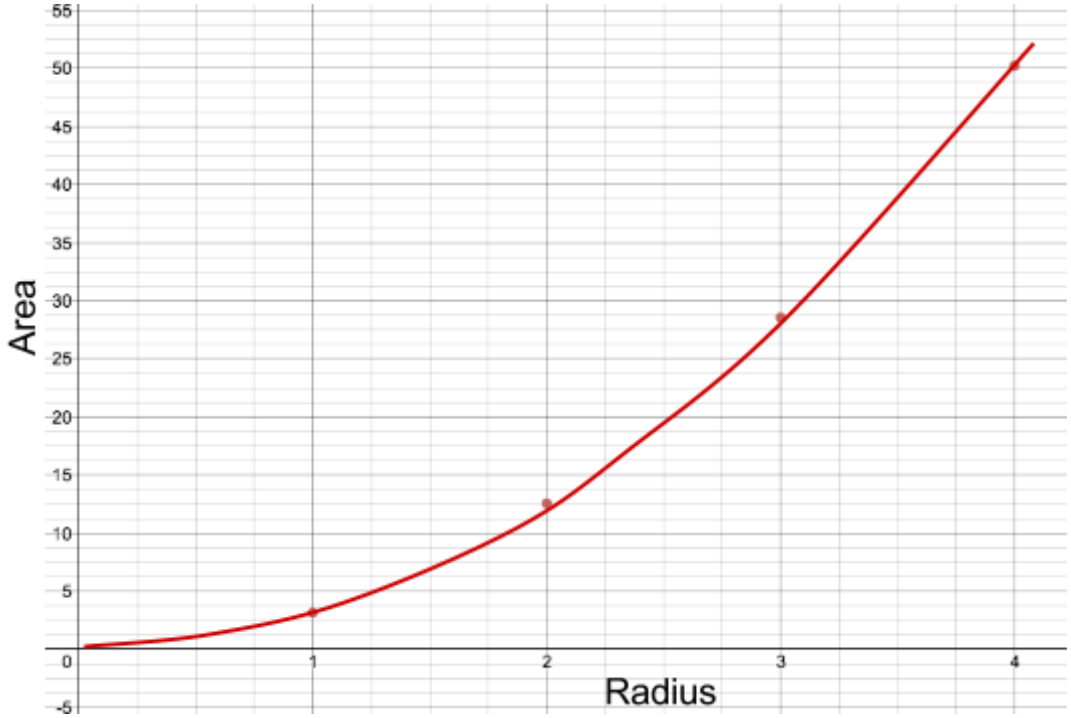
or

This is a linear function because there is a constant rate of change or constant ratio between coordinate pairs. The rate of change is 3 units.

g. The area of a circle as a function of its radius ($A = 3.14r^2$).

Radius	Area
1	3.12
2	12.56
3	28.26
4	50.24

h. Graph the function from 1g.



i. Explain what type of function this is and how you know.

This is a nonlinear function because coordinate points do not create a straight line.

or

This is a nonlinear function because graph of this equation does not produce a straight line.

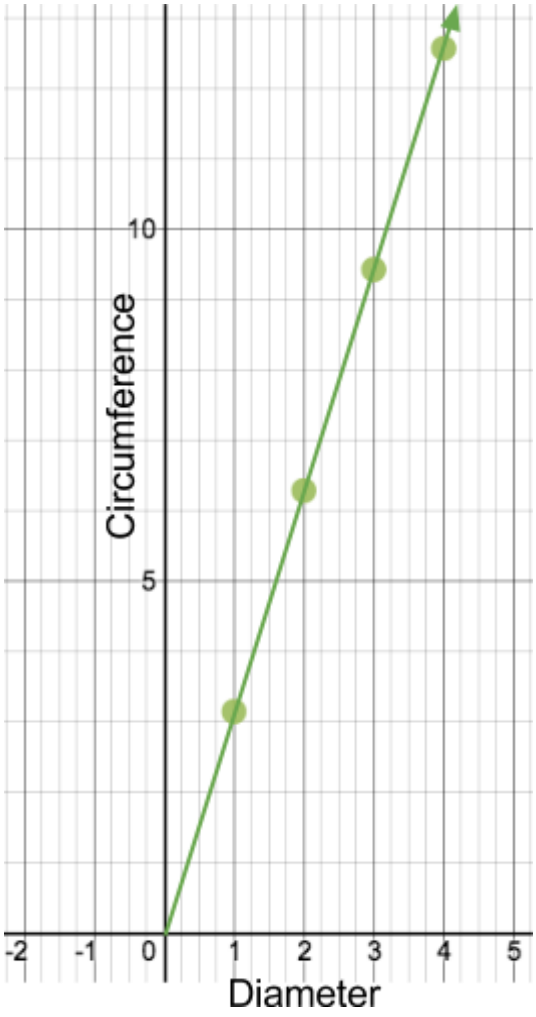
or

This is a nonlinear function because there is not a constant rate of change or constant ratio between coordinate pairs.

j. The circumference of a circle as a function of its diameter ($C = 3.14d$).

Diameter	Circumference
1	3.14
2	6.28
3	9.42
4	12.56

k. Graph the function from 1j.



I. Explain what type of function this is and how you know.

This is a linear function because coordinate points create a straight line.

or

This is a linear function because graph of this equation produces a straight line.

or

This is a linear function because there is a constant rate of change or constant ratio between coordinate pairs.

2. Use the information from problems set 1 to answer the following questions

a. What did you notice about the equations of functions that were nonlinear versus the functions that were linear.

The functions that are nonlinear have a exponent or 2 or 3 and the functions that are linear have equations that have an exponent of 1.

b. What prediction can you make regarding one way you might use to recognize a nonlinear function without graphing?

I would predict that if an equation of a function has an exponent that is greater than 1 then it is a nonlinear function.