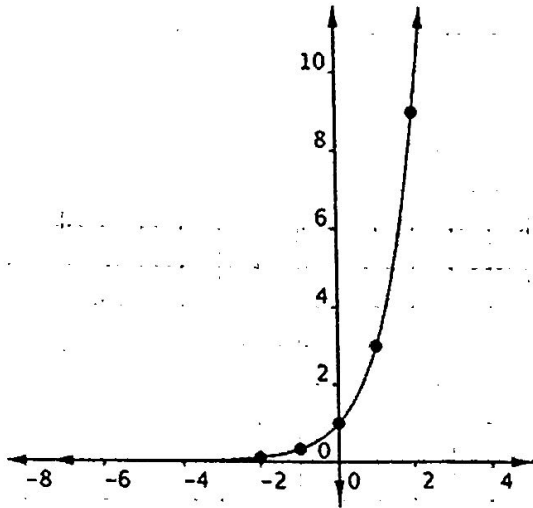


Part I: Determine if the function is arithmetic or geometric, linear or exponential, and then write the recursive AND explicit equations for each of the following.

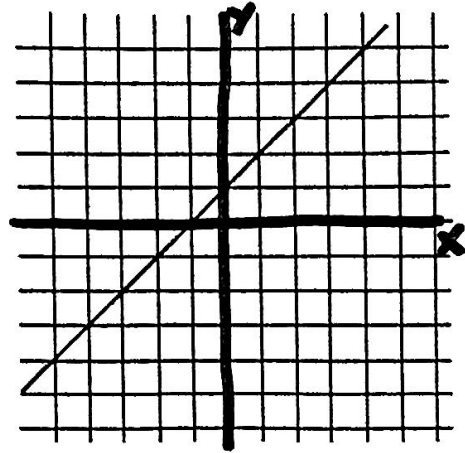
1. Circle: Arithmetic Geometric Neither



Recursive:  $f(n) = f(n-1) \times 3$   $f(0) = 1$

Explicit:  $y = 1(3)^x$

2. Circle: Arithmetic Geometric Neither



Recursive:  $f(n) = f(n-1) + 1$   $f(0) = 1$

Explicit:  $y = 1x + 1$

3. Circle: Linear Exponential Neither

x	f(x)
1	8
2	48
3	288

Recursive:  $f(n) = f(n-1) \times 6$   $f(1) = 8$

Explicit:  $y = 8(6)^{x-1}$

4. Circle: Linear Exponential Neither

x	f(x)
2	-14
3	-9
4	-4

Recursive:  $f(n) = f(n-1) + 5$   $f(2) = -14$

Explicit:  $y = 5(x-2) - 14$

5. Circle: Linear Exponential Neither

Mrs. Weidner has started collecting pennies from her students each time they complain about having to do homework. On the first day she collects 38 pennies, and each day after she collects, on average, 23 more pennies.

Recursive:  $f(n) = f(n-1) + 23$   
 $f(1) = 38$

Explicit:  $y = 23(x-1) + 38$

6. Circle: Linear Exponential Neither

Mrs. Clay has decided to move to a newer and bigger house that can accommodate 1000 giraffes. When she moves into the house, she has 21 giraffes, and the giraffes triple each year. At this rate, when will Mrs. Clay have to move to a bigger house in order to accommodate all of the giraffes she will have to take care of?

Recursive:  $f(n) = f(n-1) \times 3$   
 $f(0) = 21$

Explicit:  $y = 21(3)^x$

She needs to move after 3 years

7. Circle: Linear Exponential Neither

Ms. Curtis is so obsessed with her kitten Pickle that she has decided she wants another kitten just like her, named Dill. (Pickle needs a friend after all.) She wants to save up enough money to cover all of the expenses that come with owning a new pet (food, vaccines, etc.). If she starts with \$30.00 in her savings fund and adds \$15 each month, then when will she be able to purchase Dill if she calculates that Dill is going to cost her approximately \$150.00

Recursive:  $f(n) = f(n-1) + 15$   
 $f(0) = 30$

Explicit:  $y = 15x + 30$

She can take Dill home after \_\_\_\_\_ months.

8. Circle: Linear Exponential Neither

Ms. Hayes' car broke down on her one day after school, so she HAD to buy a brand new ride so that she could get to school to teach all of her wonderful students. If Ms. Hayes paid \$23,000.00 for her new ride, and its value depreciates at a rate of 12.5% per year, then what will her car be worth in 5 years? (Write an equation to help you answer this question.)

Recursive:  $f(n) = f(n-1) \times .875$   
 $f(0) = 23,000$

Explicit:  $y = 23000(.875)^x$

The car will be worth \$11,797 in 5 years.

Part II: Answer the following questions completely. Use multiple representations to assist you (i.e. tables, graphs, equations, etc.)

9. Find the slope of the line that passes through the following points:

a. (-3,4) and (5, -12)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-12 - 4}{5 - (-3)} = \frac{-16}{8} = -2$$

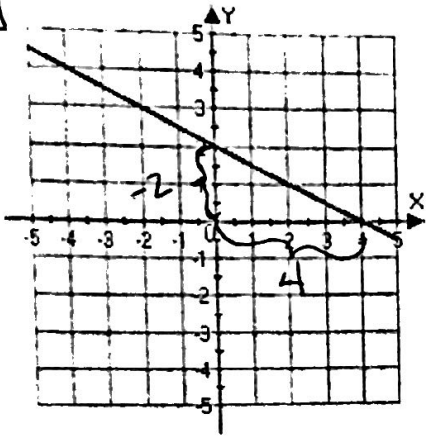
m = -2

b. (6, -2) and (15, -3)

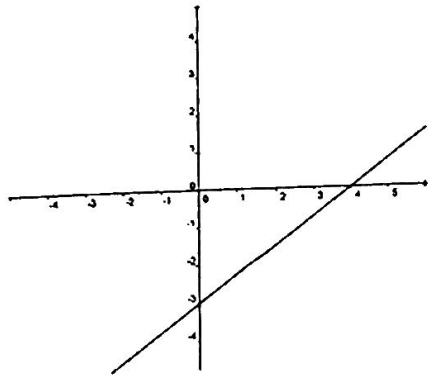
$$m = \frac{-3 - (-2)}{15 - 6} = \frac{-1}{9}$$

m =  $-\frac{1}{9}$

c.  $m = \frac{-2}{4} = \frac{-1}{2}$



d.  $m = \frac{3}{4}$



10. Find the equation for the line that goes through the point  $(-3, 12)$  and has a slope of  $-5$ . Simplify your equation!

$$y = m(x - x_1) + y_1$$

$$y = -5(x + 3) + 12$$

$$y = -5x - 15 + 12$$

$$y = -5x - 3$$

11. Find the equation of the line that passes through the points  $(4, -8)$  and  $(5, 19)$ . Simplify your equation!

$$m = \frac{19 - (-8)}{5 - 4} = \frac{27}{1} = 27$$

$$y = 27(x - 4) - 8$$

$$y = 27x - 108 - 8$$

$$y = 27x - 116$$

$$\textcircled{\text{or}} y = 27(x - 5) + 19$$

$$y = 27x - 135 + 19$$

$$y = 27x - 116$$

12. Given an exponential curve passes through the points  $(0, 5)$  and  $(4, 405)$ , write the explicit equation that represents the function.

a. Common ratio: 3

b. Explicit Equation:  $y = 5(3)^x$

guess and check CR

x	y
0	5
1	15 $\downarrow \times 3$
2	45 $\downarrow \times 3$
3	135 $\downarrow \times 3$
4	405 $\downarrow \times 3$

13. Fill in the missing pieces of the table and write the explicit functions that represent the following tables.

a. Given the table represents an arithmetic sequence:

X	0	1	2	3
Y	4	56.8	109.6	162.4

$\downarrow$   
 $+d$

$$4 + 3d = 162.4$$

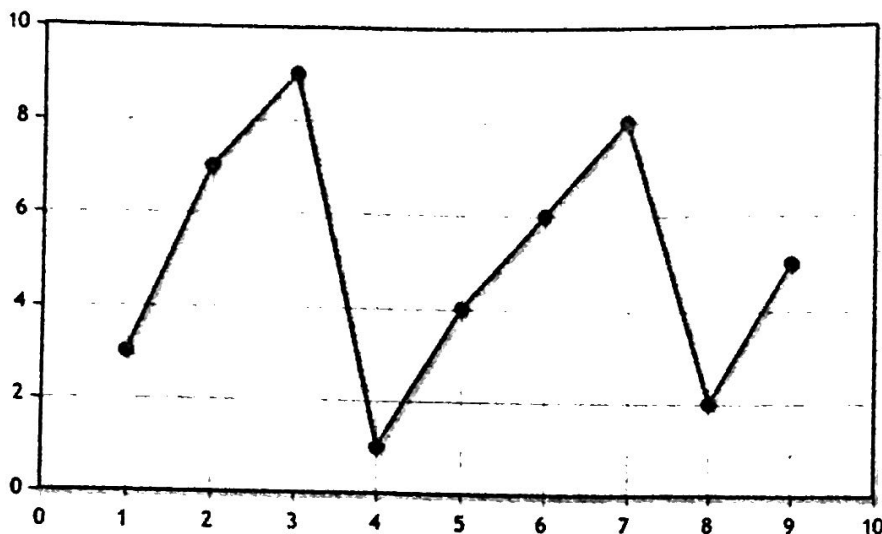
$$-4 \quad -4$$

$$\frac{3d}{3} = \frac{158.4}{3}$$

$$d = 52.8$$

Explicit Equation:  $52.8x + 4 = y$

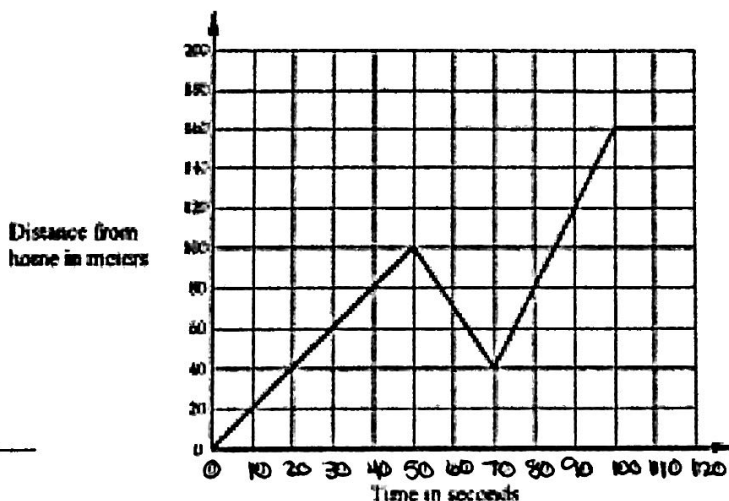
Part III: Given the graphs, answer the following questions using interval notation when appropriate.



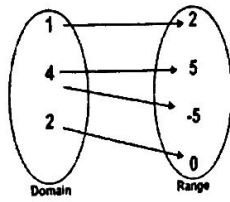
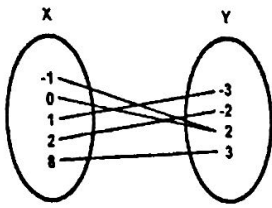
20. When is the graph increasing?  $[1,3)$   $(4,7)$   $(8,9]$   
 21. When is the graph decreasing?  $(3,4)$   $(7,8)$   
 22. What is the domain?  $[1,9]$   
 23. What is the range?  $[1,9]$   
 24. What is the maximum?  $(3,9)$   
 25. What is the minimum?  $(4,1)$   
 26. Find  $f(5)$ : 4    27. Find  $f(8)$ : 2    28. Find  $x$  when  $f(x)=9$ : 3  
 29. Find  $x$  when  $f(x)=1$ : 4  
 30. Does the graph represent a function? Circle YES NO

Using the graph below, answer the following questions:

31. Increasing Interval:  $[0, \overset{50}{\cancel{60}})$   $(70, 100)$   
 32. Decreasing Interval:  $(50, 70)$   
 33. Constant Interval:  $(100, 120]$   
 34. Domain:  $[0, 120]$   
 35. Range:  $[0, 160]$   
 36. X-Intercept:  $(0, 0)$   
 37. Y-Intercept:  $(0, 0)$   
 38. Find  $f(70)$ : 40    39. Find  $f(20)$ : 40  
 40. Find  $x$  when  $f(x)=120$ :  $x=90$



Determine whether or not the following represent a function: Circle your answer.



$\{(0, -2), (2, 4), (4, 7), (2, -3)\}$

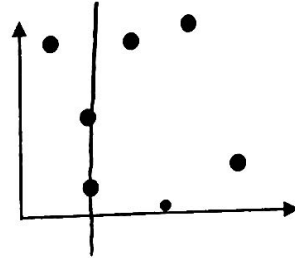
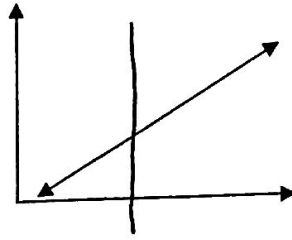
$\uparrow$                        $\uparrow$   
 (2, 4)                      (2, -3)

a.) Function:  Yes  No

b.) Function:  Yes  No

c.) Function:  Yes  No

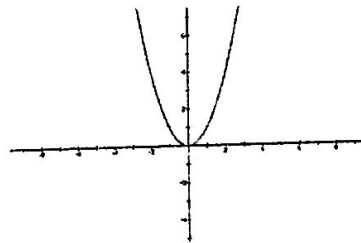
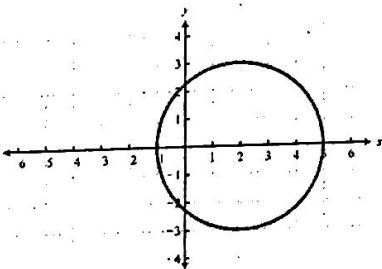
X	Y
-3	19
8	10
5	12
-6	27
8	10



d.) Function:  Yes  No

e.) Function:  Yes  No

f.) Function:  Yes  No



g.) Function:  Yes  No  
 Vertical Line Test!

h.) Function:  Yes  No  
 Vertical Line Test!