Module 1 Review

Solve the following equations for the unknown variable.

1. $3(2x + 1) = 2(x + 3) + 3x$

$6x+3 = 2x+6+3x$

$6x+3 = 5x+6$

$\boxed{x = 3}$

2. $2(2x + 3) + 5(x + 4) = 4(2x + 5) + 8$

$4x+6+5x+20 = 8x+20+8$

$9x+26 = 8x+28$

$\boxed{x=2}$

3. Review Elvira's Task with sticky notes. Module 1.3

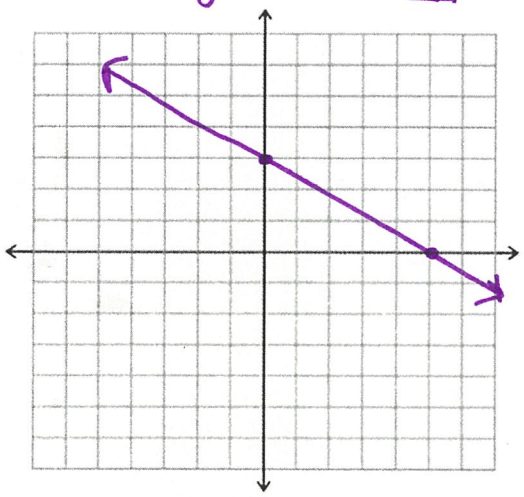
Creating equations...

Write the equation of the line in slope intercept form. Then graph each line.

4. $3x + 5y = 15$

$5y = -3x+15$

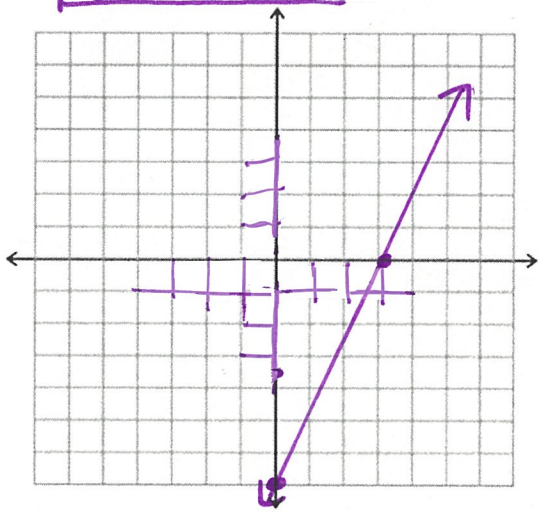
$\boxed{y = -\frac{3}{5}x+3}$



5. $7x - 3y = 21$

$-3y = -7x+21$

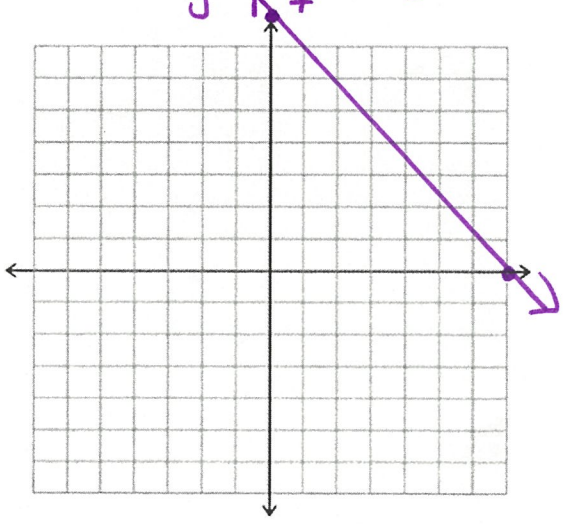
$\boxed{y = \frac{7}{3}x-7}$



6. $8x + 7y = 56$

$7y = -8x+56$

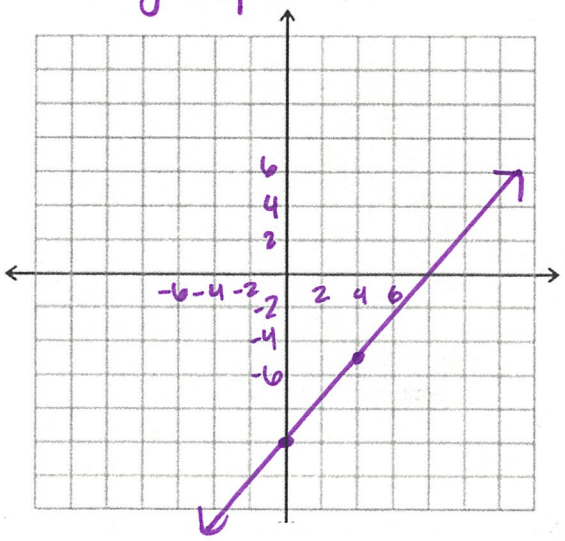
$y = \frac{-8}{7}x+8$



7. $-5x - 4y = 40$

$-4y = 5x+40$

$y = \frac{-5}{4}x-10$



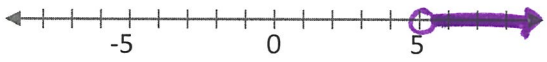
#8-11. Solve each inequality. Graph the solutions on the number line AND state 3 numbers in the solution set. Show all your work!

8. $2x + 7 > 17$

$-7 \quad -7$

$2x > 10$

$x > 5$



3 numbers in the solution set:

6, 7, 8 ...

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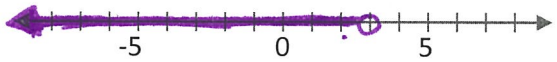
9. $20 > 6z + 2$

$-2 \quad -2$

$18 > 6z$

$3 > z$

$z < 3$



3 numbers in the solution set:

2, 1, 0 ...

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10. $9 < -3w + 6$

$-6 \quad -6$

$3 < -3w$

$-1 > w$

$w < -1$

3 numbers in the solution set:

-4, -3, -2 ...

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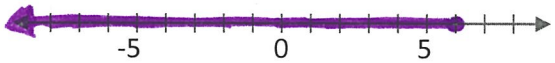
11. $7y - 1 \leq 29 + 2y$

$5y \leq 30$

$y \leq 6$



3 numbers in the solution set:

3, 4, 5 ...

Use the following matrices:

$$A = \begin{bmatrix} 7 & 6 \\ 2 & 4 \\ 0 & 3 \end{bmatrix} \qquad B = \begin{bmatrix} 5 & 9 \\ 1 & 2 \end{bmatrix} \qquad C = \begin{bmatrix} 3 & 8 \\ 6 & 9 \end{bmatrix}$$

12. Find B – 3C $\begin{bmatrix} -4 & -15 \\ -17 & -25 \end{bmatrix}$

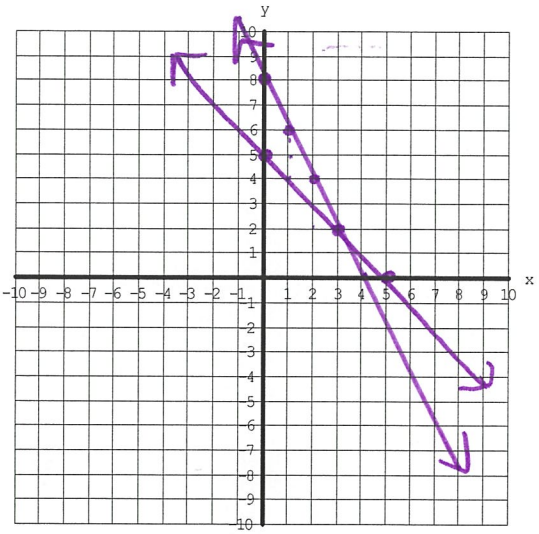
13. Find AB $\begin{bmatrix} 41 & 75 \\ 14 & 26 \\ 3 & 6 \end{bmatrix}$

Module 2 Review Homework

For #1 solve each system of equation by graphing:

14. $y + x = 5$
$y = -2x + 8$

(3,2)



For #15-16, solve each system of equations using the substitution or elimination:

15. $y = -x + 15$
$4x + 3y = 38$

$4x + 3(-x+15) = 38$
$4x - 3x + 45 = 38$
$x = -7$
$y = -(-7) + 15$
$y = 22$

(-7,22)

16. $2x - 3y = 4$
$x + 4y = -9$

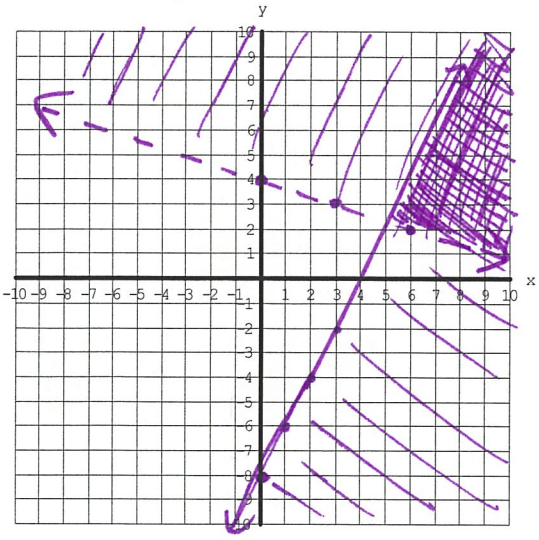
$2x - 3y = 4$
$-2x + 8y = -18$
$0x - 11y = 22$
$y = -2$

$2x - 3(-2) = 4$
$2x + 6 = 4$
$2x = -2$
$x = -1$

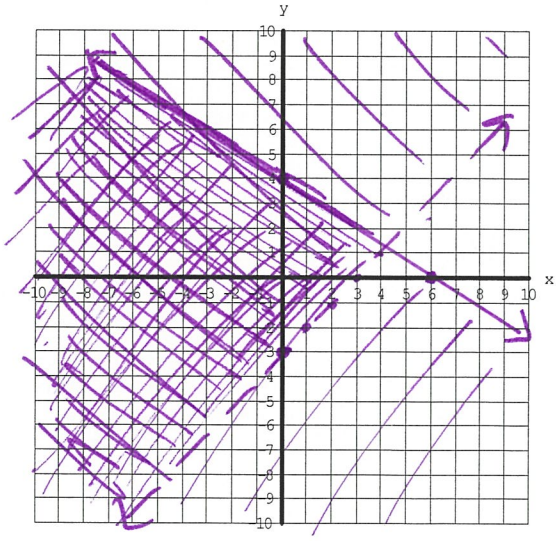
(-1,-2)

For #17-18, solve each system of inequalities.

17. $y \leq 2x - 8$
$y > -\frac{1}{3}x + 4$



18. $2x + 3y \leq 12$
$y > x - 3$



19. Jason is buying wings and hot dogs for a party. One package of wings costs $7. Hot dogs cost $4 per pound. He must spend less than $40.

x - wings
y - hot dogs

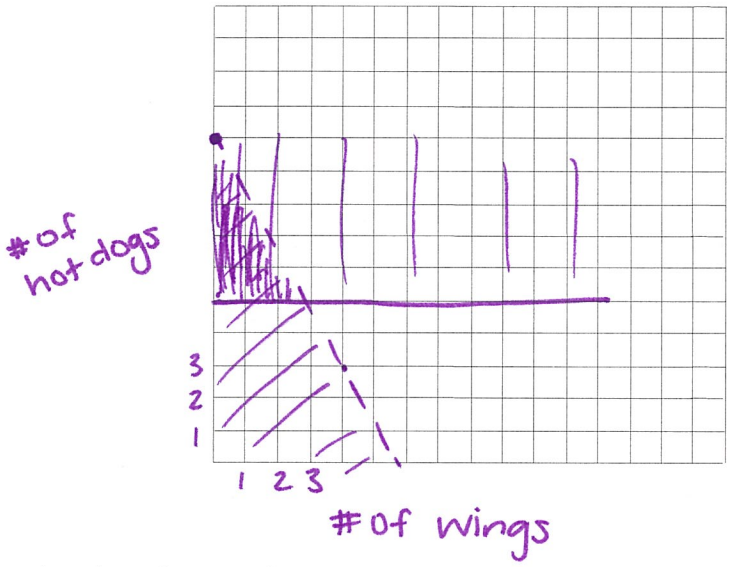
a. Write an inequality to represent the cost of Jason's food for the party.

$7x + 4y < 40$

b. Jason knows that he will be buying at least 5 pounds of hot dogs. Write an inequality to represent this situation.

$y \geq 5$

c. Graph both inequalities and shade the intersection.



d. Identify two solutions and justify your answers.

(1, 6) in the feasible region
(1, 7)

For #20, solve the system of equation using matrix row reduction:

20. $2x - 3y = 4$
$x + 4y = -9$

$\begin{bmatrix} 2 & -3 & 4 \\ 1 & 4 & -9 \end{bmatrix}$ $R_1 - 2R_2 \rightarrow R_2$

$\begin{bmatrix} 2 & -3 & 4 \\ 0 & -11 & 22 \end{bmatrix}$ $-\frac{1}{11}R_2 \rightarrow R_2$

$\begin{bmatrix} 2 & -3 & 4 \\ 0 & 1 & -2 \end{bmatrix}$ $R_1 + 3R_2 \rightarrow R_1$

$\begin{bmatrix} 2 & 0 & -2 \\ 0 & 1 & -2 \end{bmatrix}$ $\frac{1}{2}R_1 \rightarrow R_1$

$\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & -2 \end{bmatrix}$ $x = -1$, $y = -2$ $(-1, -2)$

Module 3 Review

Use the given information to state as much as possible about each sequence. Your answer should include: type of sequence, the common difference or common ration, a table of at least 5 terms, a graph, the recursive rule, and the explicit rule.

21. Type:

arithmetic

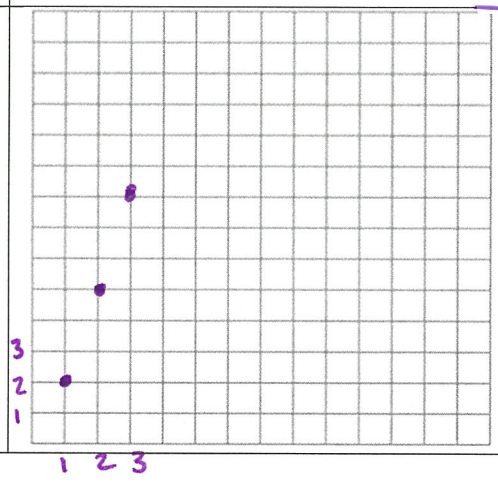
x	$f(x)$
1	2
2	5
3	8
4	11
5	14

Common difference/ratio:

3

Recursive rule:

$f(1) = 2 \;\; f(x) = f(x-1) + 3$



Explicit rule:

$f(x) = 2 + 3(x-1)$

OR

$f(x) = 3x - 1$

22. Type:

geometric

x	$f(x)$
0	3
1	6
2	12
3	24

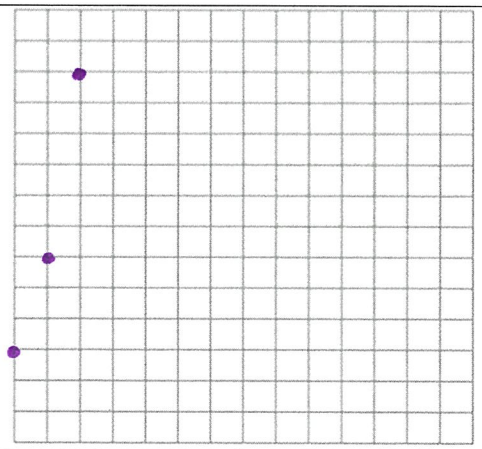
Common difference/ratio:

2

Recursive rule:

$f(0) = 3,$

$f(x) = f(x-1) \cdot 2$



Explicit rule:

$f(x) = 3 \cdot 2^x$

23. Type:

arithmetic

x	$f(x)$
1	3
2	5
3	7
4	9

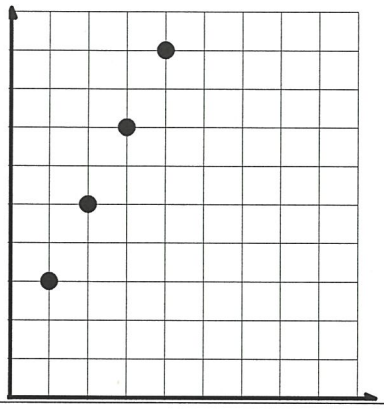
Common difference/ratio:

2

Recursive rule:

$f(1) = 3,$

$f(x) = f(x-1) + 2$



Explicit rule:

$f(x) = 3 + 2(x-1)$

OR

$f(x) = 2x + 1$

24. Type:

geometric

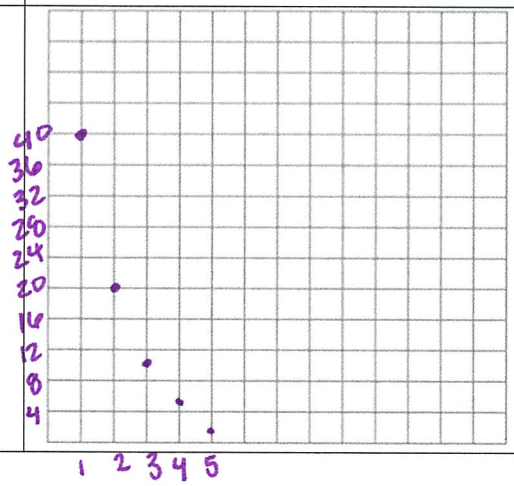
x	$f(x)$
1	40
2	20
3	10
4	5
5	5/2

Common Ratio = $\frac{1}{2}$

Recursive rule:

$f(1) = 40,$

$f(x) = f(x-1) \cdot \frac{1}{2}$



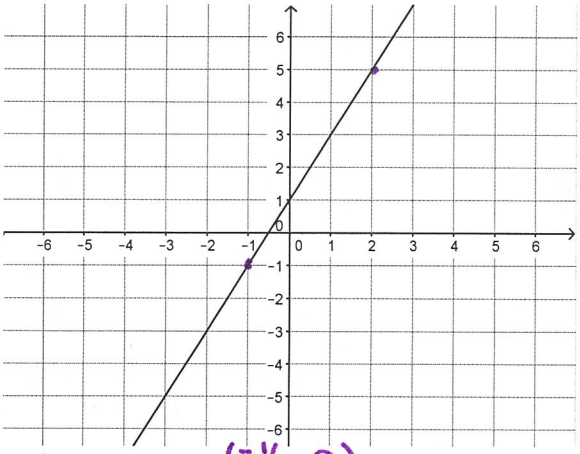
Explicit rule:

$f(x) = 40 \cdot \left(\frac{1}{2}\right)^{x-1}$

Module 4 Review

For each of the functions find the following information.

25.

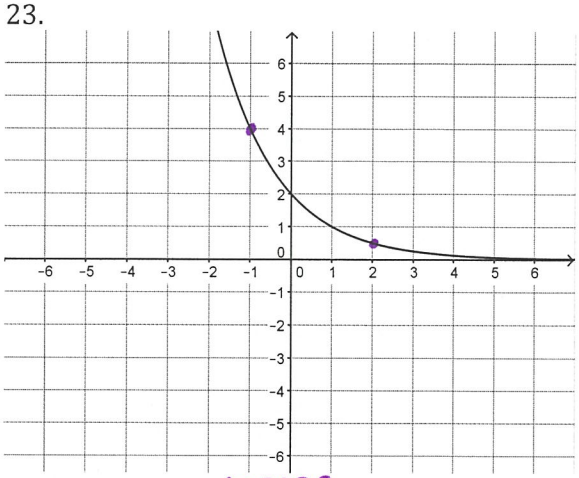


***x*- intercept:** $(-\frac{1}{2}, 0)$

***y*- intercept:** $(0, 1)$

Rate of change between $x = -1$ and $x = 2$ 2

23.

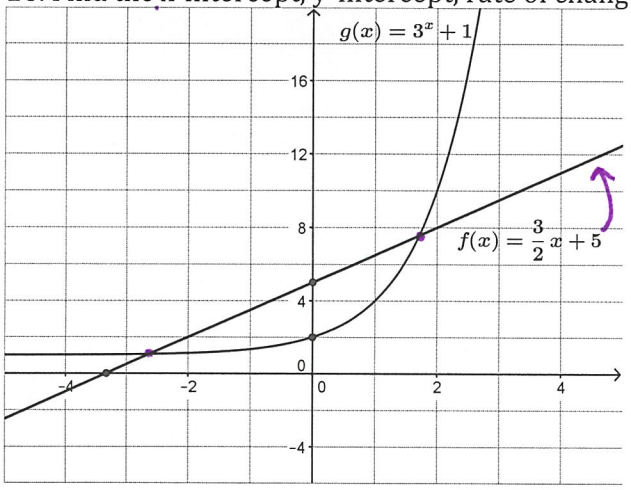


***x*- intercept:** none

***y*- intercept:** $(0, 2)$

Rate of change between $x = -1$ and $x = 2$ $\frac{3}{6}$

26. Find the x-intercept, y-intercept, rate of change of each function and where is f(x) >g(x)?



f(x)

x-int : $(\frac{-10}{3}, 0)$

y-int : $(0, 5)$

rate of change : $\frac{3}{2}$

$0 = \frac{3}{2}x + 5$

$\frac{2}{3} \cdot -5 = \frac{3}{2}x \cdot \frac{2}{3}$

$\frac{-10}{3} = x$

g(x)

x-int : none

y-int : (0, 2)

rate of change : not constant

f(x) > g(x) on the interval (-2.75, 1.75)

27. Write an explicit formula to model the number of dots per day.

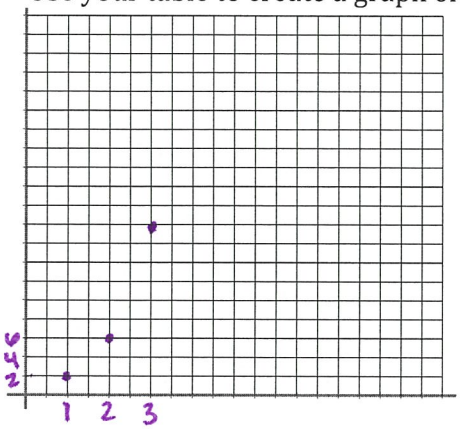
Day 1 Day 2 Day 3 $r = 3$

$f(x) =$ $2 \cdot 3^{x-1}$

Model the function using the table provided:

Day	Number of Dots
1	2
2	6
3	18
4	54

Use your table to create a graph of the function:



28. Bank Plans:

Suppose you worked mowing lawns all summer and earned $100. Two savings institutions, Linear Luck and Exponential Experiment want you to let them "hold onto your money" for a while.

Linear Luck: This savings plan will add $100 to your balance for every month that you leave your money in the account.

Exponential Experiment: This savings plan will multiply your balance by 2 every month that you leave your money in their account.

Analyze the plans: Write the explicit function for each account, and decide which account is best at what time

Linear Luck

x	y
0	100
1	200
2	300

$f(x) = 100x + 100$

Exponential Experiment

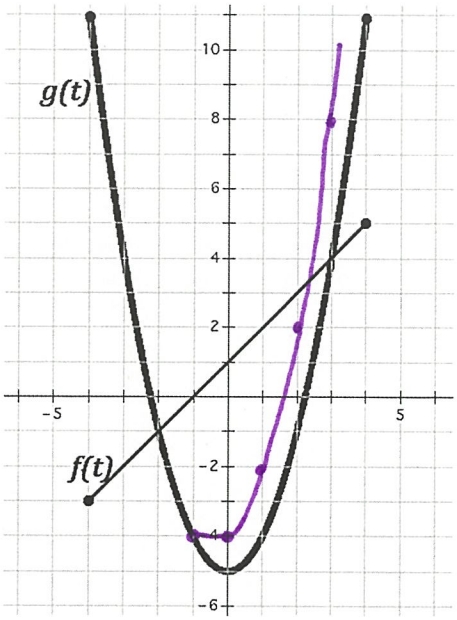
x	y
0	100
1	200
2	400

$f(x) = 100 \cdot 2^x$

This is the better option.

Module 5 Review

Consider the linear graph of $f(t)$ and the nonlinear graph of $g(t)$ to answer questions 9-14. Approximations are appropriate answers.



29. Where is $f(t) = g(t)$? (-2,-1) and (3,4)

30. Where is $f(t) > g(t)$? (-2,3)

31. What is $f(0) + g(0)$? -4

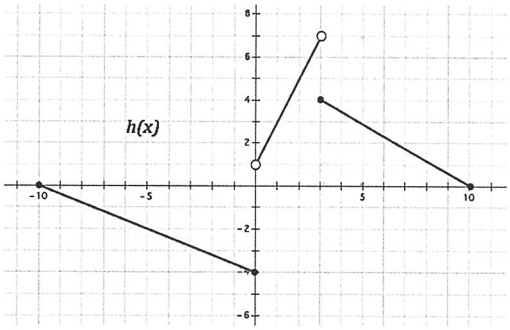
32. What is $f(-1) + g(-1)$? -4

33. Which is greater: $f(0)$ *or* $g(-3)$? g(-3)

34. Graph: $f(t) + g(t)$ from $[-1,3]$ →

t	f(t)+g(t)
-1	-4
0	-4
1	-2
2	2
3	8

35. Use the graph to answer the following questions?



a. Where is the graph increasing? (0,3)
b. Where is the graph decreasing? (-10,0),(3,10)
c. What is the domain? [-10,10]
d. What is the range? [4,7)
e. Maximum Value?
f. Minimum Value? -4
g. When is h(x) > 0? (0,10)

36. Which of the following relations are functions?

- {(3, 1), (4, 5), (5,7), (3,1), (0, 0)} Not a function
- {(3, 1), (3, 5), (3,7), (3,2), (3, 0)} Not a function
- {(3, 1), (4, 1), (5,1), (2,1), (0, 1)} function
- {(2, 1), (4, 5), (7,7), (3,1), (5, 0)} function