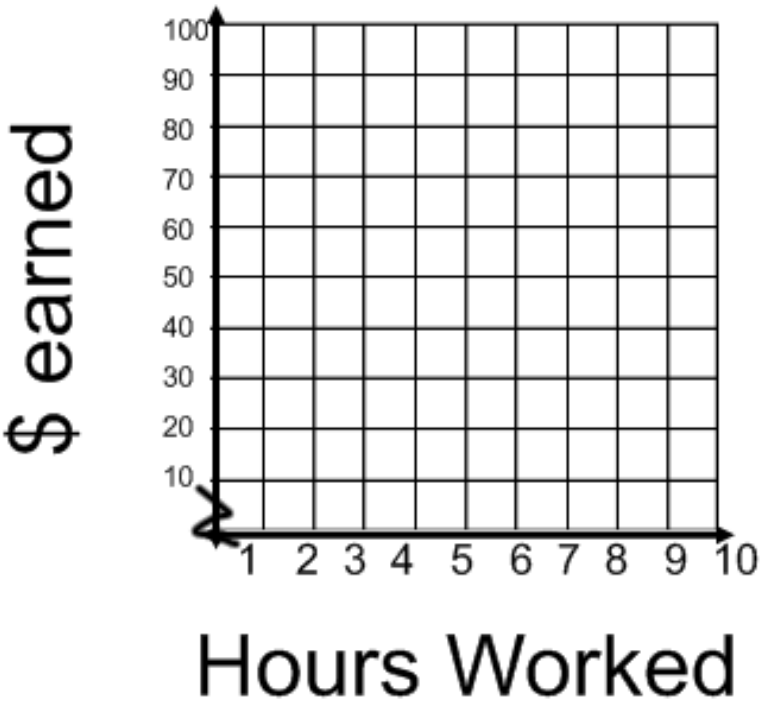
Linear Modeling Name:_____

1. Lizzy babysits on the weekends to earn extra money. She charges $10 flat plus $12 an hour. We can represents the amount of money that Lizzy earns by the following function : *b(x)*

$$b(x) = 10 + 12x$$

a. If LIzzy worked for 5 hours on Friday night, how much money did she make in total?

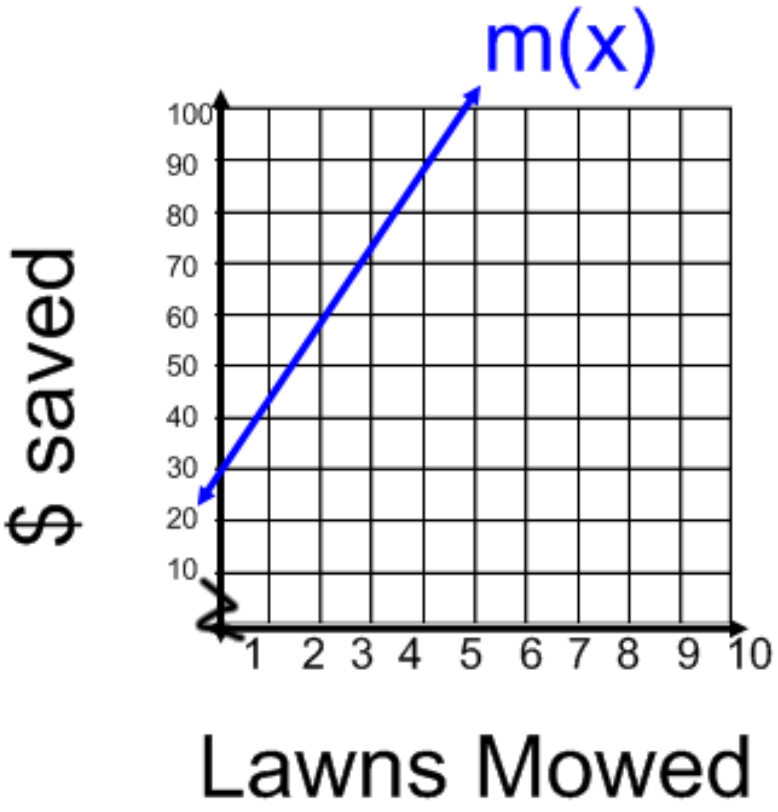
b. If LIzzy earned $46 on Saturday night, how many hours did she work?



c. Using your answers to part a and b, what are two points that you know are on the graph of the function of *b(x)*?

d. Use the grid to plot the points from part c. and graph your line and label it *b(x).*

2. Jarred is saving up to buy a new computer. To earn money he is mowing lawns. The amount of money Jarred starts with and is earning per lawn can be represented by a function *m(x)* and is graphed below:



a. How much money does Jarred start with before he mows any lawns?

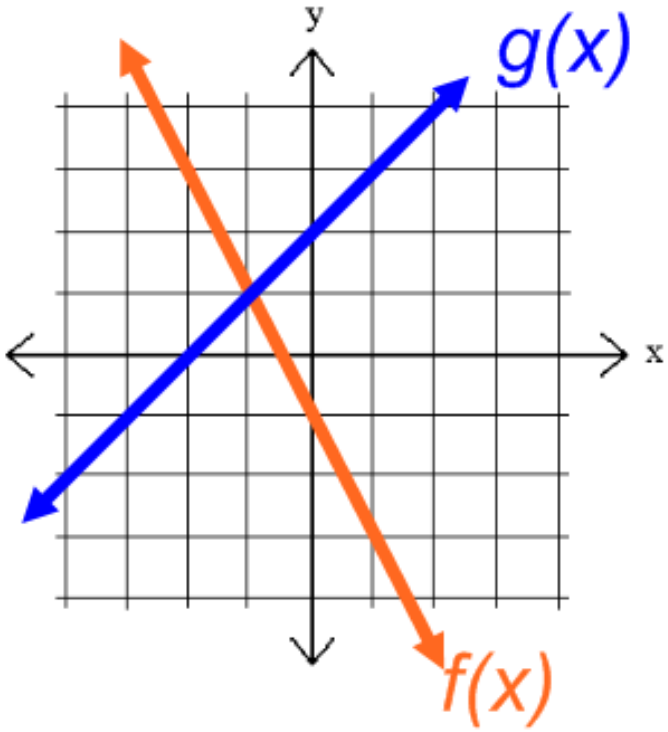
b. How much money will jarred have after he mows two lawns? So what is *m(2)*?

c. How many lawns will Jarred have mowed to have saved $90? So what does x equal when *m(x)* = 90?

d. How much money does Jarred earn per lawn?

e. If your answer from part a represents the y-intercept of the function and your answer from part d is the slope, what is the equation of *m(x)?*

3. Look at the graphs to the right and answer the following questions:



a. What are the coordinates of the points where *f(x) = g(x) ?*

b. What is *f(1)?* What is *g(1)*?

c. Which function has a greater value at x =1?

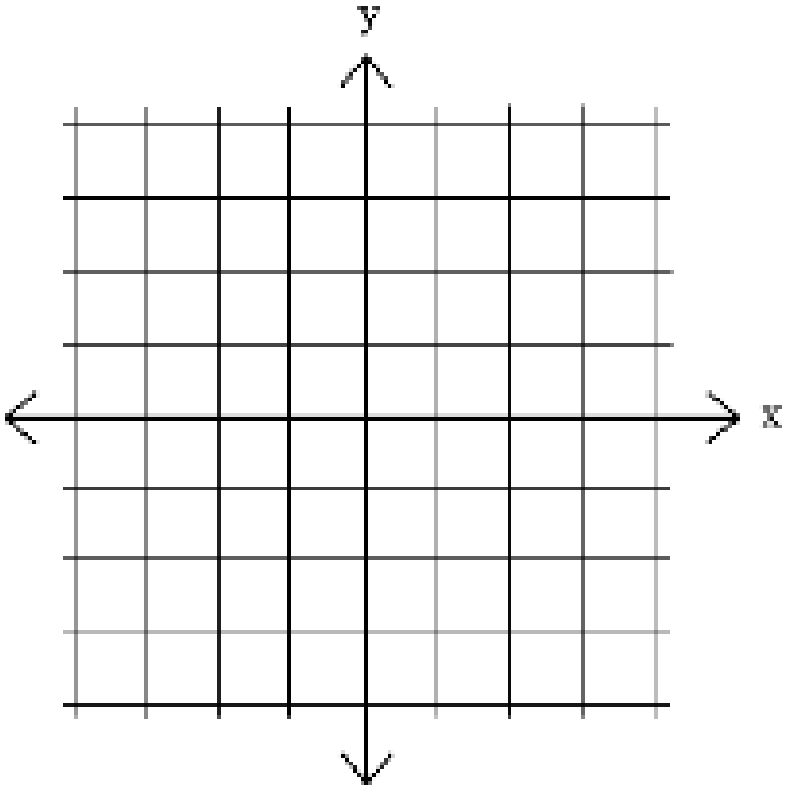
d. Give an example of an x value where *g(x) < f(x)*

e. When *f(x) = 3* what does x equal?

f. When *g(x) = 3,* what does x equal?

g. Find the equation of f(x)? Write the equation of g(x)?

4. Let $p(x) = x + 1$ and $q(x) = \frac{-1}{2}x - 2.$



a. Graph the two functions on an x-y grid and label them both as *p(x)* and *q(x).* (graph them in different colors if you can)

b. Find *p(-2)* and *q(-2).*

c. Find the x values for when *p(x) = -4* and *q(x) = -4*

d. Add the function *r(x) = -1* to your graph (choose a different color if you can).

e. What are the coordinates of the point where *p(x)=q(x)=r(x)*

5. Write the following equations:

1) through: $(-2, -3)$ and $(0, -4)$

2) through: $(0, 3)$ and $(4, 3)$

3) through: $(-1, -2)$, parallel to $y = 2x + 2$

4) through: $(-4, -1)$, perp. to $y = -\frac{4}{3}x + 5$