Initials: _____

1. Answer the following questions about the table below:

x	0	1	2	3	4	5
h(x)	-3	-2	-1	4	6	-1

(a) (3 points) Does the table represent a function? **Explain** your answer in a sentence or two.

Yes!

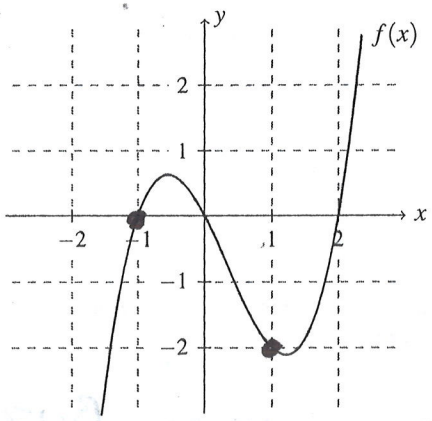
(b) (5 points) Evaluate the following:

$h(0) =$ $\boxed{-3}$ $h(h(3)) =$ $\boxed{6}$ $h^{-1}(-2) =$ $\boxed{1}$

(c) (2 points) Solve for x when $h(x) = 6$?

$x =$ $\boxed{4}$ when does $h(x) = 6$?

2. Below is a graph of a function $f(x)$:



(a) (2 points) **Evaluate $f(-1)$ and $f(1)$?**

$f(-1) =$ $\boxed{0}$

$f(1) =$ $\boxed{-2}$

(b) (4 points) Compute the average rate of change of $f(x)$ on the interval $x = -1$ to $x = 1$. Write your **final answer** in the box below, and be sure to **show all work** to receive credit.

Average Rate of Change $=$ $\boxed{-1}$

$$\text{Avg}_{[a,b]}(f) = \frac{f(b) - f(a)}{b - a} = \frac{f(1) - f(-1)}{1 - (-1)}$$

$$= \frac{-2}{2} = -1$$

Initials: _____

3. Suppose that Buzz makes custom glass vases and that the cost, in Dollars, of ordering a vase from Buzz with a radius of r inches is $C(r) = 8.5r + 15$.

(a) (3 points) Find and interpret $C(12)$ within the context of this problem.

$C(12) = 117$

A vase of radius 12 in costs \$117.

(b) (3 points) Suppose that the smallest vases that Buzz makes have a radius of 1 inch and the largest have a radius of 12 inches. Based on this information what is the domain of $C(r)$?

$[1, 12]$

(c) (3 points) Notice that the range of $C(r)$ is the interval [23.5, 117]. Interpret the range of $C(r)$ in the context of the problem. Be sure to include the specific values and the units.

\$23.5 is the cheapest vase Buzz sells.

\$117 is the most expensive

Initials: _____

4. This problem involves equations of lines. Be sure to **show all work** on all parts to receive credit.

(a) (2 points) Find the equation of line A, which passes through the points $(1,2)$ and $(6,-3)$.

① Slope $m = \frac{-3-2}{6-1} = -1$

② PSF

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

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

(b) (2 points) Find the equation of line B, which has slope $\frac{3}{4}$ and passes through the point $(12,6)$.

PSF

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

$y = \frac{3}{4}(x-12)+6$

(c) (2 points) Find a line which is perpendicular to line B and has y-intercept of ~~$y=3$~~ $(0,3)$. intercept!!

① Slope of ⊥ line

$m = \frac{-4}{3}$

② $y = mx+b$

$y = -\frac{4}{3}x+3$

(d) (3 points) Where do the lines $y = x-2$ and $y = \frac{1}{3}x-5$ intersect? Give the (x,y)-coordinates of the point where these lines intersect. Write your **final answer** in the box below, and be sure to **show all work** to receive credit.

Point of Intersection = [ ]

$x-2 = \frac{1}{3}x-5$

Solve for x

Solve for y

Initials: _____

5. Suppose that the dark lord Sauron has a jewlery store specializing in rings which he sells for \$525 each. He leases his space for \$3000 every month and each ring costs him \$150 to make.

   (a) (3 points) Write a function $C(r)$ which gives Sauron's expenses for a month in which he sells r rings.

$C(r) = 150r + 3000$

   (b) (3 points) Interpret the meaning of $C(9) = 4350$. Include units in your answer.

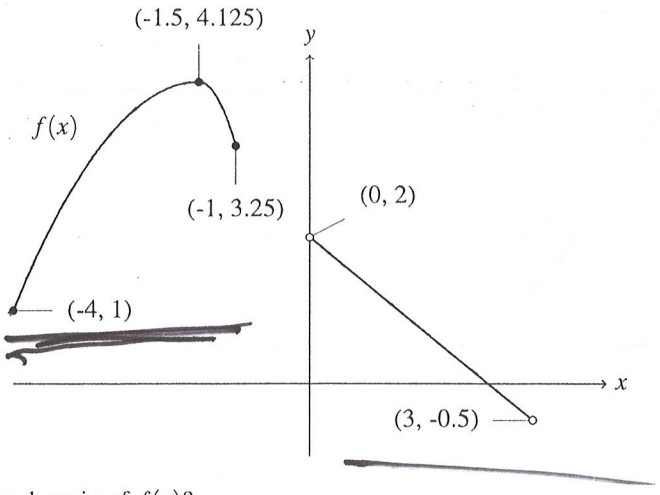
How ~~For~~ 9 rings

To make 9 rings it costs Sauron \$4350.

   (c) (3 points) Note that the revenue Sauron makes each month is $R(r) = 525r$. How many rings does Sauron need to sell so that his revenue equals his cost?

Initials: _____

6. Below is a graph of a function $f(x)$ with some (x, y)-coordinate points labeled:



(a) (2 points) What is the domain of $f(x)$?

Domain of $f(x)$: $[-4, -1] \cup (0, 3)$

(b) (2 points) What is the range of $f(x)$?

Range of $f(x)$: $(-0.5, 4.25]$

$[1, 4.25] \cup (-0.5, 2) \leftarrow$ okay

$= (-0.5, 4.25]$

7. (3 points) Consider the function $g(x) = \sqrt{x-4}$. What is the domain of $g(x)$?

Domain of $g(x)$: $[4, \infty)$

Interval notation

$x - 4 \geq 0$

$x \geq 4$

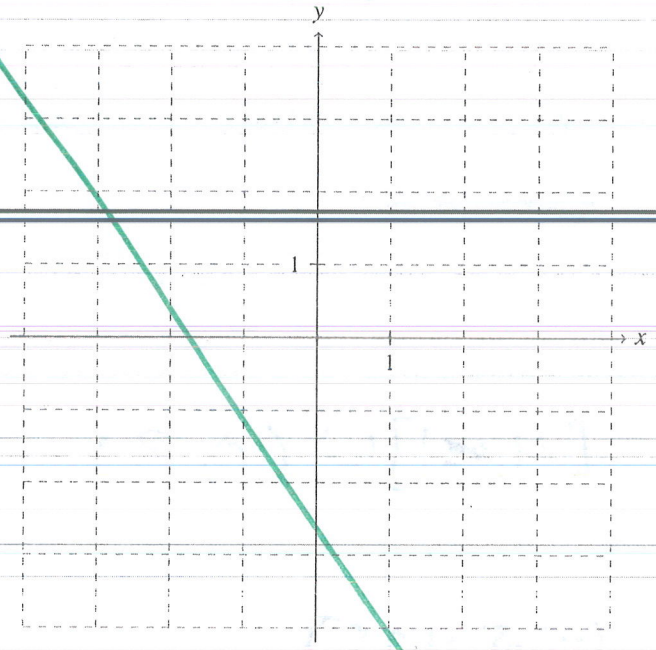
Inequality notation.

Initials: _____

8. Consider the function

$$f(x) = \begin{cases} -3 & x < -2 \\ x+2 & -2 \le x < 1 \\ 1 & x \ge 1 \end{cases}$$

(a) (4 points) **Draw a graph of the function $f(x)$ on the grid below.**



(b) (2 points) Find $f(-2)$ and $f(2)$.

$f(-2) =$ $\boxed{}$ $f(2) =$ $\boxed{}$

(c) (4 points) Suppose that $g(x) = x^2 - 1$. Find $g(f(-3))$ and $f(g(4))$. Be sure to **show all work** to receive credit.

$g(f(-3)) =$ $\boxed{}$ $f(g(4)) =$ $\boxed{}$