1) Determine whether the relation represents a function. If it is a function, state the domain and range. If it is not a function, explain why. $\{(6.22, 7.62), (6.222, 0), (\frac{5}{7}, 0), (0.714, -6)\}$

−15

It is not a function,
the input $\frac{5}{7}$ or 0.714
has 2 outputs.

These are
2 different
numbers

$\frac{5}{7} \neq 0.714$

2) If $f(x) = 6x^3 - 9x^2 - x + C$ and $f(2) = 1$, what is the value of C?
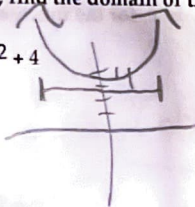
$6(2)^3 - 9(2)^2 - (2) + C = 1$

$48 - 36 - 2 + C = 1$

$10 + C = 1$

✓

$C = -9$

For problems 3-5, find the domain of the function.

3) $f(x) = x^2 + 4$

$D = (-\infty, \infty) \; \mathbb{R}$ ✓

4) $h(x) = \frac{x - 1}{x^3 - 81x}$

−1

$D = (-\infty, 9) \cup (9, \infty)$

$x \neq 9$

$x^3 - 81x = 0$

$x^2 = 81$

$x = 9$

$x(x^2 - 81) = 0$

$x(x-9)(x+9) = 0$

$x \neq 0, 9, -9$

5) $f(x) = \sqrt{13 - x}$

−2.5

$13 - x \geq 0$

$D = \mathbb{R} \; (-\infty, \infty)$

≤ 0

$x \leq 13$

6) Find, and simplify, $f(x - 1)$ when $f(x) = x^2 - 3x + 3$.

−.5

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

✓

$x^2 + 2x + 2 - 3x + 3 + 3$

$x^2 - x + 8$

9.5

7) For $f(x) = 3x - 4$; and $g(x) = 2x - 5$

Find and simplify $f \cdot g$.

$$(3x-4)(2x-5)$$

$$f(x)g(x) = 6x^2 - 15x - 8x + 20 \checkmark$$

$$\boxed{6x^2 - 23x + 20}$$

8) Find $\left(\frac{f}{g}\right)(-2)$ when $f(x) = 2x - 5$ and $g(x) = 2x^2 + 14x + 4$.

$$\frac{2x-5}{2x^2+14x+4} = \frac{2(-2)-5}{2(-2)^2+14(-2)+4} = \frac{-9}{-16} = \frac{9}{16} \checkmark$$

$$8-28+4$$

For problems 9 and 10, find and simplify the difference quotient of f, $\frac{f(x + h) - f(x)}{h}$, $h \neq 0$, for the function.

9) $f(x) = x^2 + 5x + 6$

$$\frac{((x+h)^2 + 5(x+h) + 6) - (x^2 + 5x + 6)}{h} = \boxed{h + 2x + 5}$$

$\bigcirc -,5$

$$\frac{h^2 + 7h + x}{h}$$

$$\frac{x^2 + 2hx + h^2 + 5x + 5h + 6 - x^2 - 5x - 6}{h} \quad \frac{h^2 + 2hx + 5h}{h}$$

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

$\bigcirc -1$

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

$$\frac{-2h}{h} \qquad \frac{-1}{2x(x+h)}$$

$\bigcirc 8.5$

Quiz 2.2-2.4   Bernardi   c+

1) Use the graph of f given below to answer the following questions:

X	Y
-10	6
-6	0
0	-6
8	4
10	0

a) Find f(-10).

$$f(-10) = 6$$

b) Is f(8) positive or negative?

$$f(8) = 4 \ldots \text{ So positive}$$

c) For what numbers x is f(x) = 0?

$$y = 0 \quad \text{when } x = -6 \quad , 7, \text{ and } 10$$

-6

d) What is the range of f?

$$[-8, 6) \cup]$$

(-.5)

e) When does f(x) = -4?

$$y = -4 \qquad f(6) = -4 \qquad x = 6$$

2) Given the function $f(x) = \dfrac{x^2 - 25}{x - 9}$, find the domain and x- and y-intercepts, if any, of the graph of f.

$$f(x) = x + \tfrac{25}{9}$$

$$D: (-\infty, \infty) \qquad y\text{-int}: \tfrac{25}{9} \checkmark$$

$$R: (-\infty, \infty) \qquad x\text{-int}: -\tfrac{25}{9} \pm 5$$

$$D: x \neq 9$$

-2

3) Find an equation of the secant line containing (1, f(1)) and (2, f(2)).

$$f(x) = x^3 - x$$

$$f(1) = 0 \quad (1, 0) \qquad f(2) = 6 \quad (2, 6)$$
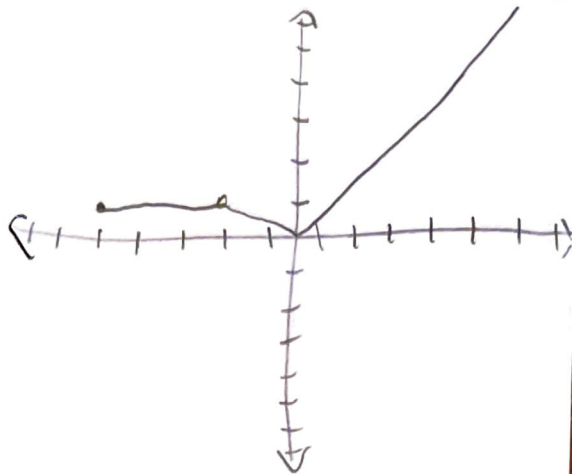
$$\frac{6 - 0}{2 - 1} = \frac{6}{1} = 6 \qquad y = 6x - 6$$

$$f(x) = 6x - 6 \checkmark$$

4) Answer the quaestions based on the following function.

$$f(x) = \begin{cases} 1 & \text{if } -6 \le x < -2 \\ |x| & \text{if } -2 \le x < 9 \\ \sqrt{x} & \text{if } 9 \le x \le 36 \end{cases}$$

(a) What is the domain of f(x)?

-.5

$[-6, \infty)$
$36]$

(b) What is the y-intercept?

$(0,0)$ ✓

(c) Find f(9)

$y = 3 \qquad f(9) = 3$ ✓

(d) Find f(-7)

$y = $ undefined Does not exist

(e) What is the x-intercept?

$(0,0)$ ✓

5) Given the function $f(x) = \dfrac{x^2 - 3}{x - 1}$, is the point $(-2, -\frac{1}{3})$ on the graph of f?

$$f(-2) = \frac{(-2)^2 - 3}{(-2) - 1} = \frac{1}{-3} = -\frac{1}{3} \qquad (-2, -\frac{1}{3}) \text{ IS} ✓$$

on the graph

6) Use a graphing utility to graph the function over the indicated interval and approximate any local maxima an minima.

$x-2 \quad y+2$

f(x) = x³ - 3x + 1, (-2, 2)

local max: $(-1, 3) = \cancel{(-2, 5)}$ $(-1, 3)$
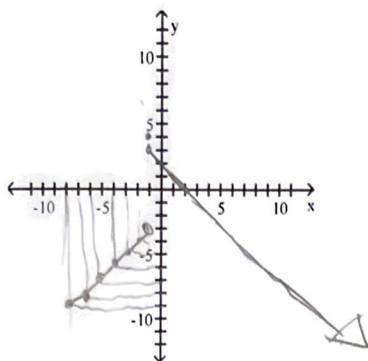
-.5

local min: $(1, -1) = \cancel{(-1, 1)}$ $(1, -1)$

Dec: $(-1, 1)$

Inc: $(-\infty, -1) \cup (1, \infty)$

7) Graph the function.

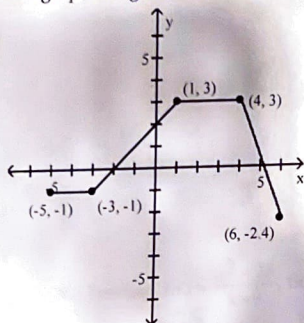$$f(x) = \begin{cases} x-2 & \text{if } -8 \le x < -1 \\ 4 & \text{if } x = -1 \\ -x+2 & \text{if } x > -1 \end{cases}$$

$D: [-8, \infty)$

$R: (-\infty, 4]$

8) Use the graph of f given below to answer the following questions:

(1, 3)   (4, 3)

(-5, -1)   (-3, -1)

(6, -2.4)

a) Where is f(x) increasing?

$(-3, 1)$

b) What are the local minimum?

-5 -1, -2.4 $(-5, -1)$ $(-3, -1)$ $(6, -2.4)$

c) When do the local minimum occur?

-5 when $x = 6$, $x = -3$, $x = -5$

$(-5, -3)$

d) What are the extreme maximum and minimum

-5 max: $(1, 3)$ $(4, 3)$ 3

min: $(6, -2.4)$ -2.5

Name __SUTTON__   Period __2__   Date____

$\dfrac{F}{}$

$y = f(x)$ $\begin{array}{c|c} x & y \\ \hline -2 & 4 \end{array}$

For problems 1-3 , suppose the point (-2, 4) is on the graph of $y = f(x)$. Find a point on the graph of the given function.

(-1)

1) $y = f(x - 2)$ $x+2$ $\boxed{x - 2}$ $\begin{array}{c|c} & y \\ \hline -4 & 4 \end{array}$ $(-4, 4)$

2) $y = f(x) - 2$

$\begin{array}{c|c} x & y-2 \\ \hline -2 & 2 \end{array}$ $(-2, 2)$ ✓

(-1)

3) $y = 2f(x+1) + 4$

$x-1$ $\boxed{x+1}$ $\begin{array}{c|c} & 2y + 4 \\ \hline -1 & 8 \quad 12 \end{array}$ $(-1, 8)$

(-1)

4) Suppose that the x-intercepts of the graph of $y = f(x)$ are 5 and -8. What are the x-intercepts of $y = 2f(x + 6)$?
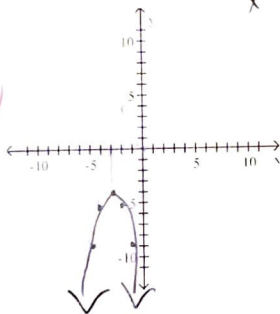
$\begin{array}{c|c} x & y \\ \hline 5 & 0 \\ -8 & 0 \end{array}$ $x-6$ $\boxed{x+6}$ $\begin{array}{c|c} & 2y \\ \hline 11 & 0 \\ -2 & 0 \end{array}$ $(11, 0)$

$(-2, 0)$

(-1.5)

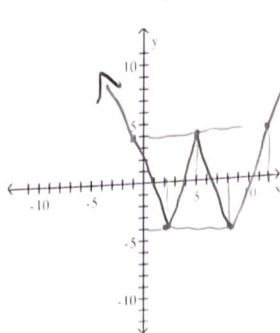5) Graph $f(x) = -(x - 3)^2 - 4$ using the techniques learned in class. Show your work
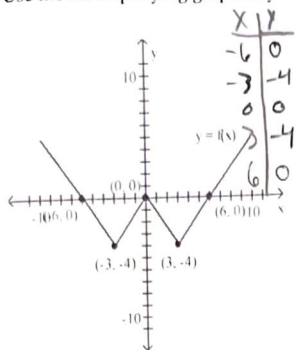
x^2 $\begin{array}{c|c} X & Y \\ \hline 2 & 4 \\ 1 & 1 \\ 0 & 0 \\ -1 & 1 \\ -2 & 4 \end{array}$ $x+3$ $\boxed{X-3}$ $\begin{array}{c|c} & -Y-4 \\ \hline -1 & -8 \\ -2 & -5 \\ -3 & -4 \\ -4 & -5 \\ -5 & -8 \end{array}$

y-intercept ?

6) Use the accompanying graph of $y = f(x)$ to sketch the graph of $y = 2f(-x + 5) + 4$

X	Y
-6	0
-3	-4
0	0
	-4
6	0

(0, 0) (6, 0)10 (-6, 0) (-3, -4) (3, -4) y = f(x)

-X +5	2y+4
11	4
8	-4
5	4
2	-4
-1	4

✓

7) Write the equation that results if the graph of $y = x^3$, is vertically stretched by a factor of 7 and horizontally translated to the right 4.

X	Y
2	8
1	1
0	0
-1	-1
-2	-8

X-4	7y
-2	56
-3	7
-4	0
-5	-7
-6	-56

$f(x) = 7(x^3)$

$$f(x) = 7(x-4)^3$$ ✓

8) Suppose the domain of $y = f(x)$ is [-2, 3] and the range is [1, 4].
What is the domain and range of $y = -2f(x+1)-3$?

X	Y
-2	1
3	4

X-1

X+1	-2y-3
-1	-5
4	-11

D: $[-1, 4]$

R: $[-5, -11]$

$[-11, -5]$