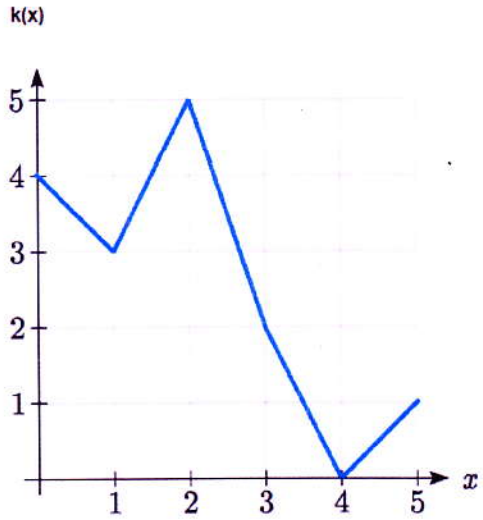
Chapter 1 Test Fall 2018 Name_____

Answers without supporting work may not receive full credit.
Use the functions defined below to answer following questions:

x	$f(x)$	$g(x)$
0	7	9
1	6	5
2	5	6
3	8	2
4	4	1
5	0	8
6	2	7
7	1	3
8	9	4
9	3	0



$$h(x) = \begin{cases} x^3+1 & \text{if } x<0 \\ 4 & \text{if } 0 \le x \le 3 \\ 3x+1 & \text{if } x>3 \end{cases}$$

$-7 = x^3 + 1$

$-8 = x^3$

$-2 = x$

(2 points each)

1. $(fg)(2)$

$g(2) = 6$

$f(2) = 5$ $\quad 5 \cdot 6 = 30$

2. $(h-g)(9)$

$h(9) = 28$

$g(9) = 0$

28

3. Find $f(k(3))$

$k(3) = 2$

$f(2) = \boxed{5}$

4. Find $h\left(f\left(g(k(1))\right)\right)$

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5. Evaluate $h^{-1}(-7)$

$h(x) = -7 \quad x = -2$

6. Evaluate $f(g^{-1}(2))$

$g(x) = 2 \quad x = 3 \quad f(3) \ \boxed{8}$

7. Evaluate $(f(2))^{-1}$

$\frac{1}{5}$

#4 ~~$k(1)=4$~~

$k(1)=3$

$g(3)=2$

$f(2)=5$

$h(5)=\boxed{16}$

2. (10 points) Find the domain of $f(x) = \frac{\sqrt{4-x}}{x+7}$

$x \neq -7$ and $4-x \geq 0$.

$x \leq 4$

$(-\infty, -7) \cup (-7, 4]$

4. (15 points) Let $f(x) = x^2 - x + 2$ and $g(x) = 2x - 1$, find each of the following. Simplify fully:

a) $\left(\frac{f}{g}\right)(x)$ and identify its domain

b) $(g - f)(x)$ and identify its domain

c) $f(g(x))$ and identify its domain

$\left(\frac{f}{g}\right)(x) = \frac{x^2 - x + 2}{2x - 1}$ $x \neq \frac{1}{2}$ or $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

b) $2x - 1 - (x^2 - x + 2) \rightarrow 2x - 1 - x^2 + x - 2$

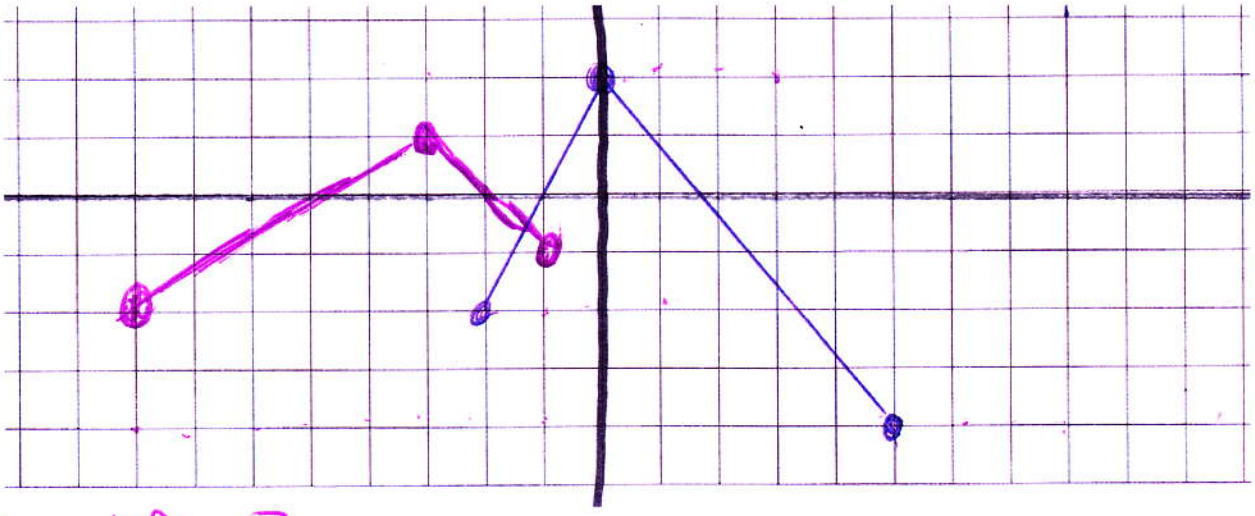
$-x^2 + 3x - 3$ all reals

c) $(2x-1)^2 - (2x-1) + 2$

$4x^2 - 4x + 1 - 2x + 1 + 2$

$4x^2 - 6x + 4$ Domain all reals

5. **(15 points)** Describe the transformation in English and use transformations to sketch the graph of $\frac{1}{2}f(-(x-3))$



Shifted RT 3
Reflected around y-axis
Vertically compressed by a factor of 2

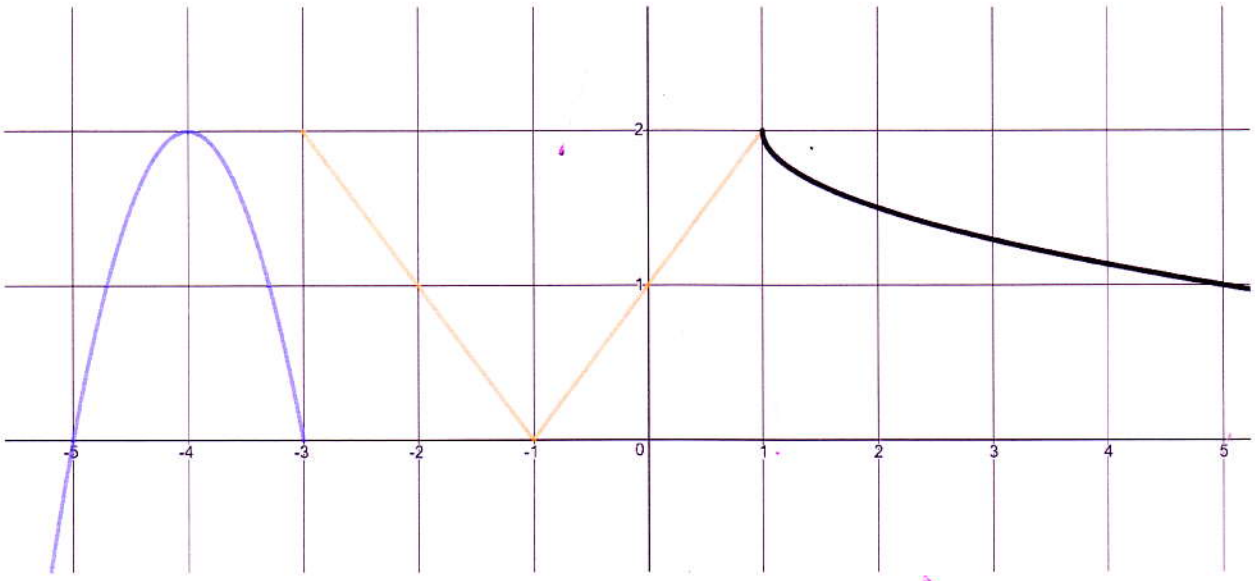
6. (5 points)

Create a table for $f^{-1}(x)$

x	3	5	7	13	15
$f(x)$	2	6	9	11	16

X	2	6	9	11	16
$f^{-1}(x)$	3	5	7	13	15

7. (20 points) Write a piece wise defined function for the graph below. Make sure to include the domain limits



$-2(x+4)^2+2$ on $(-\infty, -3)$

$|x+1|$ on $[-3, 1]$

$-\sqrt{\frac{1}{4}(x-1)}$ + on $(1, \infty)$

8. (10 points) In the last problem, State the intervals when the function is increasing and when it is decreasing. Also explain where the function is concave up and when it is concave down.

Increasing $(-\infty, -4) \cup (-1, 1)$

decreasing $(-4, -3) \cup (-3, -1) \cup (1, \infty)$

Concave up $(-3, 1)$

dom $(1, \infty)$

$-\infty, -3$

9. (10 points) Given the formula $Degrees\ C = \frac{5}{9}(Degrees\ F - 32)$ Find the inverse and function and describe what it finds for us in English.

$x = \frac{5}{9}(y-32)$

$\frac{9}{5}x = y - 32$

$y = \frac{9}{5}x + 32$

def := $\frac{9}{5}$ celcius + 32