Math 3 Unit 1 Test Review

Name: KEY

Use the k(x) to answer questions 1-2.
1. Graph the following function:

$$k(x) = \begin{cases} \frac{1}{2}x+4, & 0 \le x \le 2 \\ (x-3)^2+4, & 2 < x \le 5 \\ -2(x-5)+8, & 5 < x \le 9 \end{cases}$$

2. Use the equation or the graph to find the following:
   a. k(9) = __0__
   b. k(7.5) = 3
   c. k(1) = __4.5__
   d. k(2) = __5__
   e. k(3) = __4__
   f. k(4) = __5__
   g. k(5) = __8__
   h. k(8) = 2
   i. What is the domain of k(x)? [0, 9]
   j. What is the range of k(x)? [0, 8]

3. You are buying tee shirts for the math club. The pricing of the shirts is given by the following

$$c(x) = \begin{cases} 15x & \text{if } 1 \le x \le 10 \\ 12x & \text{if } 11 \le x \le 20 \\ 10x & \text{if } 21 \le x < \infty \end{cases}$$

function:
(where x is an integer)

   a. If 43 members of the math club order tee shirts, what is x? __43__
   What is the total cost of the tee shirts? __430__
   How much will each member pay? __10__

   b. If only 5 members of the club order tee shirts, how much will each member pay? __15__

   c. Which order costs less: 10 shirts or 11 shirts? __11 shirts__

   d. If 10 members want to buy shirts, how many shirts should be ordered so that each member gets a shirt and the cost is minimized? __x ≥ 21__
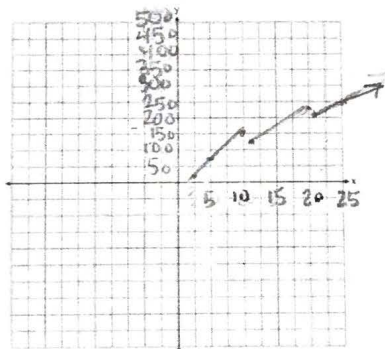
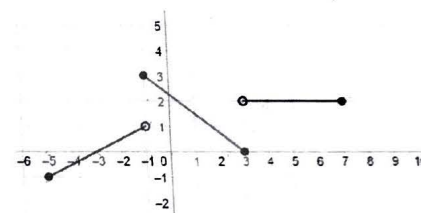4. Write the equation of $y = |x-3|$ in piecewise notation and graph.

$$f(x) = \begin{cases} -(x-3), & x < 3 \\ (x-3), & x \ge 3 \end{cases}$$
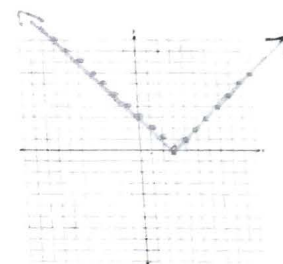
Use the graph in question 5 to answer questions 5-7.
5. Fill in the blanks to complete the equation of the following piecewise function:

$$f(x) = \begin{cases} \frac{1}{2}(x+5)-1, & -5 \le x < -1 \\ -\frac{3}{4}(x+1)+3, & -1 \le x \le 3 \\ 0(x-5)+2, & 3 < x \le 7 \end{cases}$$

6. Find the average rate of change of f(x) on each interval.

Interval	Average Rate of Change
-5 ≤ x ≤ -3	1/2
-1 ≤ x ≤ 3	-3/4
4 ≤ x ≤ 5	0

7. Find the value(s) of x where f(x) = 0.

$$f(0) = -\frac{3}{4}(0+1)+3$$
$$f(0) = -\frac{3}{4}(1)+3$$
$$f(0) = -\frac{3}{4}+\frac{12}{4} = \frac{9}{4}$$

x = __9/4__

8. Solve the following absolute value inequalities:

Inequality	Solution	Follow up question:
A. $\lvert x-3 \rvert < 5$ $X-3<5 \quad X-3>-5$ $X<8 \qquad X>-2$	$-2<X<8$	Is x = 8 in the solution set? NO
B. $\lvert x-3 \rvert > 5$ $X-3>5 \quad X-3<-5$ $X>8 \qquad X<-2$	$X>8 \;\; OY$ $X<-2$	Is x = 12 in the solution set? Yes
C. $\lvert x-3 \rvert \leq 5$	$-2 \leq X \leq 8$	Is x = 8 in the solution set? yes
D. $\lvert x-3 \rvert \geq 5$	$X \geq 8 \quad OY$ $X \leq -2$	Is x = -6 in the solution set? yes

$X-3 \leq 5 \qquad X-3 \geq -5$
$+3 \quad +3 \qquad\qquad +3 \quad +3$
$X \leq 8 \qquad\qquad X \geq -2$

$X-3 \geq 5 \qquad X-3 \leq -5$
$X \geq 8 \qquad\qquad X \leq -2$

9. Graph $y = (x-3)^2 - 4$ → down 4
↙ right 3
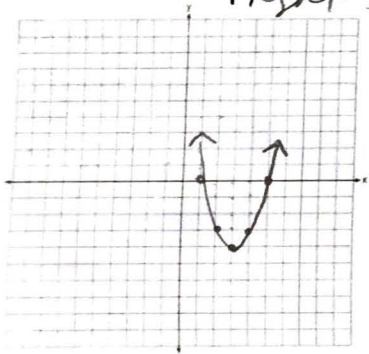
10. Write $g(x) = \lvert x+3 \rvert - 2$ as a piecewise function.

$$g(x) = \begin{cases} (X+3)-2 & X \geq -3 \\ -(X+3)-2 & X < -3 \end{cases}$$