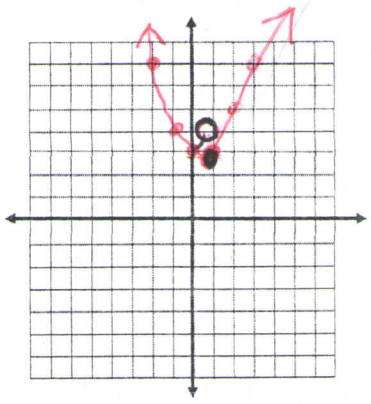
ICM Functions Worksheet #3

KEY

1. Graph each piecewise function:

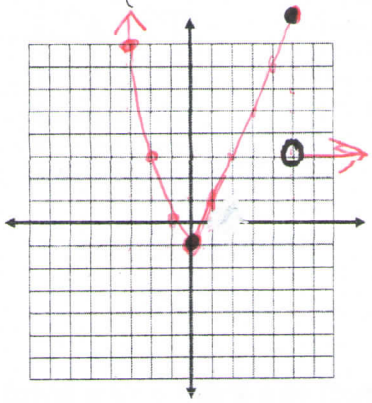
A.

$$f(x)=\begin{cases}2x+1 & x\geq 1\\ x^2+3 & x<1\end{cases}$$



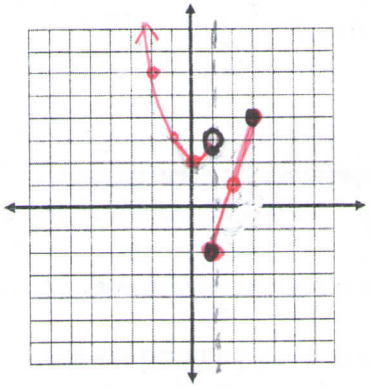
B.

$$f(x)=\begin{cases}x^2-1 & x\leq 0\\ 2x-1 & 0<x\leq 5\\ 3 & x>5\end{cases}$$



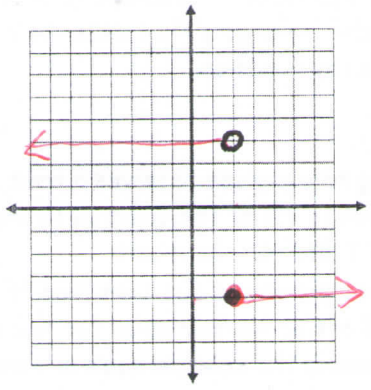
C.

$$f(x)=\begin{cases}x^2+2 & \text{if } x<1\\ 3x-5 & \text{if } 1\leq x\leq 3\end{cases}$$



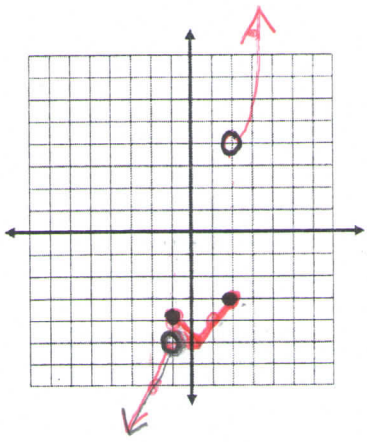
D.

$$f(x)=\begin{cases}3 & \text{if } x<2\\ -4 & \text{if } x\geq 2\end{cases}$$



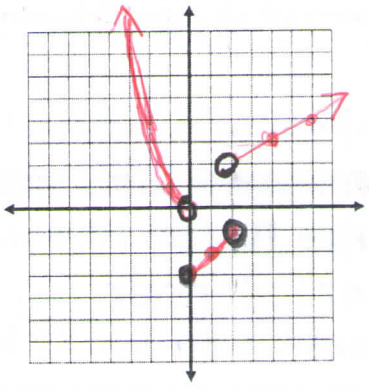
E.

$$f(x)=\begin{cases}2x-3 & \text{if } x<-1\\ |x|-5 & \text{if } -1\leq x\leq 2\\ x^2 & \text{if } x>2\end{cases}$$



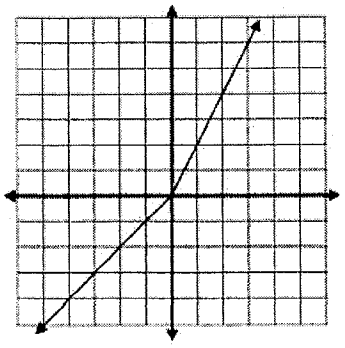
F.

$$f(x)=\begin{cases}x^2 & \text{if } x<0\\ x-3 & \text{if } 0\leq x<2\\ \frac{1}{2}x+1 & \text{if } x>2\end{cases}$$



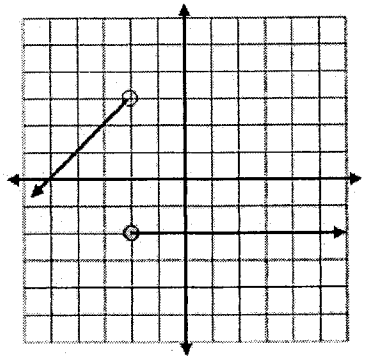
2. Write a piecewise function for each graph:

A.



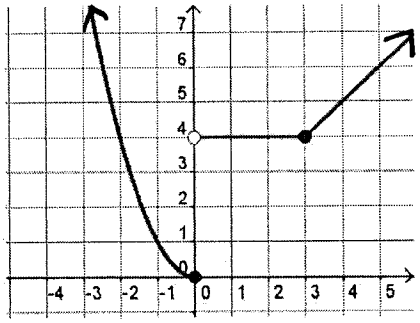
$$f(x) = \begin{cases} x, & x \leq 0 \\ 2x, & x > 0 \end{cases}$$

B.



$$g(x) = \begin{cases} x+5, & x < -2 \\ -2, & x > -2 \end{cases}$$

C.



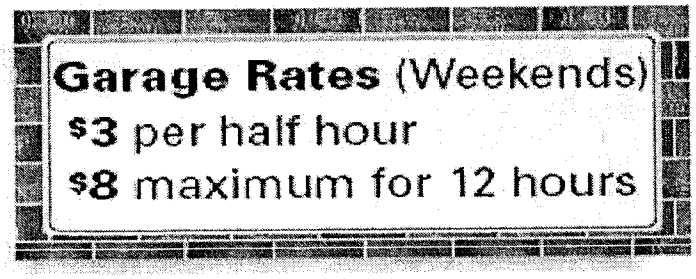
$$h(x) = \begin{cases} x^2, & x \leq 0 \\ 4, & 0 < x \leq 3 \\ x+1, & x > 3 \end{cases}$$

3. The minimum payment on a credit card is based on the total amount owed. A credit card company uses the following rules: For a bill less than $10 the entire amount is due. For a bill of at least $10 but less than $500, the minimum due is $10. There is a minimum of $30 due on a bill of at least $500 but less than $1000, a minimum of $50 due on a bill of at least $1000, but less than $1500, and a minimum of $70 is due on bills $1500 or more.
   a. Find the function f that describes the minimum payment due on a bill of x dollars.
   b. Graph the function.

4. An air conditioning salesperson receives a base salary of $2850 per month plus a commission. The commission is 2% of the sales up to and including $25,000 for the month and 5% of the sales over $25,000 for the month.
   a. Write a piecewise function that relates the salesperson's total monthly income based off or his/her sales for the month.
   b. Determine the salesperson's monthly income if his/her sales were $43,000 for the month.

5. You have a summer job that pays time and a half for overtime (if you work more than 40 hours per week). Beyond 40 hours, your compensation is 1.5 times your hourly rate of $8.00.
   a. Write a piecewise function that gives your weekly pay, P, in terms of the number of hours worked, x.
   b. How much will you make if you work 45 hours?

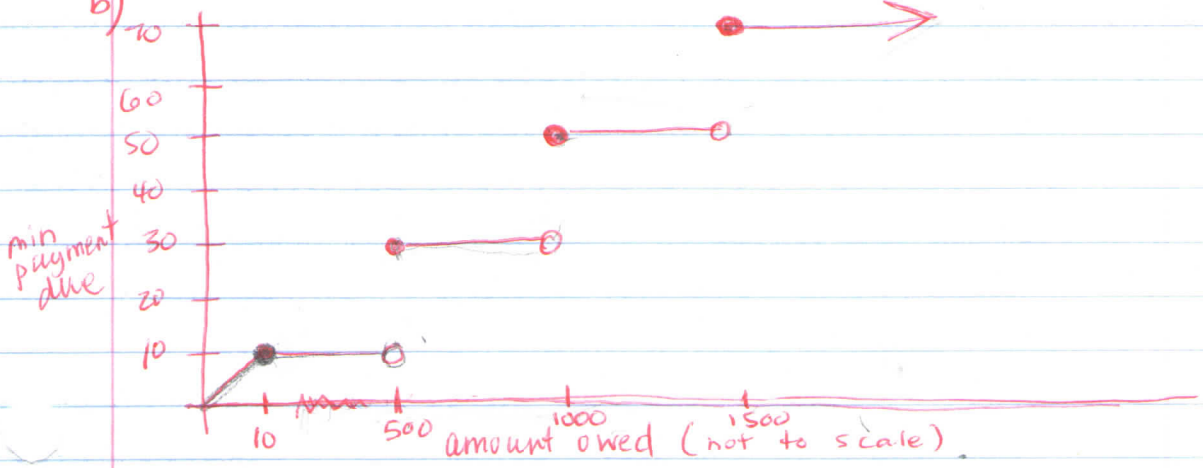
6. Write and graph a piecewise function for the following sign:



3a) Let x = amt. owed $f(x)$ = min. payment due

$$f(x) = \begin{cases} x, & x < 10 \\ 10, & 10 \le x < 500 \\ 30, & 500 \le x < 1000 \\ 50, & 1000 \le x < 1500 \\ 70, & x \ge 1500 \end{cases}$$

b)



4a) Let x = amt. of sales $f(x)$ = total monthly income

$$f(x) = \begin{cases} 2850 + .02x & 0 \le x \le 25000 \\ 2850 + .02(25000) + .05(x - 25000) & x > 25000 \end{cases}$$

b) \$2850 + .02(25000) + .05(43000 − 25000) = \$4250

5. x = # hrs worked $P(x)$ = weekly pay amt.

$$P(x) = \begin{cases} 8x, & x \le 40 \\ 8(40) + 12(x-40), & x > 40 \end{cases} \rightarrow 12x - 160$$

b) $12(45) - 160 =$ \$380

6. x = time $c(x)$ = cost to park

$$c(x) = \begin{cases} 3, & 0 < x \le 0.5 \\ 6, & 0.5 < x \le 1 \\ 8, & 1 < x \le 12 \end{cases}$$