

Sec. 4.4

Graphing Piecewise Functions with 2 Pieces

Part I. Carefully graph each of the following. Identify whether or not the graph is a function. Then, evaluate the graph at the specified domain value.

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

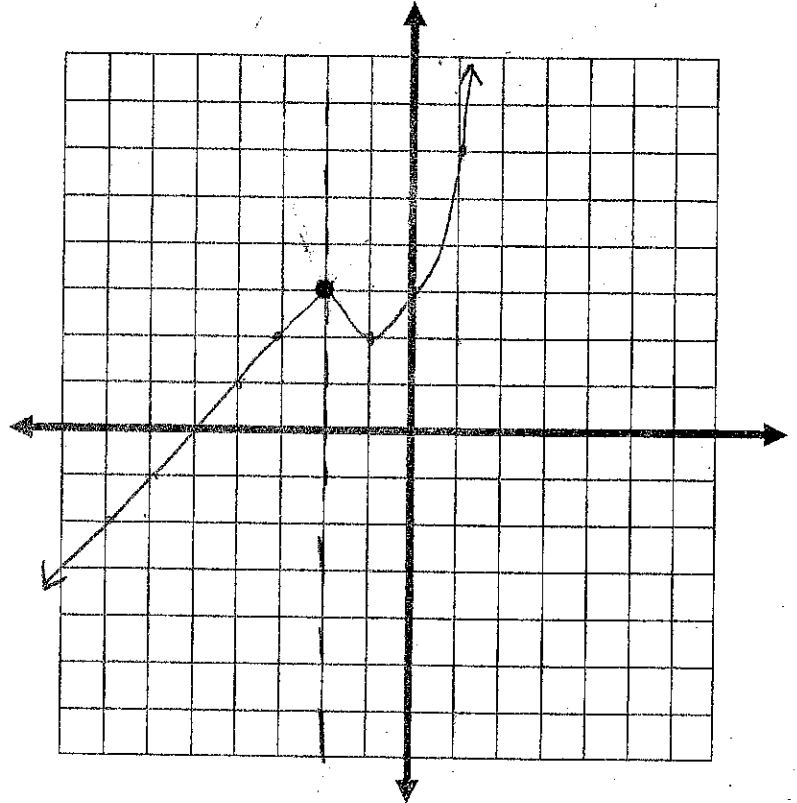
$(x+1)^2 + 2 \quad (-1, 2)$

Function? Yes or No

$f(3) = 18$

$f(-4) = 1$

$f(-2) = 3$



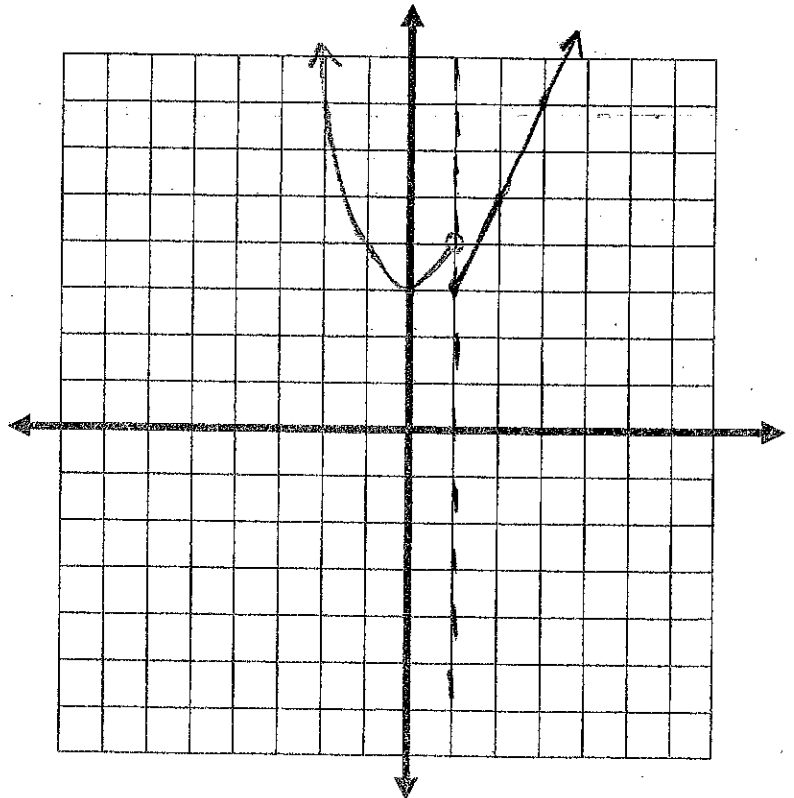
2. $f(x) = \begin{cases} 2x+1 & x \geq 1 \\ x^2+3 & x < 1 \end{cases}$

Function? Yes or No

$f(-2) = 7$

$f(6) = 13$

$f(1) = 3$



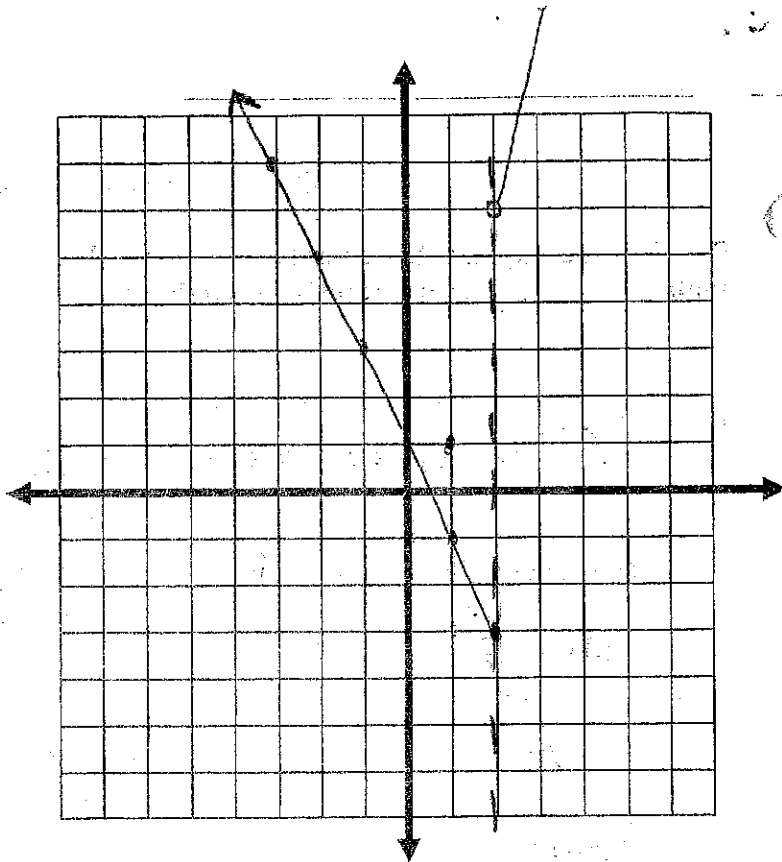
3. $f(x) = \begin{cases} -2x + 1 & x \leq 2 \\ 5x - 4 & x > 2 \end{cases}$

Function? Yes or No

$f(-4) = 9$

$f(8) = 36$

$f(2) = -3$



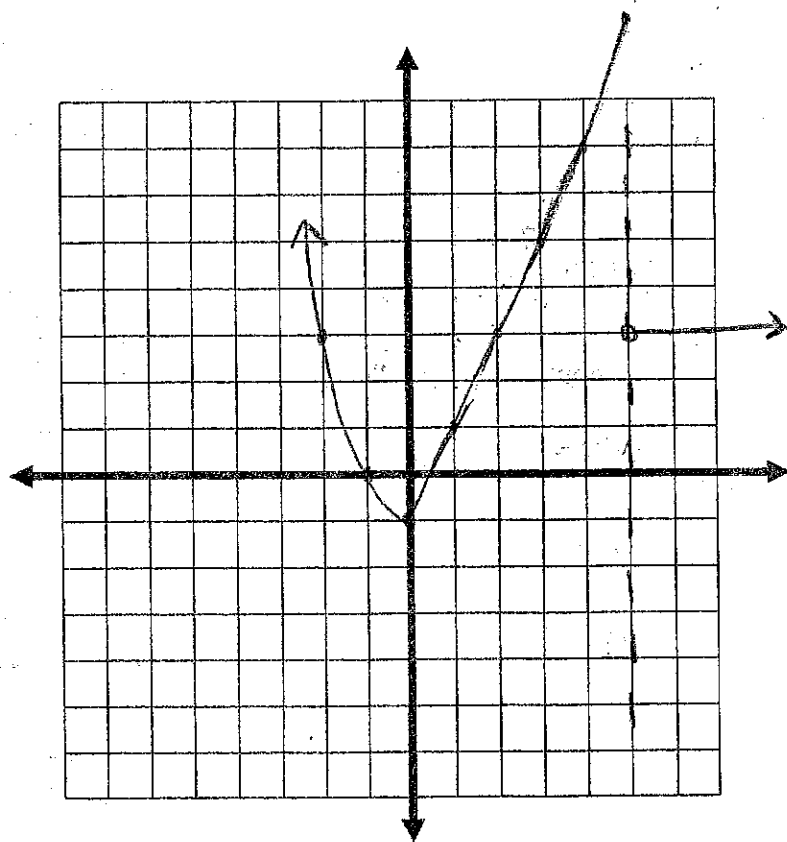
4. $f(x) = \begin{cases} x^2 - 1 & x \leq 0 \\ 2x - 1 & 0 < x \leq 5 \\ 3 & x > 5 \end{cases}$

Function? Yes or No

$f(-2) = 3$

$f(0) = -1$

$f(5) = 9$



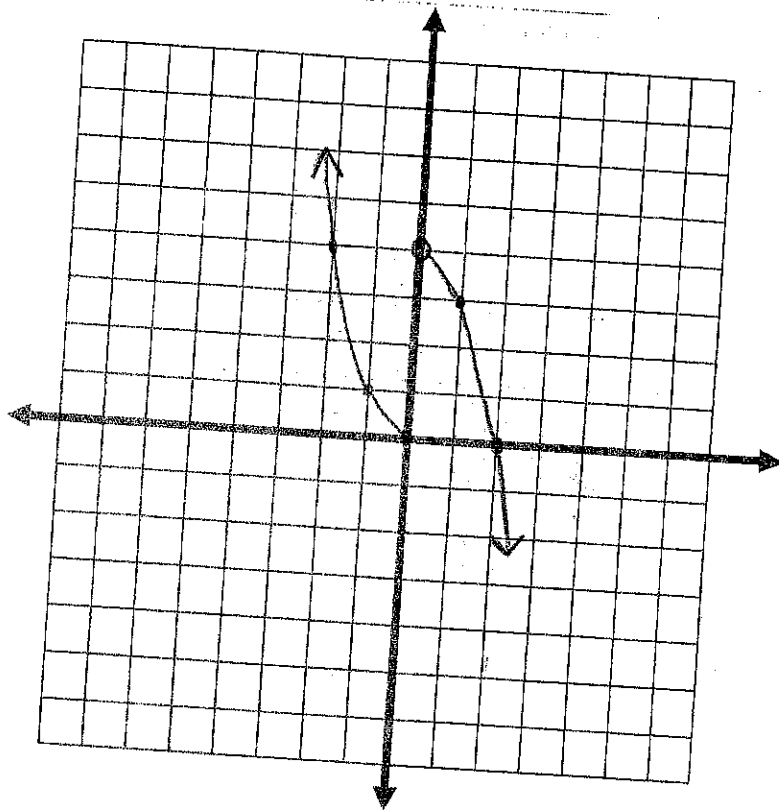
$$5. \quad f(x) = \begin{cases} x^2 & x \leq 0 \\ -x^2 + 4 & x > 0 \end{cases}$$

Function? Yes or No

$$f(-4) = 16$$

$$f(0) = 0$$

$$f(3) = -5$$



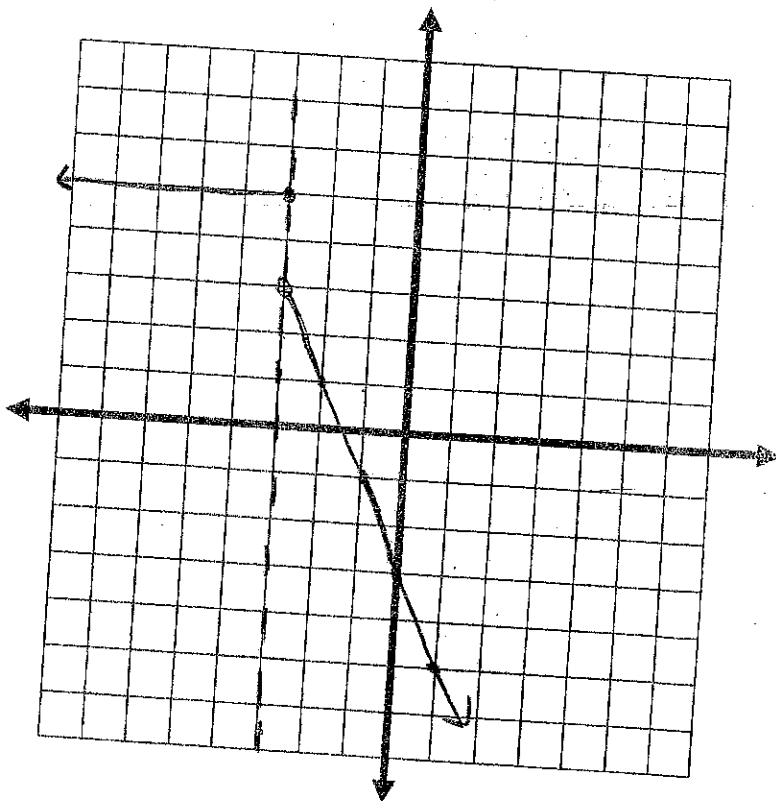
$$6. \quad f(x) = \begin{cases} 5 & x \leq -3 \\ -2x - 3 & x > -3 \end{cases}$$

Function? Yes or No

$$f(-4) = 5$$

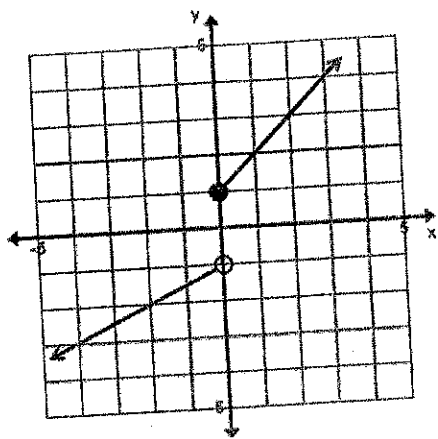
$$f(0) = -3$$

$$f(3) = -9$$



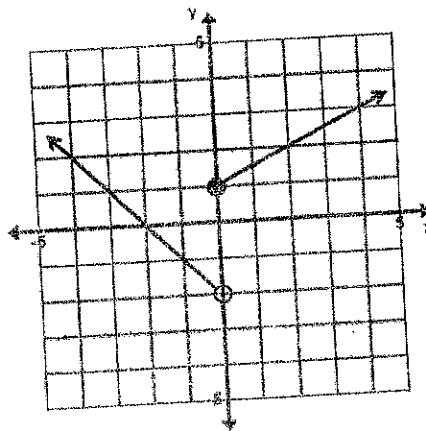
Part II. Write equations for the piecewise functions whose graphs are show below.

7.



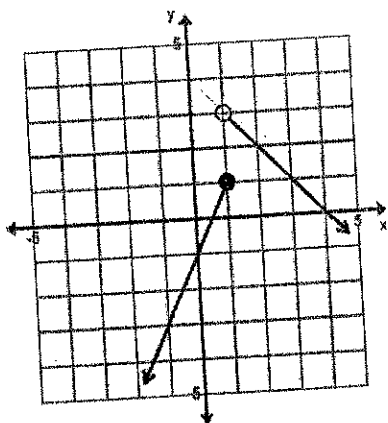
$$f(x) = \begin{cases} \frac{1}{2}x - 1 & x < 0 \\ x + 1 & x \geq 0 \end{cases}$$

8.



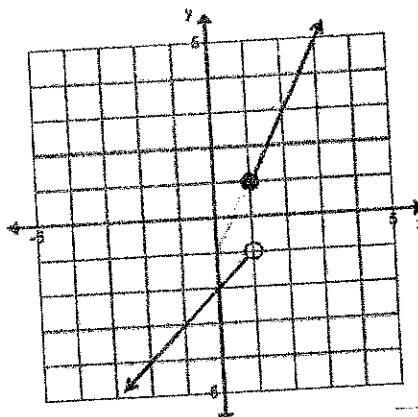
$$f(x) = \begin{cases} -x - 2 & x < 0 \\ \frac{1}{2}x + 1 & x \geq 0 \end{cases}$$

9.



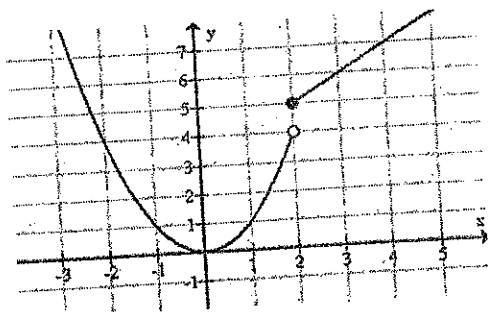
$$f(x) = \begin{cases} 2x - 1 & x \leq 1 \\ -x + 4 & x > 1 \end{cases}$$

10.



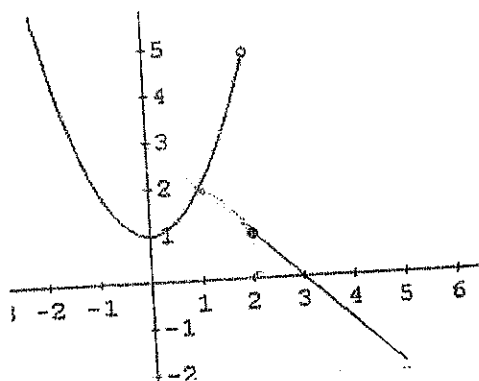
$$f(x) = \begin{cases} x - 2 & x < 1 \\ 2x - 1 & x \geq 1 \end{cases}$$

11.



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

12.



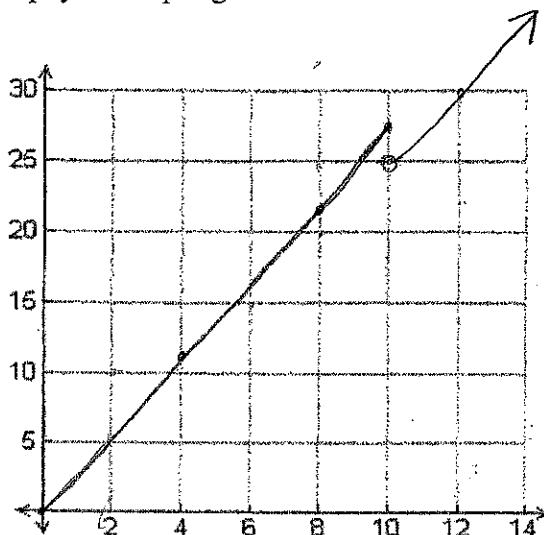
$$f(x) = \begin{cases} x^2 + 1 & x < 2 \\ -x + 3 & x \geq 2 \end{cases}$$

13. Erin buys gas at a self service station for \$2.75 a gallon. The gas station has a promotion going on that anyone who buys more than 10 gallons of gas, only has to pay \$2.50 per gallon. Erin's tank will hold 12 gallons of gas.

- a. Write a piece-wise function for the total cost $C(g)$ as a function of g gallons of gas.

$$C(g) = \begin{cases} 2.75g & 0 \leq g \leq 10 \\ 2.50g & g > 10 \end{cases}$$

- b. Graph the piecewise function.

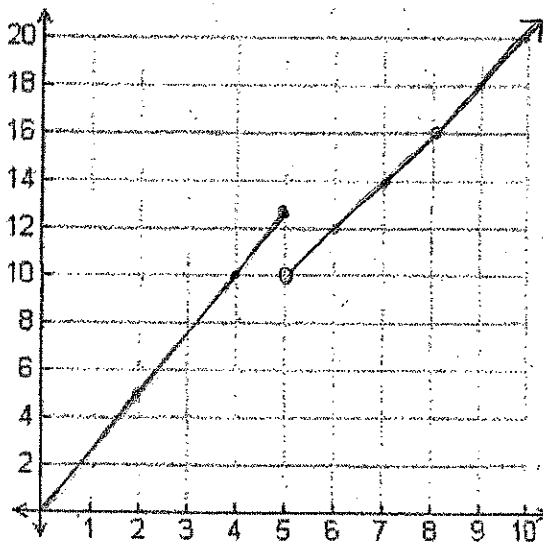


14. A supermarket has a discount on "family packs" of meat. Chicken costs \$2.00/lb for packages over 5 lbs. Smaller packages are \$2.50/lb. Express the cost as a function of weight.

- a. Write the piecewise function $C(w)$.

$$C(w) = \begin{cases} 2w & w > 5 \\ 2.5w & 0 \leq w \leq 5 \end{cases}$$

- b. Graph the function.



- c. Find: $C(3.5)$ and $C(6)$

$$C(3.5) = 2.5(3.5) \\ = \$8.75$$

$$C(6) = 2(6) = \$12$$

