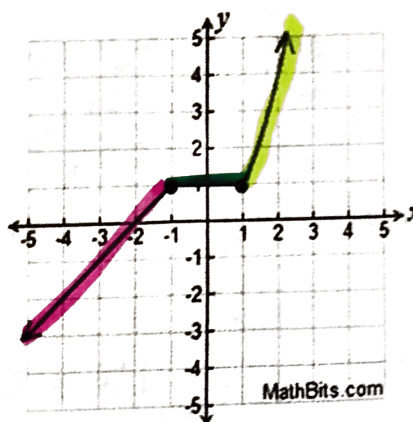# Graphing Piecewise Functions   *Key*

A piecewise defined function is a function defined ● at least two equation ("pieces"), each of which applies to a different part of the domain.

$$f(x) = \begin{cases} x+2; & x \le -1 \\ 1; & -1 < x < 1 \\ x^2; & x \ge 1 \end{cases}$$

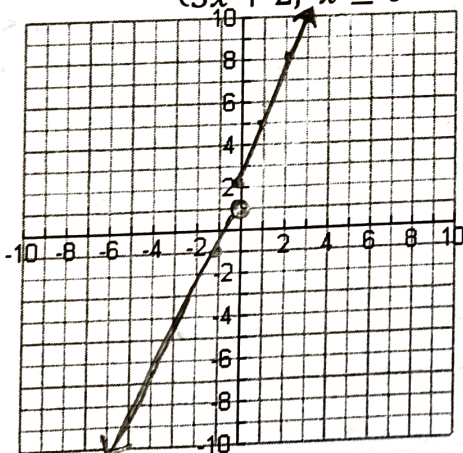Notice that each "piece" of the function has a specific constraint.

MathBits.com

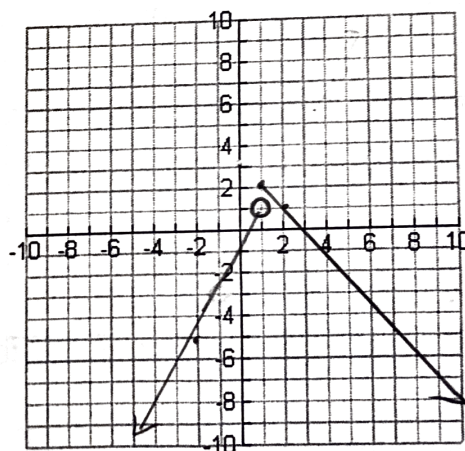1. $f(x) = \begin{cases} -\frac{1}{2}x + 4, & x \le 0 \\ (x-2)^2, & x > 0 \end{cases}$

Evaluate f(2), f(0), f(-4), f(6)

0   4   6   16

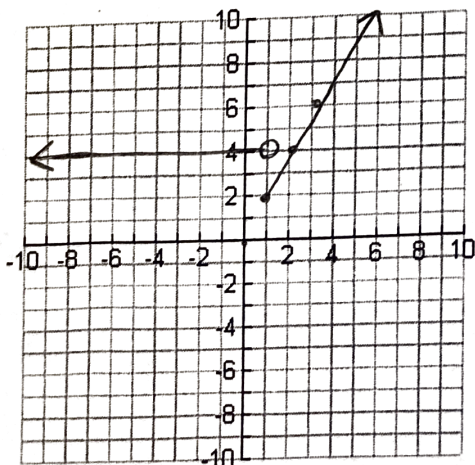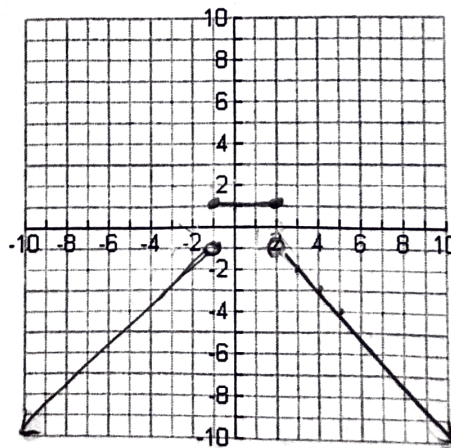2. $f(x) = \begin{cases} 2x + 1, & x < 0 \\ 3x + 2, & x \ge 0 \end{cases}$

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

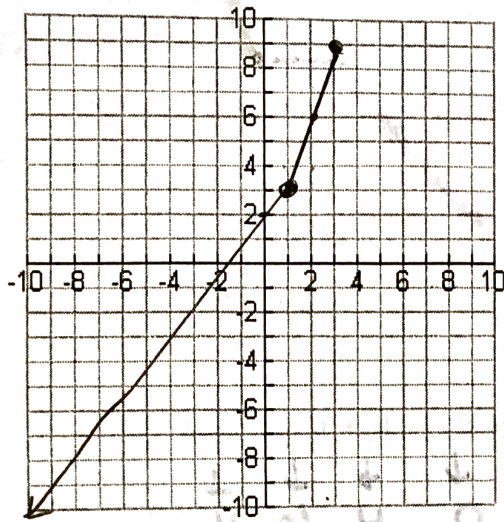4. $f(x) = \begin{cases} 2x, & x \ge 1 \\ 4, & x < 1 \end{cases}$

5. $f(x) = \begin{cases} x, & x < -1 \\ 1, & -1 \le x \le 2 \\ 1 - x, & x > 2 \end{cases}$

6. $f(x) = \begin{cases} x + 2, & x < 1 \\ 3x, & 1 \leq x \leq 3 \end{cases}$

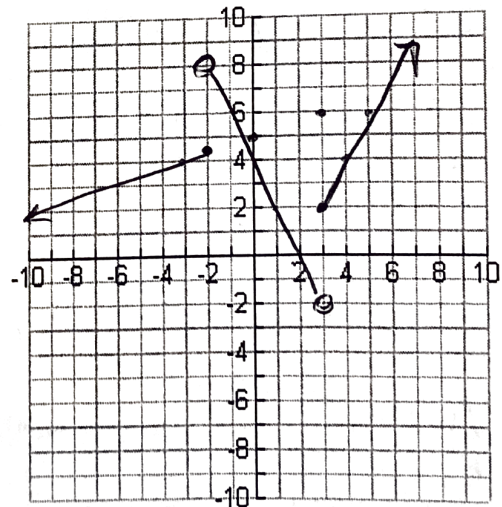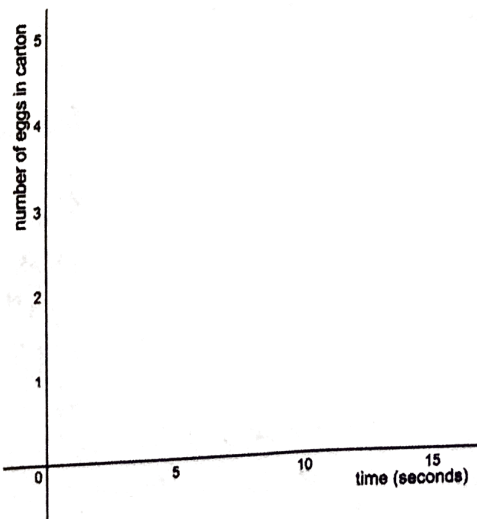7. $f(x) = \begin{cases} x - 8, & x < 2 \\ 2x - 6, & x \geq 2 \end{cases}$

8. $f(x) = \begin{cases} -5x + 2, & x \geq 0 \\ 2, & x < 0 \end{cases}$

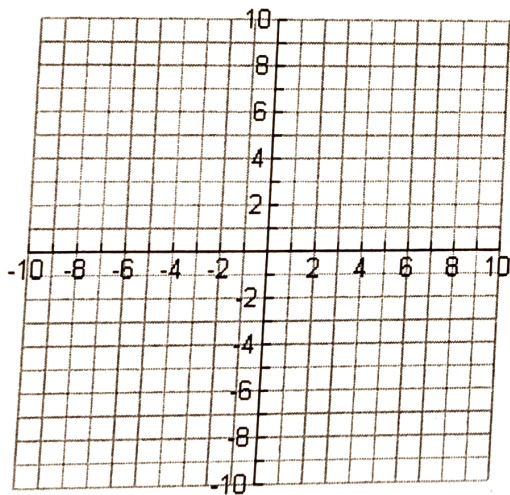9. $f(x) = \begin{cases} \frac{1}{3}x + 5 & x \leq -2 \\ -2x + 4 & -2 < x < 3 \\ 2x - 4 & x \geq 3 \end{cases}$
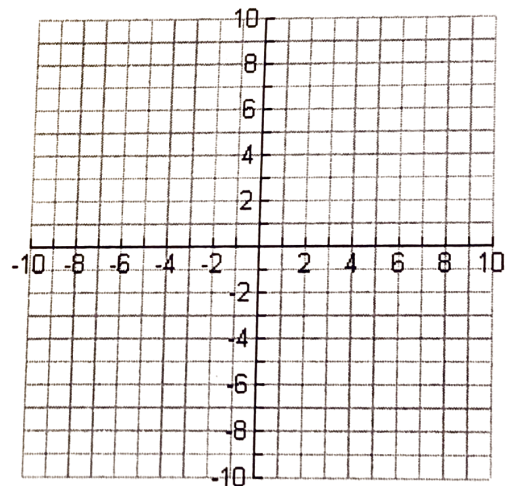

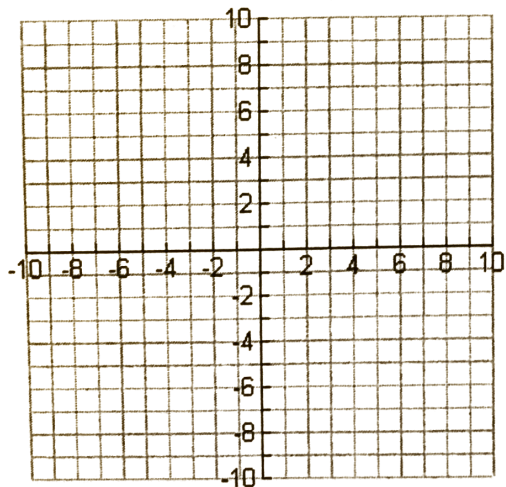Graphing a Story:

Graph the four piecewise functions:

1. $f(x) = \begin{cases} -3x, & x < 1 \\ 6, & x \geq 1 \end{cases}$

2. $f(x) = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$

3. $f(x) = \begin{cases} x + 6, & x \le -4 \\ 2x + 4, & x > -4 \end{cases}$

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