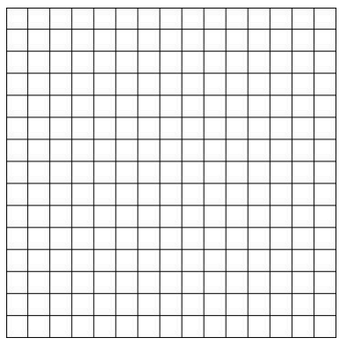
Name: _____ **Precalculus Unit 2, Lesson 6**

Aim: How do we graph piecewise functions?

I. Do Now:

1. Given $f(x) = x^2 - 2$
   (a) Find *a*, *b*, and *c*.
   (b) Find the axis of symmetry.
   (c) Substitute the *x*-value of the axis of symmetry into the equation to find the *y*-coordinate of the vertex.
   (d) Find $1a =$
   $3a =$
   $5a =$
   (e) Find $(0, c)$, the *y*-intercept.
   (f) Graph the parabola on the grid to the right.

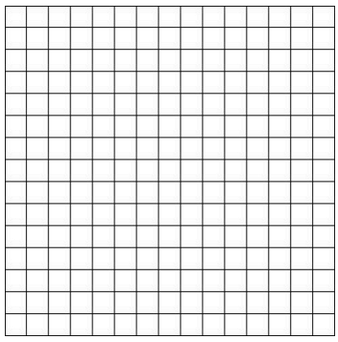


2. If $f(x) = \begin{cases} x^2 - 2, & x \le 1 \\ -x, & 1 < x \le 3 \\ -3, & x > 3 \end{cases}$

   Evaluate:
   (a) $f(-1)$
   (b) $f(2)$
   (c) $f(6)$

II. Development. Now, we'll graph the function in #2.

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



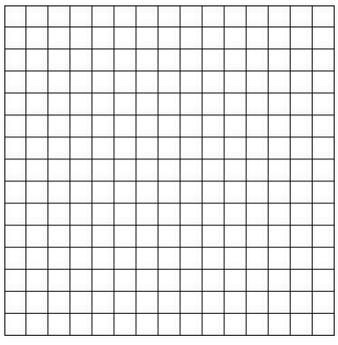
III. Definitions and Terminology

Vertical Line Test:

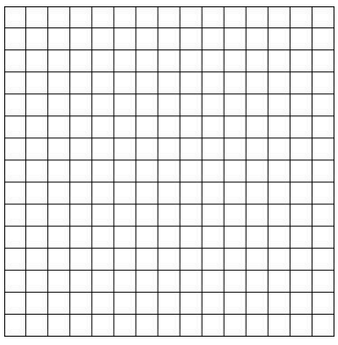
Continuous Function:

IV. Applications. Graph each piecewise function. State whether each is continuous or discontinuous.

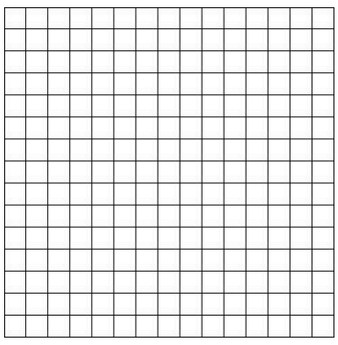
3. $g(x) = \begin{cases} -x + 2, & x \le 0 \\ 2, & 0 < x \le 3 \\ x, & x > 3 \end{cases}$



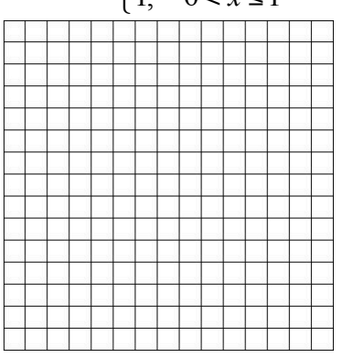
4. $h(x) = \begin{cases} 2, & x < -1 \\ -x + 1, & -1 \le x < 1 \\ x^2 - 2x + 1, & x \ge 1 \end{cases}$



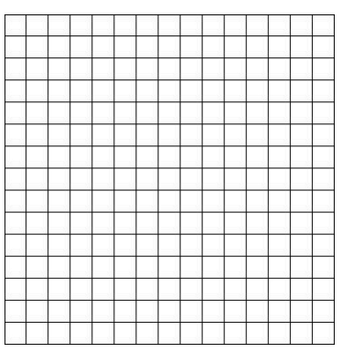
5. $h(x) = \begin{cases} (x+2)^2, & x \le -1 \\ x + 2, & -1 < x \le 2 \\ 5, & x > 2 \end{cases}$



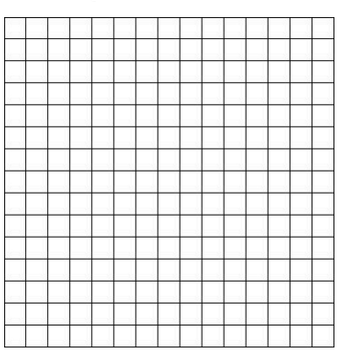
6. $f(x) = \begin{cases} 4, & 3 < x \le 4 \\ 3, & 2 < x \le 3 \\ 2, & 1 < x \le 2 \\ 1, & 0 < x \le 1 \end{cases}$



7. $g(x) = \begin{cases} x, & x \ge 0 \\ -x, & x < 0 \end{cases}$



8. $h(x) = \begin{cases} -x^2 - 4, & x \le 0 \\ 2x - 4, & 0 < x < 3 \\ 2, & x \ge 3 \end{cases}$



To graph a piecewise function on the graphing calculator:

$Y_1 = (4)(3 < x \text{ and } x \le 4) + (3)(2 < x \text{ and } x \le 3) +$
$(2)(1 < x \text{ and } x \le 2) + (1)(0 < x \text{ and } x \le 1)$

[Use 2nd MATH to enter inequality symbols.]

HW14
• Complete this sheet.