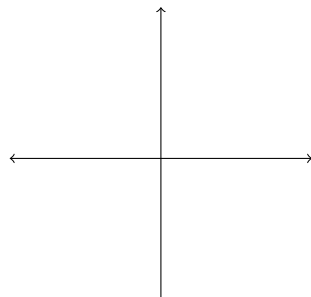
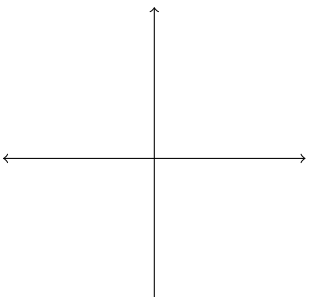


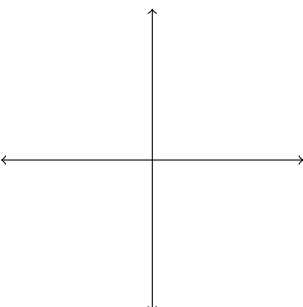
**Objectives:**

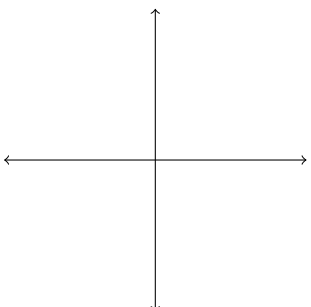
- Determine if a piecewise function is continuous
- State the Intermediate Value Theorem and use to determine information about a function

**Continuity practice:** Determine where each of these functions is continuous and classify the types of discontinuities. Sketch each graph.

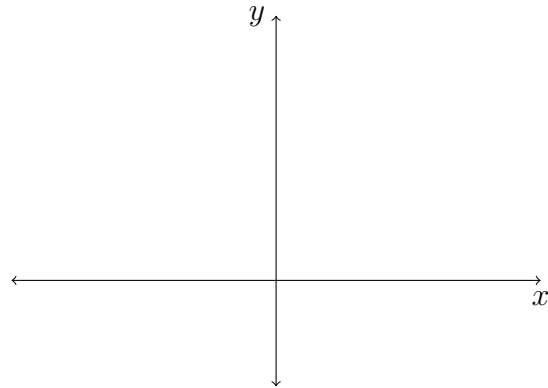
$$f(x) = \begin{cases} x + 3 & x > 2 \\ x^2 + 1 & x < 2 \end{cases}$$


$$g(t) = \begin{cases} 2t + 1 & t \geq 1 \\ t^2 & t < 1 \end{cases}$$


$$h(x) = \frac{x + 1}{x^2 - x - 2}$$


$$r(u) = \frac{|u - 2|}{u - 2}$$


**Intermediate Value Theorem:** Suppose  $f$  is \_\_\_\_\_ on the closed interval  $[a, b]$  and let  $N$  be any number between  $f(a)$  and  $f(b)$ , where  $f(a) \neq f(b)$ . Then:



**Example:** Show that  $f(x) = 3x^3 - 6x + 1$  crosses the  $x$ -axis somewhere.

