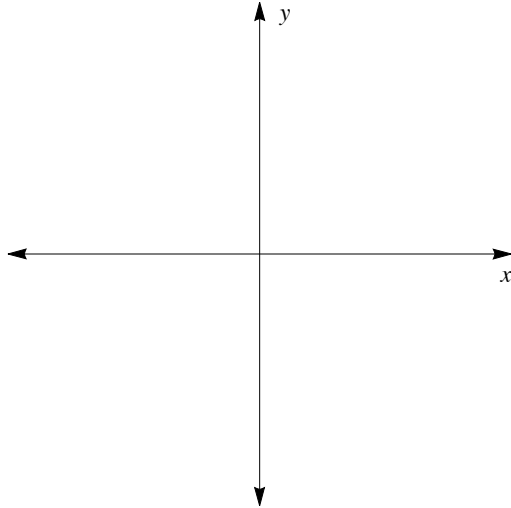


## Continuity 2: Intuitive Notion of Continuity

An informal definition of a continuous function:

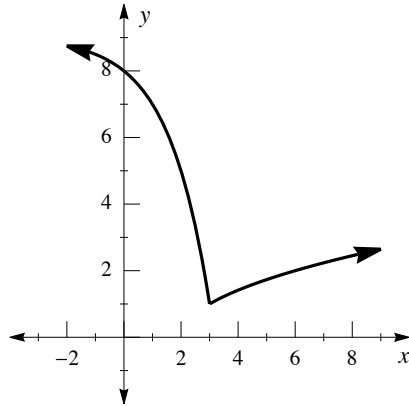
*A function is continuous if the graph of the function can be drawn without lifting your pencil from the paper.*

1. Using the template below, graph what you think might be one or two different continuous functions.



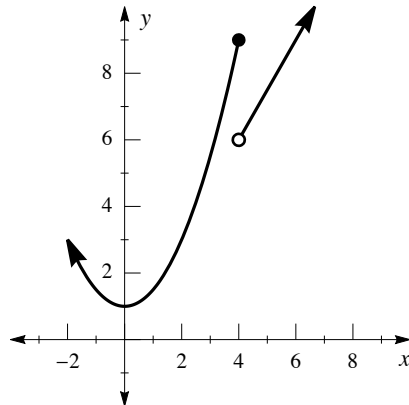
2. Below is piecewise function (made from two non-linear pieces) that appears to be continuous at  $x = 3$ . How can we determine that the function is continuous at  $x = 3$ ?

$$f(x) = \begin{cases} 9 - 2^x & x \leq 3 \\ \sqrt{x-2} & x > 3 \end{cases}$$



3. When the values of the function are not connected, we say that the function is **not continuous**. Use the equation of the following piecewise function to confirm that the graph is correct and that the function is **discontinuous** at  $x = 4$ .

$$g(x) = \begin{cases} 0.5x^2 + 1 & x \leq 4 \\ 1.5x & x > 4 \end{cases}$$



**[Challenge]** It is important to know that polynomial, rational, power, exponential, logarithmic, and trigonometric functions are continuous at all points **in their domains**. (We'll be looking closer at this soon).