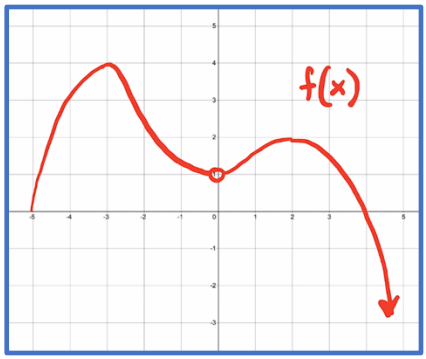
Limits "Boot Camp" for Calculus

- What is a limit?
- One-sided limits
- Properties of limits
- Calculating limits
- Squeeze Theorem
- Infinite Limits
- Limits at Infinity
- Continuity
- Important limits

What is CONTINUITY?

$\lim_{x \to 0^-} f(x) =$ $\lim_{x \to 0} f(x) =$

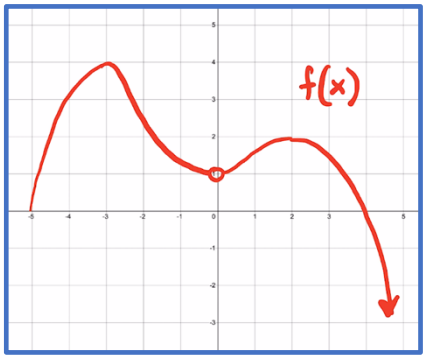
$\lim_{x \to 0^+} f(x) =$ $f(0) =$



A function is CONTINUOUS at $x = a$ **if**

$$\lim_{x \to a} f(x) = f(a)$$

Is the function continuous at $x = -3$ **?**

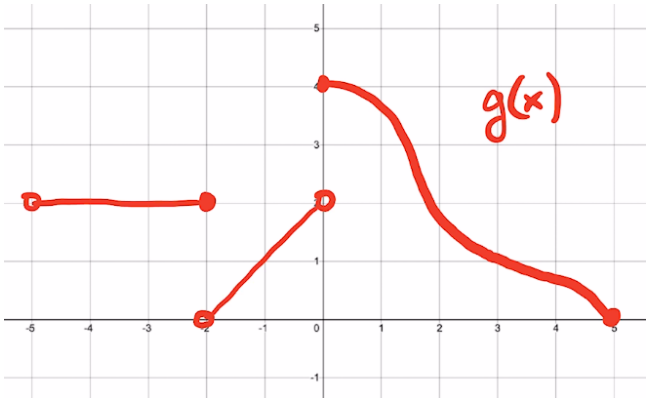


Turning things around….

So, IF a function IS known to be continuous at $x = a$**, then**

$$\lim_{x \to a} f(x) = f(a)$$

For what values of x **is** $g(x)$ **NOT continuous?**

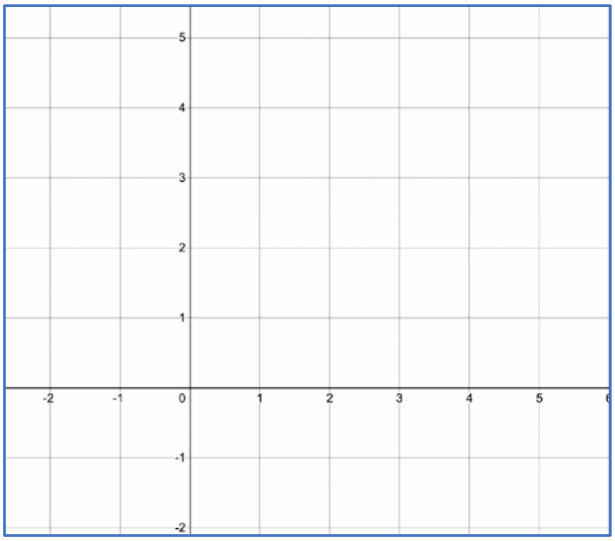


So, on what INTERVALS IS $g(x)$ **continuous?**

The Intermediate Value Theorem

Suppose $f(x)$ **is continuous on** $[a, b]$ **and let** M **be any number between** $f(a)$ **and.** $f(b)$ **, then there exist a number** c **such that**

$a < c < b$ **and** $f(c) = M$



Example

Show that $f(x) = 5x^2 - 1$ **has a root in the interval** $[0, 1]$