2.3 day 2

Thursday, August 24, 2017 9:28 AM

Intermediate Value Theorem

IVT

Given $y = f(x)$

x	f(x)
-1	4
0	3
3	-2
-5	5
8	7

a. How many roots can you guarantee?

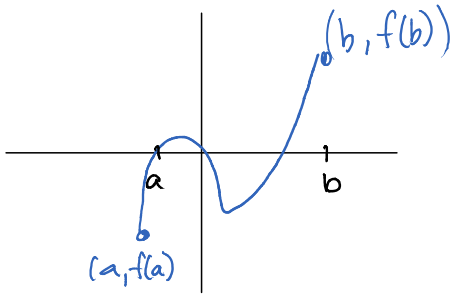
none

b. $f(x)$ is continuous on the interval $[-1, 8]$. How many roots can you guarantee?

2

c. True or False. If $f(x)$ is continuous on the interval $[-1, 8]$, then $f(x) = 6$ at least once.

IVT: A function $y = f(x)$ that is continuous on a closed interval $[a, b]$ takes on every value between $f(a)$ & $f(b)$.



Determine whether each function

Continuity Steps

1. $f(c)$ exists
2. $\lim_{x \to c} f(x)$ exists
3. $\lim_{x \to c} f(x) = f(c)$

Determine whether each function is continuous @ the given point. State why or why not.

$$f(x) = \begin{cases} x & 0 \le x < 1 \\ 2 - x & x \ge 1 \end{cases} \quad @ \; x = 1$$

1. $f(1) = 2 - 1 = 1$
2. $\lim_{x \to 1^-} f(x) = 1 \qquad \lim_{x \to 1^+} f(x) = 2 - 1 = 1$

   $\therefore \lim_{x \to 1} f(x) = 1$
3. $f(1) = \lim_{x \to 1} f(x) = 1$

$f(x)$ is continuous @ $x = 1$ b/c $f(1) = \lim_{x \to 1} f(x)$