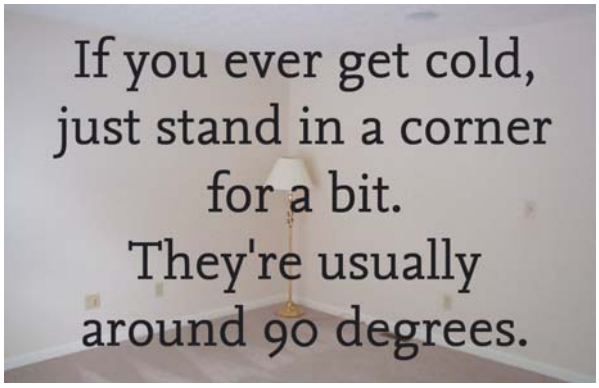
Wednesday, August 24, 2016

- 2.3 Notes - Continuity
- Pennant Assignment

Quiz Friday - 2.1 - 2.3

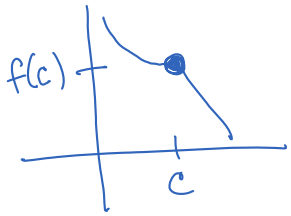


www.dimarcomath.weebly.com

2.3 – Continuous Functions

A function $f(x)$ is continuous at $x=c$ when:

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



---

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

   1. $f(1) = 2-1 = 1$
   2. $\lim_{x\to 1^-} f(x) = 1$ $\lim_{x\to 1^+} f(x) = 2-1 = 1$
   3. $f(1) = \lim_{x\to 1} f(x)$ So function is continuous at $x=1$.

2. $f(x) = \begin{cases} x^2 & 0 \le x < 2 \\ 4 & x > 2 \end{cases}$ at $x=2$

   1. $f(2) =$ D.N.E. Not continuous!
   2. $\lim_{x\to 2^-} f(x) = (2)^2 = 4$ $\lim_{x\to 2^+} f(x) = 4$

   Since limit = but no $f(2)$, Removable Discontinuity (Hole)

3. $\begin{cases} x^3 & x < 2 \end{cases}$

since lim... (Hole)

③ $f(x) = \begin{cases} x^3 & x < 2 \\ 2x+5 & x \geq 2 \end{cases}$ at $x = 2$

① $f(2) = 2(2)+5 = 9$

② $\lim_{x \to 2^-} f(x) = 2^3 = 8$ $\lim_{x \to 2^+} f(x) = 9$

Not continuous bc $\lim_{x \to 2} f(x) = DNE$ Jump Discontinuity

④ $f(x) = \frac{x+1}{x+5}$ at $x = -5$

① $f(-5) = \frac{-4}{0}$ D.N.E. Vertical Asymptote

Infinite Discontinuity

Intermediate value theorem

If a function is continuous from a to b, it passes through all values between f(a) and f(b)