

Agenda: 8/12/15

- Calculator Questions?
- Lesson 11
 - Continuity
 - One-sided limits
- Work on PS 11
- ★ Quiz 1 on Friday

T/F A local minimum is a place where the graph goes from decreasing to increasing.

Continuity

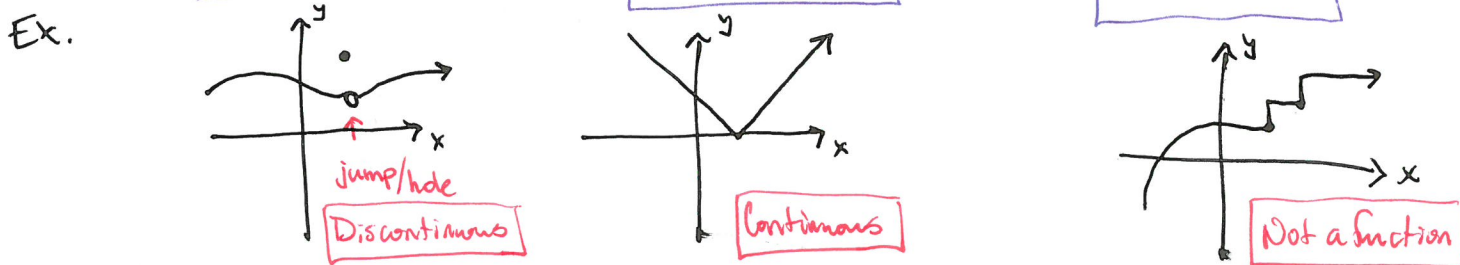
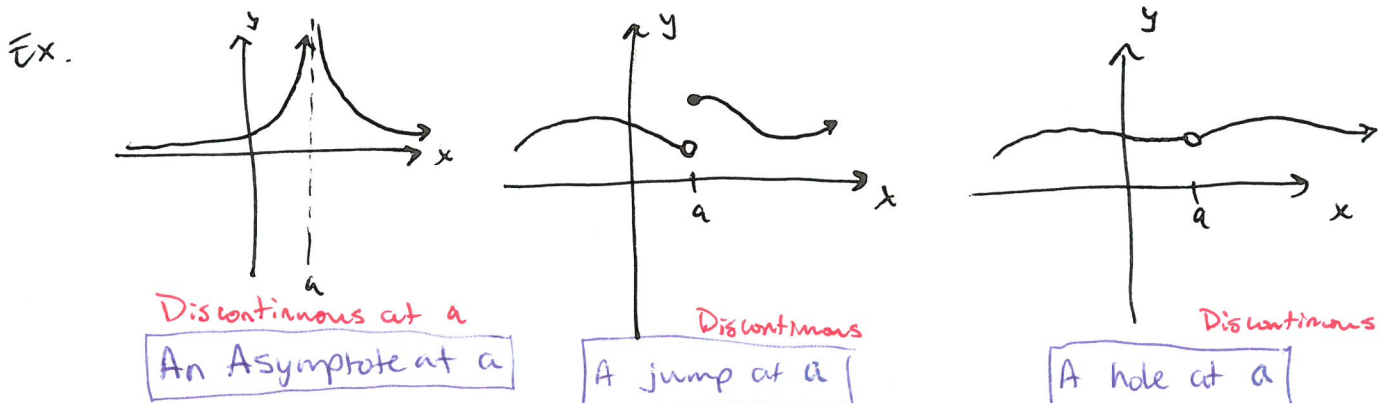
Worth big points on your quiz

★ Def - A function is continuous on the interval (a, b) if the function is

1. defined for all $x \in (a, b)$
2. Any small change in x produces a small change in y .

• That is the graph doesn't have any holes, jumps, or breaks.

Def - if a function is not continuous, we say it is discontinuous.



Left-hand & Right hand Limits :

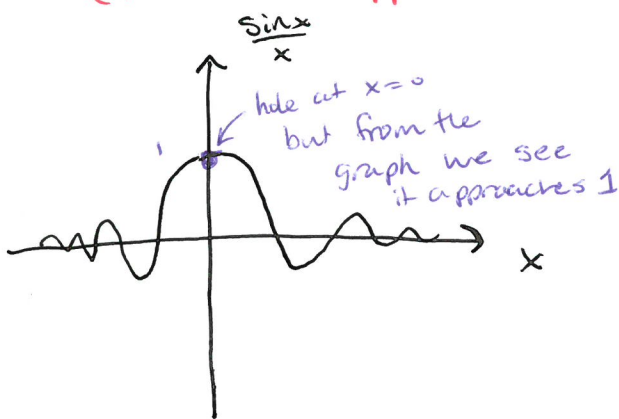
* Important to the study of Calculus.

Def - The limit of a function f , as x approaches a value a , $\left[\lim_{x \rightarrow a} f(x) \right]$ is the value the function as x approaches a .

• Very important in determining the following values as $x \rightarrow 0$

$(1+x)^{1/x}$ and $\frac{\sin x}{x}$

• We can't just evaluate at 0 since they are undefined there
 However, letting x get close to zero we see that $(1+x)^{1/x}$ approaches the value of e .



Important:

- Do not drop the limit notation
- Limit always needs a function

$\lim_{x \rightarrow a} (f(x))$

- Cannot plug in the value to find the limit

Left hand limit: $\lim_{x \rightarrow a^-} f(x)$, x approaches a on the left

Right hand limit: $\lim_{x \rightarrow a^+} f(x)$, x approaches a on the right

Ex. 11.1 Find the following limits using the graph:

$\lim_{x \rightarrow 3^+} f(x) = 2$

$\lim_{x \rightarrow 3^-} f(x) = 1$

$\lim_{x \rightarrow 1^-} f(x) = 1$

$\lim_{x \rightarrow 1^+} f(x) = 2$

$\lim_{x \rightarrow 2^+} f(x) = 1.5$

$\lim_{x \rightarrow 2^-} f(x) = 1.5$

$f(3) = 1$
 $f(1) = 2$
 $f(2) = 4$

