

Good afternoon Happy Tuesday!

Agenda:

-Quiz Pre-Calc Review

-Start Limits

# What is Calculus?

General Process:

- ① Pre-calc Math
- \* ② Limit - Process
- ③ calculus

Sketch  
Graph

$$f(x) = \frac{x^3 - 1}{x - 1} = \frac{(x-1)(x^2+x+1)}{x-1}$$

Evaluate  
 $f(x)$  at  $x=1$ .

Hole @  $x=1$   
 $f(1) = \text{undefined}$

limit  
as approaches  
 $\downarrow$  of  $f(x)$ .

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

$x$	.75	.9	.99	.999	1
$f(x)$	2.313	2.71	2.970	2.997	?

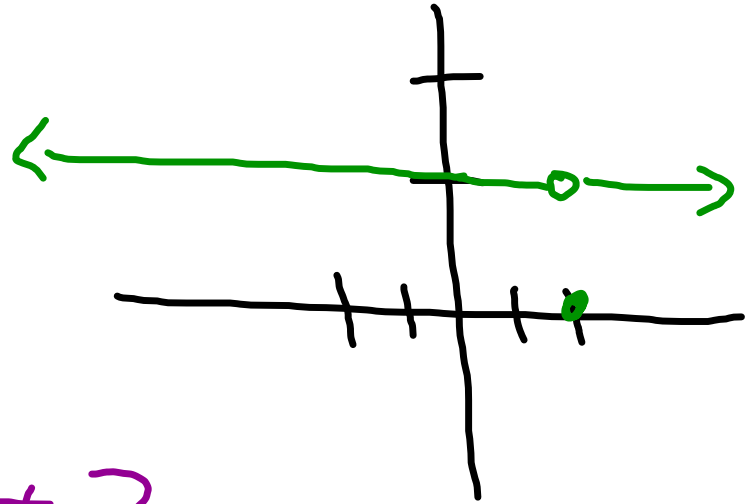
$x$	1.001	1.01	1.1	1.25
$f(x)$	3.003	3.030	3.31	3.83

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

If  $f(x)$  becomes  
arbitrarily close to some  
number  $L$ , as  $x$  approaches  $c$   
from both sides then  
the limit  $f(x)$  as  
 $x \rightarrow c$  is  $L$ .

$$\lim_{x \rightarrow c} f(x) = L$$

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



$$f(x) = \begin{cases} 1, & x \neq 2 \\ 0, & x = 2 \end{cases}$$

Limit:

Sketch the graph of

What is the value at

What is the limit as  $x$  approaches?

$x \rightarrow 1$   
The "limit of  $f(x)$  as  $x$  approaches 1" is 3.

$x$	.75	.9	.99	.999	1
$f(x)$	2.313	2.71	2.97	2.997	?

	1.001	1.01	1.1	1.25
	3.003	3.03	3.31	3.813

If  $f(x)$  becomes arbitrarily close to some number  $L$ , as  $x$  approaches  $c$ , from both sides then the

limit of  $f(x)$  as  $x \rightarrow c$  is  $L$ .

$$\lim_{x \rightarrow c} f(x) = L$$

Ex)  $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x - 2} \Rightarrow \frac{(x-2)(x-1)}{(x-2)} = 1$

$$\lim_{x \rightarrow 2} f(x)$$

$$f(x) = \begin{cases} 1, & x \neq 2 \\ 0, & x = 2 \end{cases}$$

