

Determining Limits Algebraically:

- Step #1: Substitute the number that x is approaching INTO the equation!
- If substitution yields....
 - A number, then you are done! ☺
 - A number divided by zero will yield a vertical asymptote (we discussed those yesterday)
 - ZERO divided by ZERO then we will use known limits, graphs, or factoring/rationalizing in order to determine the limit.

Lots of Examples: The first four are the easiest type....

$\lim_{x \rightarrow 2} 3 =$	$\lim_{x \rightarrow -4} x =$
$\lim_{x \rightarrow 2} (4x^2 + 3) =$	$\lim_{x \rightarrow \pi} (\sin x) =$
<p>Uh oh...</p> $\lim_{x \rightarrow 2} \sqrt{x - 5} =$	

$$\lim_{x \rightarrow 1} \left(\frac{x^2 - 1}{x - 1} \right) =$$

$$\lim_{x \rightarrow -3} \frac{x^2 + x - 6}{x + 3} =$$

$$\lim_{x \rightarrow 2} \frac{2 - x}{x^2 - 4} =$$

$$\lim_{x \rightarrow 5} \frac{x^2 + 5x}{x + 5} =$$

$$\lim_{x \rightarrow 5} \left(\frac{\frac{1}{5} - \frac{1}{10-x}}{x-5} \right) =$$

$$\lim_{x \rightarrow 0} \frac{(x-7)^2 - 49}{x}$$

$$f(x) = \begin{cases} 2x+1 & x \leq 2 \\ x-3 & x > 2 \end{cases}$$

$$\lim_{x \rightarrow 0} f(x) =$$

$$\lim_{x \rightarrow 5} f(x) =$$

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

$$\lim_{x \rightarrow 3} \frac{\sqrt{x+6} - 3}{x-3} =$$