Precalc notes 11.2

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Techniques for evaluating limits

1. Dividing out technique

http://www.youtube.com/watch?v=oDAKKQuBtDo

$$\lim_{x\to 4}\frac{x-4}{x^2-x-12}$$

$$\lim_{x\to -3}\frac{x^3+27}{x+3}$$

Techniques for evaluating limits

2. Rationalizing the numerator technique

$$\lim_{x\to 0}\frac{\sqrt{x+4}-2}{x}$$

$$\lim_{x\to 0}\frac{\sqrt{x+9}-3}{x}$$

Techniques for evaluating limits

3. Using technology

$$\lim_{x\to -1}\frac{x^2-4x-5}{x+1}$$

$$\lim_{x\to 0}\frac{1-\cos x}{x}$$

$$\lim_{x\to 0}(x+1)^{1/x}$$

Evaluating one sided limits

$\lim_{x\to c-} f(x) = L_1$ ← represents the limit evaluated from the left

$\lim_{x\to c+} f(x) = L_2$ ← represents the limit evaluated from the right

A function has a limit at a given point *c* iff $L_1 = L_2$.

Determine the limit by evaluating the one sided limits.

$$\lim_{x\to 0}\frac{|x|}{5x}$$

$$\lim_{x\to 2}\begin{cases} x^2+1, & x<2 \\ -\frac{1}{2}x+6, & x>2 \end{cases}$$

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The difference quotient

For $f(x) = x^2 + 3$, find $\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$

For $f(x) = \sqrt{x-2}$, find $\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$

For $f(x) = \frac{1}{x-3}$, find $\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$