Ch. 1.3b More Evaluating Limits Notes

A. Simplify using conjugate expression

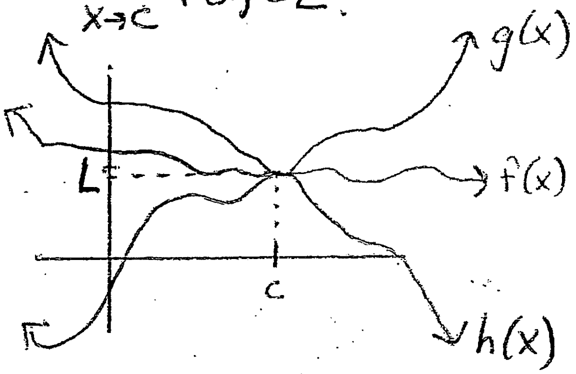
*If there is a sum or difference of 2 terms in numerator, multiply numerator and denominator by the conjugate.

$\boxed{\text{Ex. 1}}$ $\lim\limits_{x \to 4} \dfrac{6-\sqrt{x+32}}{x-4}$

B. Simplify by finding common denominator

$\boxed{\text{Ex. 2}}$ $\lim\limits_{x \to 0} \dfrac{\frac{1}{x+4}-\frac{1}{4}}{x}$

C. Squeeze Theorem: If $h(x) \le f(x) \le g(x)$ for all x in an open interval containing c, and if $\lim\limits_{x \to c} h(x) = L = \lim\limits_{x \to c} g(x)$, then $\lim\limits_{x \to c} f(x) = L$.



$\boxed{\text{Ex. 3}}$ Let $h(x)=1$, $g(x)=x^2+1$. If $h(x) \le f(x) \le g(x)$, find $\lim\limits_{x \to 0} f(x)$

Special Trigonometric Limits

1) $\lim_{x\to 0} \frac{\sin(ax)}{(bx)} = \frac{a}{b}$

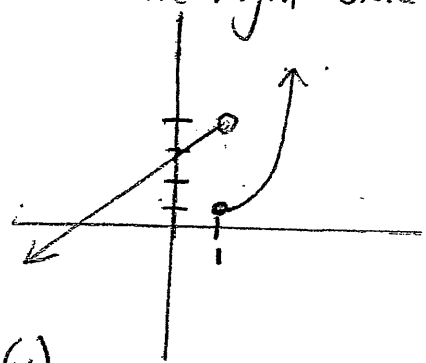
2) $\lim_{x\to 0} \frac{(ax)}{\sin(bx)} = \frac{a}{b}$

3) $\lim_{x\to 0} \frac{1-\cos(ax)}{(ax)} = 0$

Ch. 1.4a Notes Continuity and One-sided Limits.

A. One-sided Limits - describes the function's behavior from the left or the right side of an x-value.

$\boxed{\text{Ex. 1}}$ $f(x) = \begin{cases} x^2, & x \geq 1 \\ x+3, & x < 1 \end{cases}$



a) Left-handed limit: $\lim_{x\to 1^-} f(x) =$ ____

"The limit, (y-value that graph approaches), from the left side of $x=1$ is ____"

b) Right-handed limit: $\lim_{x\to 1^+} f(x) =$ ____

"The limit, (y-value that graph approaches), from the right side of $x=1$ is ____"

* If $\lim_{x\to c^-} f(x) = \lim_{x\to c^+} f(x)$, then the limit of $f(x)$ as $x\to c$ exists.