Ch. 1.3a Evaluating Limits Algebraically Notes:

Rules:

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

1) $\lim_{x\to c} b = b$ 2) $\lim_{x\to c} b\,f(x) = bL$

I. To find limits for a function, first try to plug the argument (c) into the function. If the resulting value is a real number, then the value is the limit.

Ex. 1

a) $\lim_{x\to 2}(x^2+3x) = \boxed{}$

b) $\lim_{x\to 2} 5 = \boxed{}$

c) $\lim_{x\to -1}(3x^5-2x^2+7x+4) =$

$= \boxed{}$

d) $\lim_{x\to \pi} x\cos x =$

II. Cancelling method:

*If you plug the argument (c) into the function and get a resulting value of $\frac{0}{0}$ (indeterminate form), then simplify further using factoring and cancelling

Steps:

1) plug in argument
2) $\frac{0}{0}$ means evaluate further
3) Try finding common factors to cancel
4) plug in argument into reduced function
5) Confirm resulting value is a real number

Ex. 2 $\lim_{x\to 2} \dfrac{x^2+5x+6}{x+2}$

Ex.3 $\lim\limits_{x \to 1} \dfrac{x^2+5x+6}{x-1} =$

Ex.4 $\lim\limits_{x \to 3} \dfrac{x^2-4}{x+2} =$

Ex.5 $\lim\limits_{x \to 2} \dfrac{x^2-4}{x+2} =$

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I. To find limits for a function, first try to plug the argument (c) into the function. If the resulting value is a real number, then the value is the limit.

$\boxed{\text{Ex. 1}}$

a) $\lim_{x \to 2} (x^2 + 3x) = \boxed{10}$

b) $\lim_{x \to 2} 5 = \boxed{5}$

c) $\lim_{x \to -1} (3x^5 - 2x^2 + 7x + 4) = -8 = \boxed{-8}$

d) $\lim_{x \to \pi} x\cos x = \pi\cos\pi = -\pi$

II. Cancelling method:

*If you plug the argument (c) into the function and get a resulting value of $\frac{0}{0}$ (indeterminate form), then simplify further using factoring ~~and cancelling~~

Steps:

1) plug in argument
2) $\frac{0}{0}$ means evaluate further
3) Try finding common factors to cancel
4) plug in argument into reduced function
5) Confirm resulting value is a real number

$\boxed{\text{Ex. 2}}$ $\lim_{x \to -2} \frac{x^2 + 5x + 6}{x + 2} = \frac{0}{0}$

$\lim_{x \to -2} \frac{\cancel{(x+2)}(x+3)}{\cancel{x+2}}$

$\lim_{x \to -2} x + 3 = \boxed{1}$

$\boxed{\text{Ex.3}}$ $\lim_{x \to 1} \frac{x^2+5x+6}{x-1} = \frac{12}{0}$

$\boxed{\text{Ex.4}}$ $\lim_{x \to 3} \frac{x^2-4}{x+2} = \frac{5}{5} = \boxed{1}$

$\boxed{\text{Ex.5}}$ $\lim_{x \to 2} \frac{x^2-4}{x+2} = \frac{0}{4} = \boxed{0}$