

Pre-Calculus

Notes: Evaluating Limits Algebraically

You can evaluate limits three ways

- 1) Numerically
- 2) Graphically
- 3) Algebraically

Evaluating Limits Algebraically

- 1st Try Direct Substitution

Ex 1) $\lim_{x \rightarrow 3} 2x + 1 =$

Ex 2) $\lim_{x \rightarrow 5} f(x), f(x) = \begin{cases} 2x - 4, & x < 5 \\ -x^2 + 6x - 8, & x \geq 5 \end{cases}$

Ex3) $\lim_{x \rightarrow 2} f(x), f(x) = \begin{cases} -x, & x < 2 \\ x - 4, & x \geq 2 \end{cases}$

- What if Direct Substitution results an undefined value?

- Try **Factoring**

Ex 4) $\lim_{x \rightarrow 3} \frac{x-3}{x^2-2x-3} =$

➤ Try **Multiplying by the Conjugate** (Rationalizing)

$$\text{Ex 5) } \lim_{x \rightarrow 25} \frac{\sqrt{x}-5}{x-25} =$$

➤ Try getting a **common denominator**.

$$\text{Ex 6) } \lim_{x \rightarrow -2} \frac{\frac{1}{x} + \frac{1}{2}}{x^3 + 8} =$$

Now you try ☺

$$7) \lim_{x \rightarrow 1} \frac{2x^2 + x - 3}{x^2 - 3x - 4} =$$

$$8) \lim_{x \rightarrow \frac{1}{5}} \frac{5x^3 - 1}{5x - 1} =$$

$$9) \lim_{x \rightarrow 16} \frac{4 - \sqrt{x}}{x - 16} =$$

$$10) \lim_{x \rightarrow -2} \frac{\frac{1}{x-4} + \frac{1}{4}}{x} =$$

$$11) \lim_{x \rightarrow 3^-} f(x), f(x) = \begin{cases} 2x - 9, & x \leq 3 \\ -1, & x > 3 \end{cases}$$

$$12) \lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4} =$$