

SECTION 2-3: LIMIT LAWS

goals:

- Know how to evaluate limits algebraically (that is, using the limit laws from this section)
- Recognize when a limit needs some algebraic manipulation and when it doesn't.
- Understand the idea behind the Squeeze Theorem.

Recall that in the Section 2.2 notes we established

$$\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1.$$

Rule:

Example

$$1. \quad \lim_{x \rightarrow 5} 14 =$$

$$2. \quad \lim_{x \rightarrow 5} x =$$

$$3. \quad \lim_{x \rightarrow 0} \frac{\sin(x)}{x} + (2x + \sqrt{2}) =$$

$$4. \quad \lim_{x \rightarrow 0} \lim_{x \rightarrow 0} \frac{\sin(x)}{x} - (2x + \sqrt{2}) =$$

$$5. \quad \lim_{x \rightarrow 0} \lim_{x \rightarrow 0} \frac{35 \sin(x)}{x} =$$

$$6. \quad \lim_{x \rightarrow 4} (5x + 20)(x - 2) =$$

$$7. \quad \lim_{x \rightarrow 4} \frac{5x + 20}{x - 2} =$$

$$8. \quad \lim_{x \rightarrow -2} (8 + 5x)^5 =$$

$$9. \quad \lim_{x \rightarrow -1} \sqrt{15 - x} =$$

1. lesson:

$$\lim_{x \rightarrow \sqrt{2}} 5x - \sqrt{8x^2 - 1}$$

2. lesson:

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

3. lesson:

$$\lim_{x \rightarrow 5} \frac{3 - \sqrt{x + 4}}{5 - x}$$

4. lesson:

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

5. lesson:

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

6. The last two problems reference the function $f(x) = \begin{cases} \frac{1}{2x} & \text{if } 0 < x \leq 2 \\ 0 & \text{if } 2 < x \end{cases}$

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

(b) $\lim_{x \rightarrow 2^+} e^{f(x)}$

7. Squeeze Theorem