

Correction / Addition to SOC Notes for Section 1.2**Example 3A (#34)**

Use the Limit Properties to find the following limit. If it does not exist, state that fact.

$$\lim_{x \rightarrow 3} \sqrt{x^2 - 16}$$

$$\lim_{x \rightarrow 3} \sqrt{x^2 - 16} = \lim_{x \rightarrow 3} (x^2 - 16)^{\frac{1}{2}} = \left(\lim_{x \rightarrow 3} (x^2 - 16) \right)^{\frac{1}{2}} = \left(\lim_{x \rightarrow 3} x^2 - \lim_{x \rightarrow 3} 16 \right)^{\frac{1}{2}}$$

$$= \left(\left(\lim_{x \rightarrow 3} x \right)^2 - 16 \right)^{\frac{1}{2}} = (3^2 - 16)^{\frac{1}{2}} = (9 - 16)^{\frac{1}{2}} = (-7)^{\frac{1}{2}} = \sqrt{-7} \quad \text{Limit does not exist.}$$

Example 3B (#35)

Use the Limit Properties to find the following limit. If it does not exist, state that fact.

$$\lim_{x \rightarrow 3^+} \sqrt{x^2 - 9}$$

$$\lim_{x \rightarrow 3^+} \sqrt{x^2 - 9} = \lim_{x \rightarrow 3^+} (x^2 - 9)^{\frac{1}{2}} = \left(\lim_{x \rightarrow 3^+} (x^2 - 9) \right)^{\frac{1}{2}} = \left(\lim_{x \rightarrow 3^+} x^2 - \lim_{x \rightarrow 3^+} 9 \right)^{\frac{1}{2}}$$

$$= \left(\left(\lim_{x \rightarrow 3^+} x \right)^2 - 9 \right)^{\frac{1}{2}} = (3^2 - 9)^{\frac{1}{2}} = (9 - 9)^{\frac{1}{2}} = (0)^{\frac{1}{2}} = 0$$

x	f(x) = x
3.1	3.1
3.01	3.01
3.001	3.001