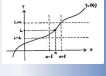
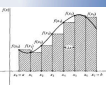


2.1 Rigorous Study of Limits



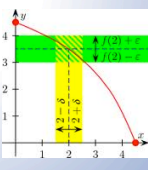
$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

$$\frac{d}{dx} \int_a^x f(t) dt = f(x)$$


$$\lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) \Delta x_i = \int_a^b f(x) dx$$

$$\int_a^b f(x) dx = F(b) - F(a)$$

Rigorous Study of Limits

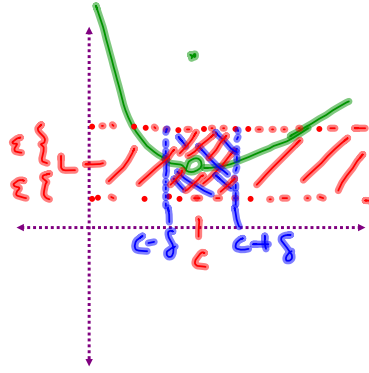
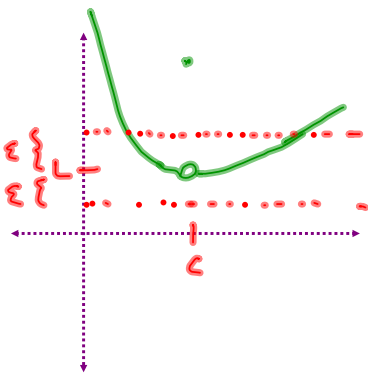


Definition

To say that $\lim_{x \rightarrow c} f(x) = L$ means that for every $\varepsilon > 0$ (no matter how small),

there exists a corresponding $\delta > 0$ such that $|f(x) - L| < \varepsilon$ provided that $0 < |x - c| < \delta$;

that is, $0 < |x - c| < \delta \Rightarrow |f(x) - L| < \varepsilon$



2.1 Rigorous Study of Limits

EX 1 Prove that $\lim_{x \rightarrow 3} (2x-5) = 1$.

EX 2 Prove that $\lim_{x \rightarrow 1} \frac{2(x-1)(x+3)}{x-1} = 8$

2.1 Rigorous Study of Limits

EX 3 Prove that $\lim_{x \rightarrow c} \frac{1}{x-5} = \frac{1}{c-5}$ for all $c \neq 5$

