

Calculus: Test 2 Note Card

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Limit Laws

Sum Law

$$\lim[f(x) + g(x)] = \lim f(x) + \lim g(x)$$

Difference Law

$$\lim[f(x) - g(x)] = \lim f(x) - \lim g(x)$$

Constant Multiple Law

$$\lim cf(x) = c \lim f(x)$$

Product Law

$$\lim[f(x) * g(x)] = \lim f(x) * \lim g(x)$$

Quotient Law

$$\lim \left(\frac{f(x)}{g(x)} \right) = \frac{\lim f(x)}{\lim g(x)}$$

Power Law

$$\lim f(x)^n = [\lim f(x)]^n$$

Root Law

$$\lim \sqrt[n]{f(x)} = \sqrt[n]{\lim f(x)}$$

Law 8

$$\lim_{x \rightarrow a} c = c$$

Law 9

$$\lim_{x \rightarrow a} x = a$$

Law 10

$$\lim_{x \rightarrow a} x^n = a^n$$

Law 11

$$\lim_{x \rightarrow a} \sqrt{x} = \sqrt{a}$$

Notes

Differentiation Laws

$$\frac{d}{dx} x^n = nx^{n-1}$$

$$\frac{d}{dx} c = 0$$

$$\frac{d}{dx} cx^n = c * nx^{n-1}$$

$$\frac{d}{dx} e^u = e^u * \ln e * \frac{d}{dx} u$$

$$\frac{a}{x^2} = ax^{-2} \text{ (for speedier differentiation)}$$

Product Rule

$$f * s' + s * f'$$

Quotient Rule

$$\frac{b * t' - t * b'}{b^2}$$

(squared, not second derivative)

Differential Usage

1st dx

Velocity

Rate of ____

Rate of Change of ____

Instantaneous Rate of Change

Current

Linear Density

Marginal Cost

Sensitivity

Slope

2nd dx

Acceleration

3rd dx

Jerk

Average Velocity/Average Rate of Change

Use slope formula

$$\frac{y_2 - y_1}{x_2 - x_1}$$

x-values are given

Plug x-values into given equation to find corresponding y-values
