



$$\Delta y = f(x_0 + dx) - f(x_0)$$

$$dx = x_0 + dx - x_0 = dx$$

$$tgA = \Delta y / dx$$

$$tgB = dy / dx$$

$$dy = tgB * dx =$$

$$= tgA * dx =$$

$$= f'(x_0) dx$$

$$\Delta y = dy \text{ при } dx \rightarrow 0$$

$$f' = \Delta y / \Delta x = dy / dx$$

$$dy = f' * dx$$

A

$dx \rightarrow 0 \quad tgA \rightarrow tgB$

$[f(x_0 + dx) - f(x_0)] / dx \rightarrow ?$
 $dx \rightarrow 0$

$$y = x^2$$

$$f(x_0) = x_0^2$$

$$f(x_0 + dx) = (x_0 + dx)^2$$

$$f'(x_0) = \lim_{dx \rightarrow 0} [f(x_0 + dx) - f(x_0)] / dx = [(x_0 + dx)^2 - x_0^2] / dx = dx[2x_0 + dx] / dx = 2x_0 + dx = [dx \rightarrow 0] = 2x_0 = tgA$$

$$f'(x) = (x^2)' = 2x$$

$$f'(x_0) = \lim_{dx \rightarrow 0} [f(x_0 + dx) - f(x_0)] / dx = [(x_0 + dx)^n - x_0^n] / dx = nx_0^{n-1} = tgA$$