평균 변화율과 순간 변화율
(The average rate of change and the instantaneous rate of change)

Start

Definition

Start

Definition

$y = f(x)$

Start

Definition

$y = f(x)$ is a function.

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x

▸ Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) =$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to}$$

▸ Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2}$$

▸ Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2)-f(x_1)}{x_2-x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2)-f(x_1)}{x_2-x_1}$$

The instantaneous rate

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2)-f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2)-f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

The derivative $f'(a)$

▸ Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

The derivative $f'(a)$ is the instantaneous rate

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

The derivative $f'(a)$ is the instantaneous rate of change of $y = f(x)$

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

The derivative $f'(a)$ is the instantaneous rate of change of $y = f(x)$ with respect to x

▸ Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

The derivative $f'(a)$ is the instantaneous rate of change of $y = f(x)$ with respect to x when $x = a$.

Start

Definition

$y = f(x)$ is a function.

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1} = \frac{\text{The increment of } y}{\text{The increment of } x} = \frac{\Delta y}{\Delta x}$$

The average rate of change of y whith respect to x over the interval $[x_1, x_2]$ or $[x_2, x_1]$

$$f'(x_1) = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{x_2 \to x_1} \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

The instantaneous rate of change of y with respect to x at $x = x_1$

The derivative $f'(a)$ is the instantaneous rate of change of $y = f(x)$ with respect to x when $x = a$.

Home