Recall: The derivative of the function $f\left(x\right)$ is:

$$f^{'}\left(x\right)=\lim\_{∆x\to o}\frac{f\left(x+∆x\right)-f(x)}{∆x}$$

The derivative $f'(x)$ is a function.

Since $f'(x)$ is a function, we can take *its* derivative.

$$\left(f '(x)\right)^{'}=$$

$f ''(x)$ is called

$f ''(x)$ is the

$f'(x)$ is increasing $     \leftrightarrow  $

$f '(x)$ is the rate of change of $f(x)$.

$f(x)$ is increasing $     \leftrightarrow  $

Recall: $f(x)$ is concave up if the rate of change of $f\left(x\right)$ is increasing.

$f(x)$ is concave up if $f'(x)$ is increasing

$f(x)$ is concave up if

$f(x)$ is decreasing $     \leftrightarrow $ $f'(x)$ is decreasing $     \leftrightarrow $

Recall: $f(x)$ is concave down if the rate of change of $f\left(x\right)$ is decreasing.

$f(x)$ is concave down if $f'(x)$ is decreasing

$f(x)$ is concave down if

$f(x)$ is concave up if $f ''(x)>0$ $f(x)$ is concave down if $f ''\left(x\right)<0$

$$f'(x)$$

$$f''(x)$$

$$f(x)$$