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

$$f'(x) = \lim_{\Delta x \to o} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$

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

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

$$(f\,'(x))' =$$

$f\,''(x)$ is called

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

$f''(x)$ is the

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

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

Recall: $f(x)$ is concave up if the rate of change of $f(x)$ 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 $f(x)$ 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 $f''(x) < 0$

$f(x)$	$f'(x)$	$f''(x)$