How does the sign of the first derivative relate to the original function?

If $f'(x) > 0$ Then $f(x)$ is increasing.

$f'(x)$ is positive

If $f'(x) < 0$ Then $f(x)$ is decreasing.

$f'(x)$ is negative

How does the sign of the second derivative relate to the original function?

If $f''(x) > 0$ Then $f(x)$ is concave upward

$f''(x)$ is positive "up" like a cup

If $f''(x) < 0$ Then $f(x)$ is concave downward

$f''(x)$ is negative "down" like a frown

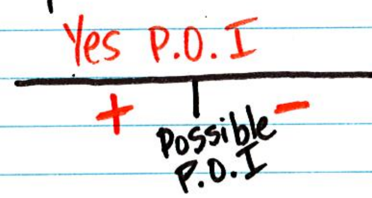
How do you find points of inflection?

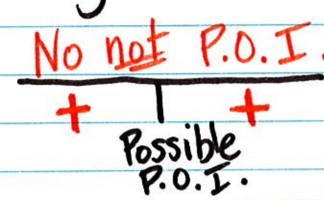
What must happen at a "possible" P.O.I for it to be a Point of Inflection?

To find points of inflection:

you set $f''(x) = 0$ and solve for x.

For it to be a point of inflection you must change signs





How do you find critical numbers?

What occurs at critical numbers?

Critical numbers:
set $f'(x)=0$ and solve for x.

Critical numbers are where extrema occur or where maximums or minimums occur.

Find critical numbers for $f(x)=\frac{3}{x+2}$

$f(x)=\frac{3}{x+2}$ domain [$\mathbb{R}: x \neq -2$]

$$f'(x)=\frac{(x+2)\frac{d}{dx}[3] - 3\frac{d}{dx}[x+2]}{(x+2)^2}$$

$$f'(x)=\frac{-3(1)}{(x+2)^2} = \frac{-3}{(x+2)^2}$$

Fraction: Set top & bottom = 0 and solve

$-3 \neq 0$ garbage

$(x+2)^2=0$

$x=-2$

critical number, but can not be a max or min