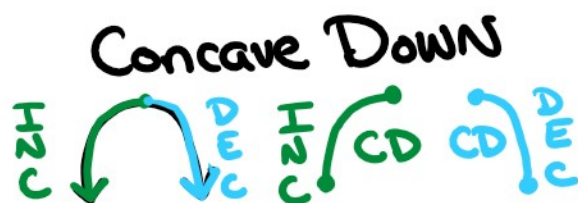
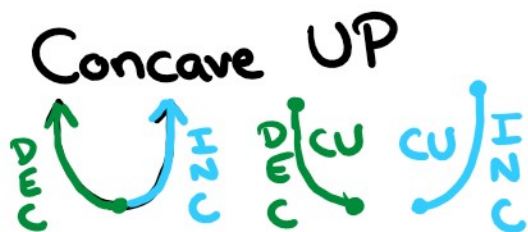


5.3 Second Derivative Test

Wednesday, June 12, 2019 7:14 AM



Second Derivative Test determines the sections of the graph of $f(x)$ that are concave up or concave down. A Point of Inflection (POI) is a point at which the concavity changes.

$$f(x) = x^3 - 3x + 2$$

$$f'(x) = 3x^2 - 3$$

Critical: $x = -1$
Points: $x = 1$

$$3x^2 - 3 = 0$$

$$3(x^2 - 1) = 0$$

$$3(x+1)(x-1) = 0$$

$x = -1$ $x = 1$

$$f''(x) = 6x \quad 6x = 0$$

Critical: $x = 0$
Points

Int. $(-\infty, -1)$ $(-1, 1)$ $(1, \infty)$

TV -2 0 2

$f'(x) =$ $+$ $-$ $+$

I/D INC DEC INC



Abs Max = none
Rel. Max = $(-1, 4)$

Abs Min = none
Rel Min = $(1, 0)$

Int. $(-\infty, 0)$ $(0, \infty)$

TV -4 1

$f''(x) =$ $-$ $+$

CU/CD CD CU

$(0, 2)$ POI

POI = $(0, 2)$