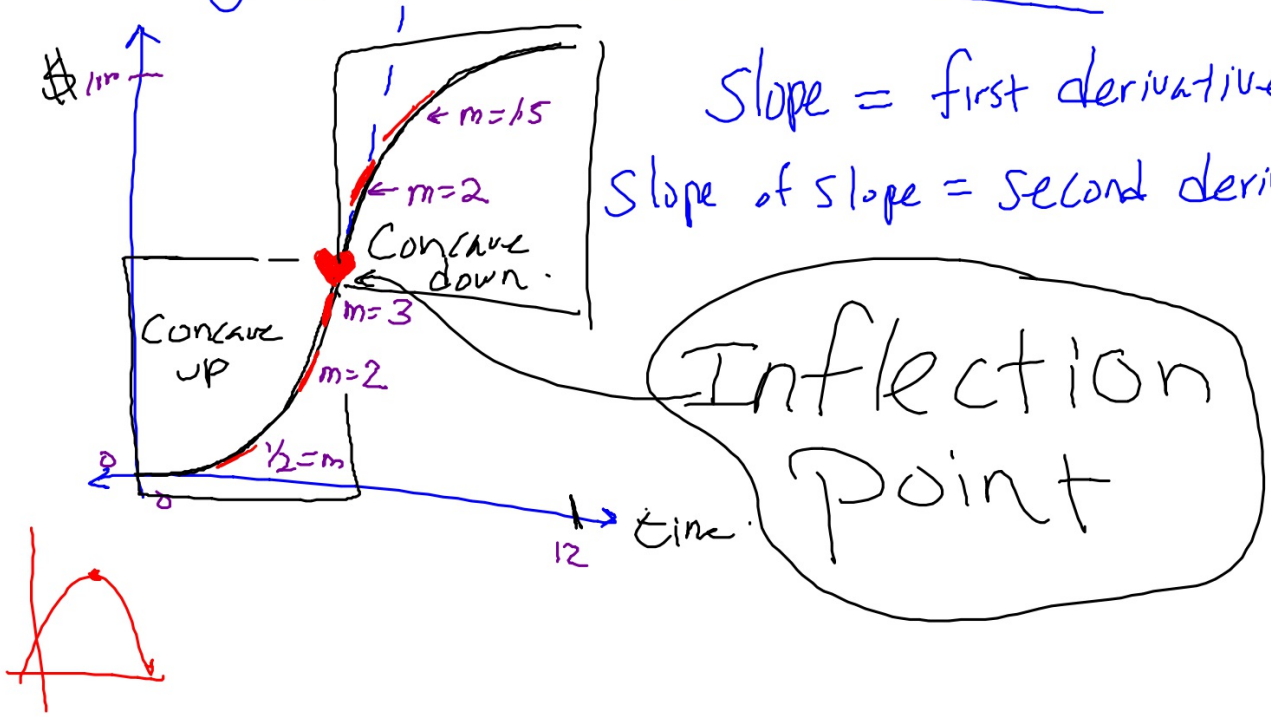
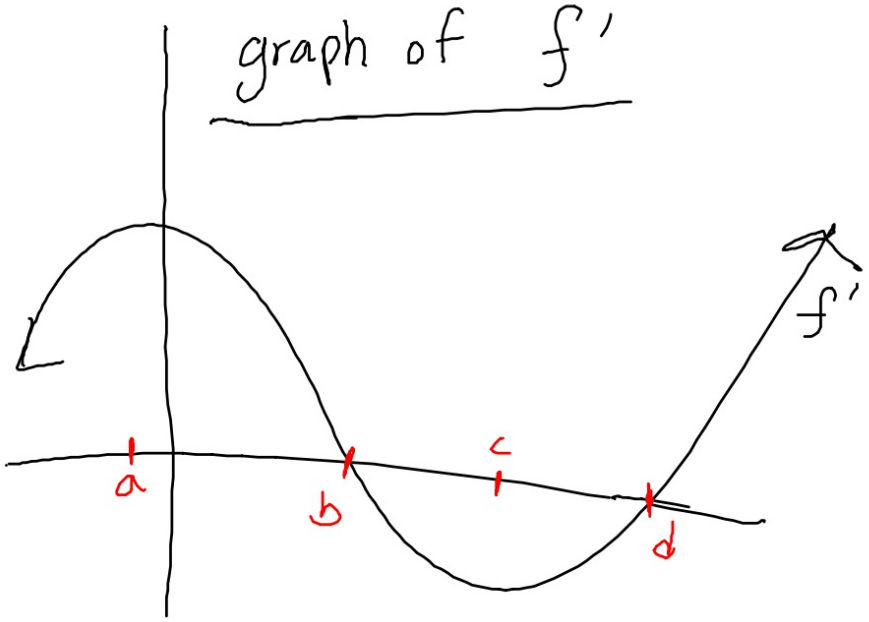
Concavity & the Second Derivative



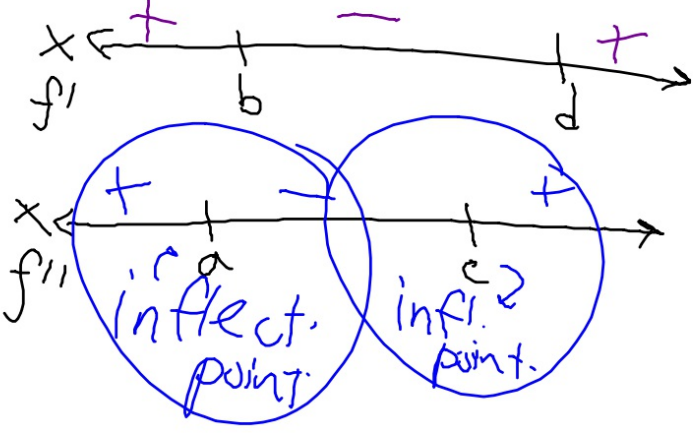
Slope = first derivative

Slope of slope = second derivative

graph of f'



F has a local max: @ x=b



Concave up: f is C.U. when $f'' > 0$.

Concave down: f is C.D. when $f'' < 0$.

When f'' is zero

and f'' changes sign,

you have an inflection point.

ex $f(x) = 3x^5 - 2x^4 + 5$

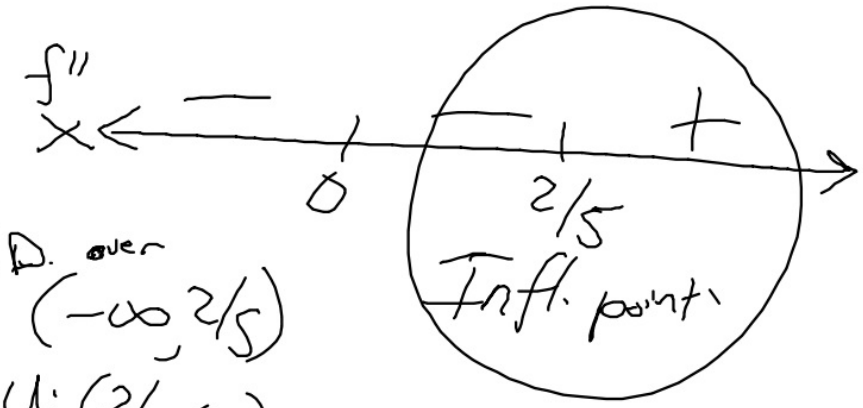
Find when C.U, C.D. and any infl. pts.

$f'(x) = 15x^4 - 8x^3$

$f''(x) = 60x^3 - 24x^2 = 0$

$12x^2(5x - 2) = 0$

$\sqrt{<3} \approx \sqrt{2} = 1.41...$ $x = 0$ $x = 2/5$ "terrace points"



C.D. over $(-\infty, 2/5)$

C.U: $(2/5, \infty)$

I.P @ $x = 2/5$