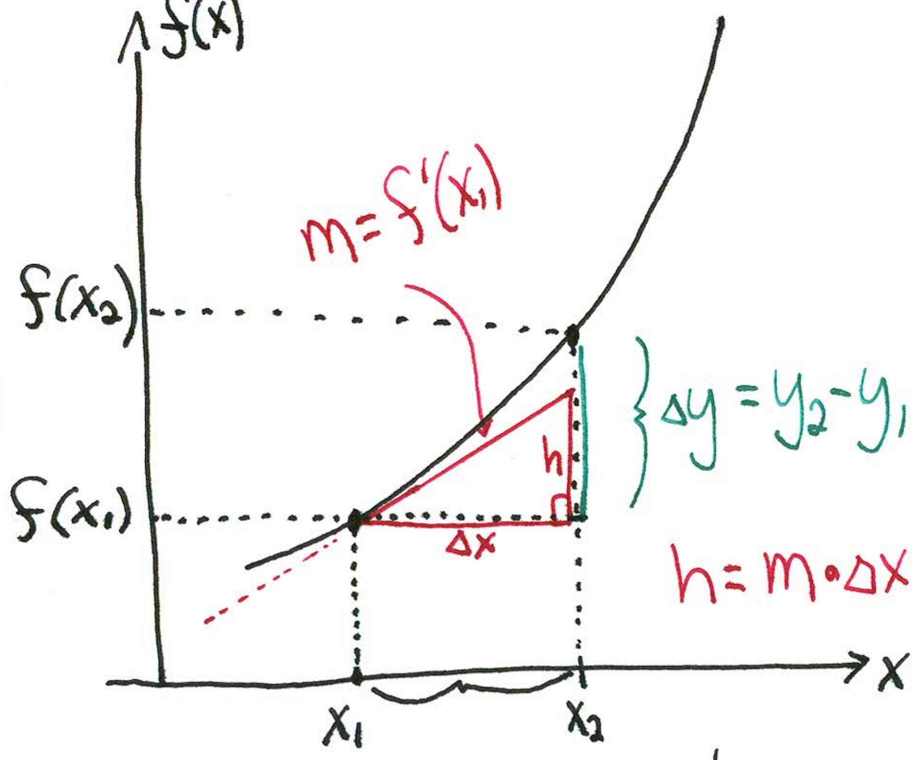
Monday, September 23, 2013 (Day 16)

Leftovers from Section #3-7 Marginal Analysis

Recall this picture from Wednesday, Sept 18.

Some function called f. Considering what happens when the input changes from $x = x_1$ to $x = x_2$.



the line tangent to graph of f at $x = x_1$ has slope $m = f'(x_1)$

$\Delta y = y_2 - y_1 = f(x_2) - f(x_1) =$ exact change in y ✓

$h = m \cdot \Delta x = f'(x_1) \cdot \Delta x =$ approximate change in y.

$\Delta x = x_2 - x_1 =$ change in x

<u>Main issues:</u>

(1) We are usually interested in knowing the value of Δy (the exact change in y)

(2) But the value of h is often very close to the value of Δy. That's why h is called the "approximate change"

(3) And often, Δy is difficult to calculate but h is <u>easy</u> to calculate.

So we often will compute h to get an approximate value for the change in y.

Return to wednesday's example

A company makes guitars.

The ~~de~~ Demand x is the number of guitars made (and sold) each week.

The Cost $C(x)$ of producing x guitars is $C(x) = 1000 + 100x - .25x^2$

(A) If batch size changes from $x_1 = 50$ to $x_2 = 51$, What is the exact change in cost of producing a batch of guitars?

(Book wording: Find the exact cost of ~~p~~ producing the 51^{st} guitar.)

Solution

We need to find

$\Delta C = \Delta y =$ exact change in cost

$\cancel{= f(51) - f(\ )}$

$= C(51) - C(50)$

Use computer: $C(50) = 5375$ ← used calculator

$C(51) = 5449.75$ ←

$$\Delta C = \Delta y = C(51) - C(50) = \begin{array}{r} 5449.75 \\ -\ 5375.00 \\ \hline \$74.75 \end{array}$$

~~(B)~~ (B) If the Batch Size changes from $x_1 = 50$ to $x_2 = 51$ guitars, use the Marginal Cost function to find an approximate value for the change in Cost of producing a batch of guitars. That is, use Marginal Cost to find an approximation for ΔC.

(Book Wording: Use the Marginal Cost to approximate the cost of producing the 51^{st} guitar.)