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Tuesday, September 25, 2012 (Day 13)

Review Yesterday's Discussion of Marginal Analysis.

Given a function f

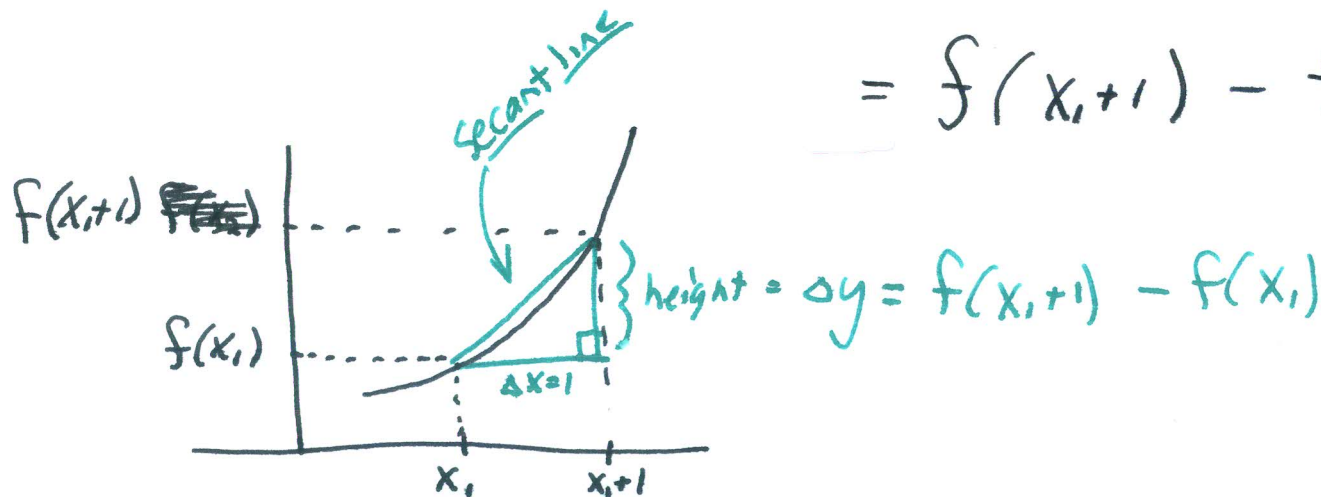
Given a known x -value x_1

Question: What is the exact change in y -value,
when the x -value changes by $\Delta x = 1$?

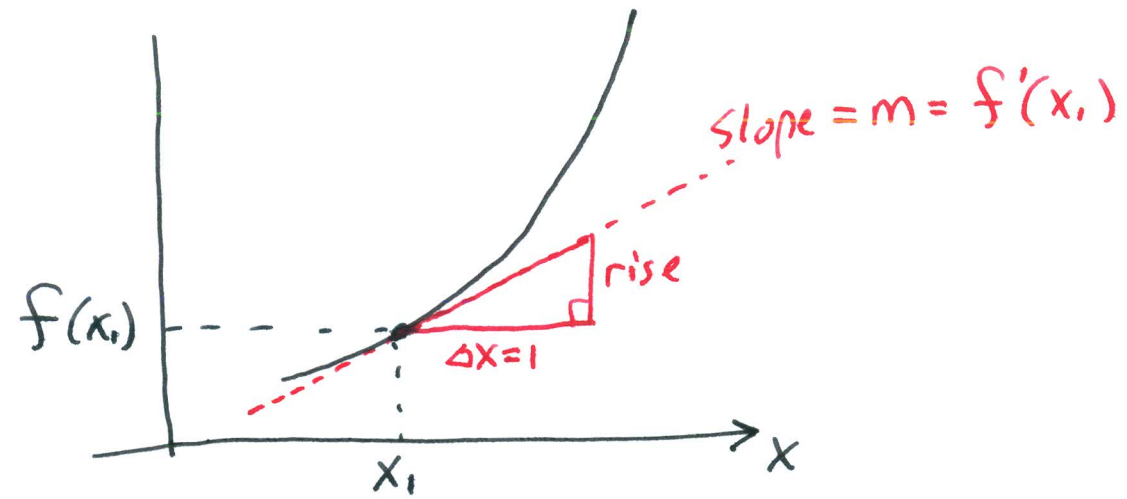
Answer: Exact change = Δy

$$= f(x_2) - f(x_1)$$

$$= f(x_1 + 1) - f(x_1)$$



We can also draw a triangle using the line that is tangent at the point $(x,y) = (x_1, f(x_1))$



$$m = f'(x_1) = \frac{\text{rise}}{\text{run}} = \frac{\text{rise}}{1} = \text{rise}$$

$$\text{So rise} = f'(x_1)$$

Then we observed

exact change Δy on green triangle \approx rise on red triangle

$$\Delta y \approx f'(x_1)$$

We explored this fact in an example about guitars.

Resuming 2nd Example, about lamps

(B) (Continuing example)

Find the Revenue function ~~f(x)~~ $R(x)$ and its domain

Solution:

$$\begin{aligned}
 \text{Revenue } R(x) &= X \cdot P \quad \text{from yesterday} \\
 &= X \cdot \left(\left(-\frac{1}{20} \right) X + 50 \right) \\
 &= \left(-\frac{1}{20} \right) X^2 + 50X
 \end{aligned}$$

Domain is $0 \leq x \leq 1000$ because the equation for P from yesterday was only valid for $0 \leq x \leq 1000$.

