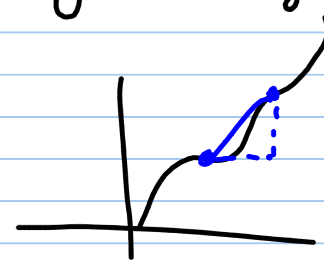
3.4 Rates of Change ~ Business & Economics

If it costs a company $C(x)$ dollars to produce x units of a certain item/commodity then $C(x)$ is called a COST FUNCTION

If the # of items produced changes from x_1 to x_2, then additional cost is: $\Delta C = C(x_2) - C(x_1)$
and the AVERAGE rate of change of cost is:

$$\frac{\Delta C}{\Delta x} = \frac{\overset{y_2}{C(x_2)} - \overset{y_1}{C(x_1)}}{x_2 - x_1}$$



"Marginal" ⇒ "instantaneous"
The "Marginal" cost is like the "instantaneous" cost & is the derivative of the Cost $f^{\underline{n}}$.

Example:

$$C(x) = 140000 + 0.43x + 0.000001x^2$$

(a) Marginal cost of producing 1000 bags of flour.

$$C'(x) = 0.43 + 0.000002x$$

$$C'(1000) = 0.43 + 0.000002(1000)$$

$$= \$0.432/\text{bag}.$$

(b) How much would it cost to produce the 1001^{st} bag?

$$\Delta C = C(1001) - C(1000)$$

$$= [140000 + 0.43(1001) + .000001(1001)^2 - (140000 + 0.43(1000) + .000001(1000)^2)]$$

$$= \$0.432001$$

Definitions:

Price or Demand $f^{\underline{n}}$:

small p $\rightarrow$ $p(x)$ is the price per unit that a company can charge if it sells x units.

Revenue Function: is the amount of $ that comes in from the sales (gross amount)

$$R(x) = x \cdot p(x)$$

Profit $f^{\underline{n}}$:

capital 'P' $\rightarrow$ $P(x) = R(x) - C(x)$

(revenue − cost)

Marginal profit $= P'(x)$

" Revenue $= R'(x)$

Now do 3.4 ü

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