1.3 Rates of Change and Behaviors of Graphs

A <u>Rate of change</u> describes how the output quantity changes in relation to the input quantity the units on a rate of change are "output units per input units"

- dollars per hour
- miles per gallon
- beats per second
- farmer plants 60,000 onions per acre

Example 1

t	2	3	4	5	6	7	8	9
C(t)	1.47	1.69	1.94	2.30	2.51	2.64	3.01	2.14

The function C(t) above gives the average cost, in dollars, of a gallon of gasoline t years after 2000.

- To find how gas price changed from 2002-2009 you would subtract gas price in 2002 from 2009

$2.14 - 1.47 = \$0.67$ To find average rate of change

delta $\longrightarrow \frac{\Delta C(t)}{\Delta t} \longrightarrow \frac{\$0.67}{7\text{ yr}} = 0.096$

gas prices increased by about 9.6 cents per year:

Average Rate of Change $= \frac{\text{change of output}}{\text{change of input}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$