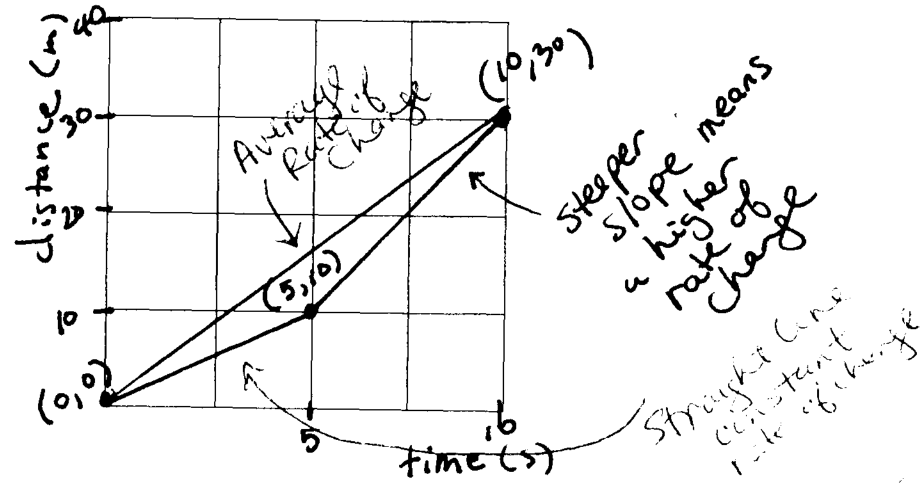
Average Rate of Change

We will be using distance (m) vs time (s) graphs for the following examples:

Example #1



(a) Determine the constant rate of change for the interval $0 \le t \le 5$

$$\text{rate of change} = \text{slope of line} = \frac{\text{rise}}{\text{run}} = \frac{\Delta d}{\Delta t} = \frac{10}{5} = 2\ m/s$$

circle "change"

$$\text{rate of change} = \frac{10-0}{5-0} = \frac{10}{5} = 2\ m/s$$

Y	0	10
X	0	5

(b) Determine the constant rate of change for the interval $5 \le t \le 10$

$$\text{rate of change} = \frac{30-10}{10-5} = \frac{20}{5} = 4\ m/s$$

Y	10	30
X	5	10

(c) What is the average rate of change for this graph?

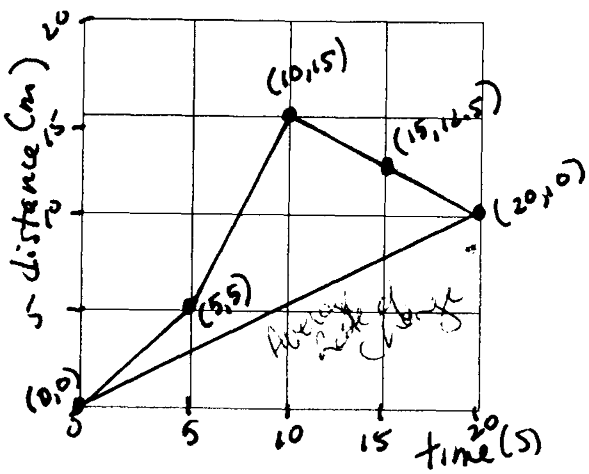
$$\text{Average Rate of Change} = \frac{2+4}{2} = 3\ m/s$$

OR

$$\text{Avg Rate of Change} = \frac{30-0}{10-0} = \frac{30}{10} = 3\ m/s$$

Y	0	30
X	0	10

Example #2



(a) Determine the constant rate of change for the interval $0 \le t \le 5$

R.O.C. = 1 m/s

(b) Determine the constant rate of change for the interval $5 \le t \le 10$

R.O.C = 2 m/s

(c) Determine the constant rate of change for the interval $10 \le t \le 15$

R.O.C. = −0.5 m/s

(d) Determine the constant rate of change for the interval $15 \le t \le 20$

R.O.C. = −0.5 m/s

(e) What is the average rate of change for this graph?

$$\text{Average R.O.C.} = \frac{1 + 2 + (-0.5) + (-0.5)}{4}$$

$= 0.5$ m/s.

OR

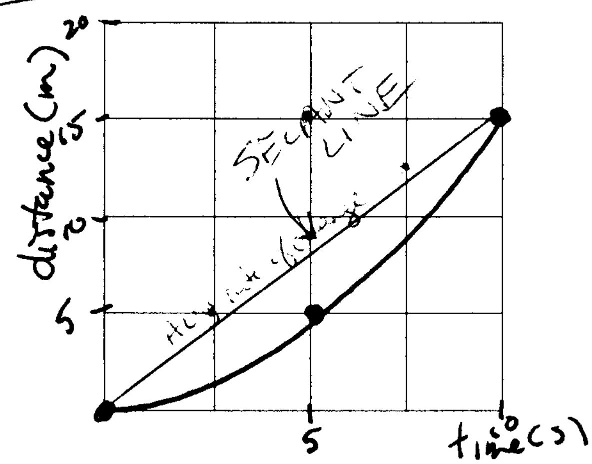
$$\text{Average rate of change} = \frac{10-0}{20-0}$$

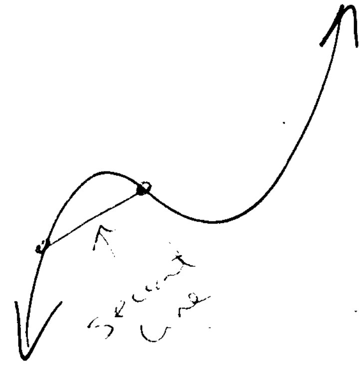
$= \frac{10}{20}$

$= 0.5$ m/s

Y	0	10
X	0	20

Example #3 – Non-Linear





(a) What is the average rate of change for this graph?

$0 \le t \le 10$

Avg R.O.C. $= \dfrac{15-0}{10-0}$

$= \dfrac{15}{10}$

$= 1.5$ m/s

y	0	15
x	0	10

(b) Determine the average rate of change for the interval $0 \le t \le 5$

(c) Determine the average rate of change for the interval $5 \le t \le 10$