$$v = \frac{\Delta d}{\Delta t} = \frac{d_f - d_i}{t_f - t_i}$$

$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$$

Constant speed vs Instantaneous Speed

8 m/s 8m/s 8m/s

100 m in 12.5s

$$v_{avg} = \frac{\Delta d}{\Delta t} = \frac{100m - 0m}{12.5s - 0s}$$

$$= 8 m/s$$

$$a_{avg} = \frac{\Delta v}{\Delta t} = \frac{8m/s - 8m/s}{12.5s - 0s}$$

$$= 0 m/s^2$$

8m/s 10m/s 5m/s

100m in 12.5s

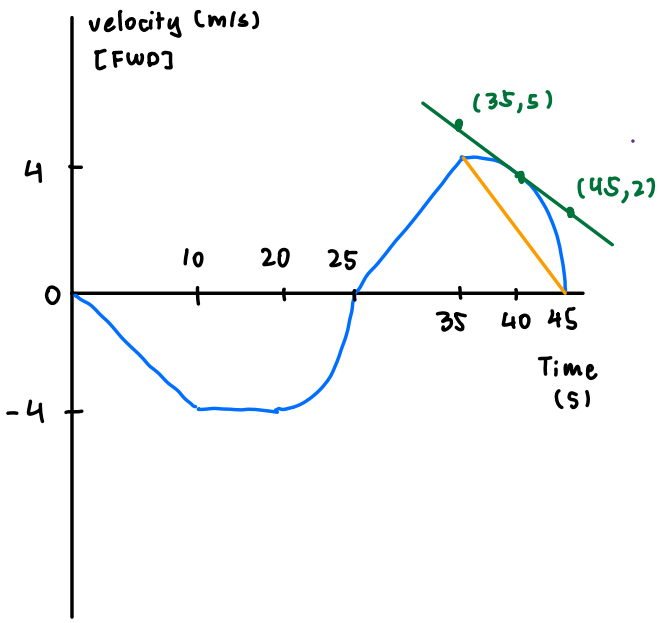
$$v_{avg} = \frac{\Delta d}{\Delta t} = \frac{100m - 0m}{12.5s - 0s}$$

$$= 8 m/s$$

$$a_{avg} = \frac{\Delta v}{\Delta t} = \frac{5m/s - 8m/s}{12.5s - 0s}$$

$$= -0.24 m/s^2$$

Rate of Change : Velocity - Time Graph to find acceleration



a) v at 20s ?

-3.8

b) a_{avg} from 0s - 10s

$$a_{avg} = \frac{-4 - 0}{10 - 0} = -0.4 m/s^2 [FWD]$$

c) a_{inst} at 5s

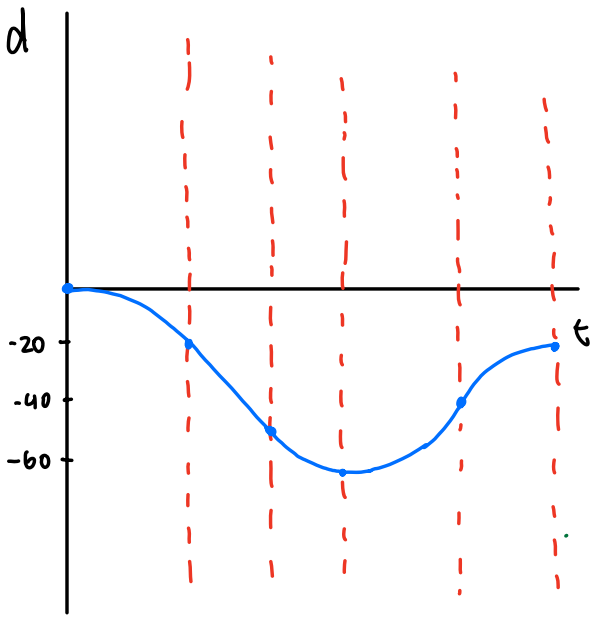
$$a_{inst} = -0.4 m/s^2 [FWD]$$

d) a_{avg} from 35s - 40s

$$a_{avg} = \frac{0 - 4}{45 - 35} = -0.4 m/s^2 [FWD]$$

e) a_{inst} at 40s

$$a_{inst} = \frac{2 - 5}{45 - 35} = -0.3 m/s^2 [FWD]$$



t	d
0	0
10	-20 (-30)
17.5	-50 (-15)
25	-65 (+20)
35	-45 (+20)
40	-25