

RECTILINEAR MOTION

— Motion in a straight line

$$s(t) = 8t - t^2$$



Find velocity at $t=2$.

$$v = \frac{\Delta s}{\Delta t} = \frac{s(2) - s(0)}{2 - 0} = \frac{12 - 0}{2} = 6 \frac{\text{units}}{\text{sec}}$$

$$\frac{s(2) - s(1)}{2 - 1} = \frac{12 - 7}{1} = 5$$

$$\frac{s(2) - s(1.9)}{2 - 1.9}$$

$$\lim_{t \rightarrow 2} \frac{s(t) - s(2)}{t - 2}$$

$$v(t) = s'(t)$$

$$a(t) = v'(t) = s''(t)$$

$$a = \frac{\Delta v}{\Delta t} \quad \frac{\frac{\Delta v}{\Delta t}}{\Delta t}$$

$$\lim_{t \rightarrow 2} \frac{v(t) - v(2)}{t - 2}$$

$$s(t) = \frac{1}{3}t^3 - 3t^2 + 8t - 6 \quad t \geq 0$$

$$v(t) = t^2 - 6t + 8$$

$$a(t) = 2t - 6$$

When will Bob be at rest?

$$v = 0$$

$$0 = t^2 - 6t + 8$$

$$\Rightarrow 0 = (t-2)(t-4)$$

$$t = 2, 4$$

When was he moving in
+ & - directions.



When will Bob be
Speeding up + slowing
down?

$$a(t) = 2t - 6$$

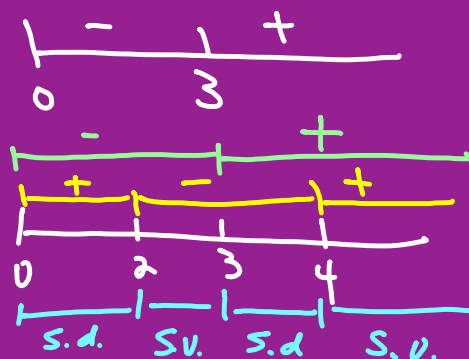


Diagram of Motion



t	s
0	-6
2	2/3
4	-2/3
3	0

How far did he travel between 1 second + 6 sec?

	Traveled
1	-2/3
2	2/3
4	-2/3
6	20/3

$$\frac{31}{3} = 10 \text{ units}$$



inc/dec $V = +$ (inc)
 concave/conv $a = -$ (concave down)
 slowing down