

d = distance traveled

Δx = displacement

Example: 1 lap on track,

$d = 400\text{ m}$ $\Delta x = 0\text{ m}$

$$v = \frac{\Delta x}{t}$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

$$\Delta x = v_i t + \frac{1}{2} a t^2$$

$$a = \frac{v_f - v_i}{t}$$

$$v_f = 2\text{ m/s}$$

$$v_i = 4\text{ m/s}$$

$$\Delta x = 24$$

$$a = ?$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

$$4 = 16 + 2 \cdot a \cdot 24$$

$$4 = 16 + 48a$$

$$-12 = 48a$$

$$a = -.25\text{ m/s}^2$$

+

$$v_i = 0$$

$$\Delta x = -20$$

$$a = -10\text{ m/s}^2$$

$$t = ?$$

$$\Delta x = v_i t + \frac{1}{2} a t^2$$

$$-20 = 0 + \frac{1}{2} (-10) t^2$$

$$20 = 5t^2$$

$$4 = t^2$$

$$t = 2\text{ s}$$

SPEED?

$$v_i = 0$$

$$v_f = ?$$

$$a = -10\text{ m/s}^2$$

$$t = 2\text{ s}$$

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

$$-10 = \frac{\Delta v}{2}$$

$$v = -20\text{ m/s}$$

$$\text{Speed} = 20\text{ m/s}$$

motion: slow, negative v
turns into
fast, negative v

v = slope

slope @ 1.5s $\approx -10\text{ m/s}$

$$v_i = 20\text{ m/s}$$

$$t = 10\text{ s}$$

$$\Delta x = ?$$

$$a = -10\text{ m/s}^2$$

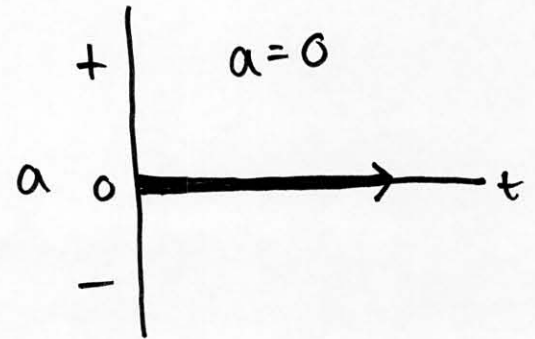
$$\Delta x = v_i t + \frac{1}{2} a t^2$$

$$\Delta x = 20 \cdot 10 + \frac{1}{2} (-10) (10^2)$$

200
 $480 - 500$

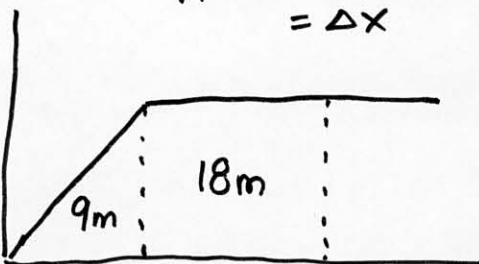
$$\Delta x = 480\text{ m} - 300\text{ m}$$

300 m
is the roof



+

AREA BENEATH
= Δx



$$\Delta x = \text{Area} = 27\text{ m}$$

$$\frac{\Delta x}{t} = v_{\text{avg}}$$

$$\frac{\Delta x}{3\text{ hr}} = 50\text{ mi/hr}$$

$$\Delta x = 150\text{ mi}$$

-30 mi

she needs 120 more miles