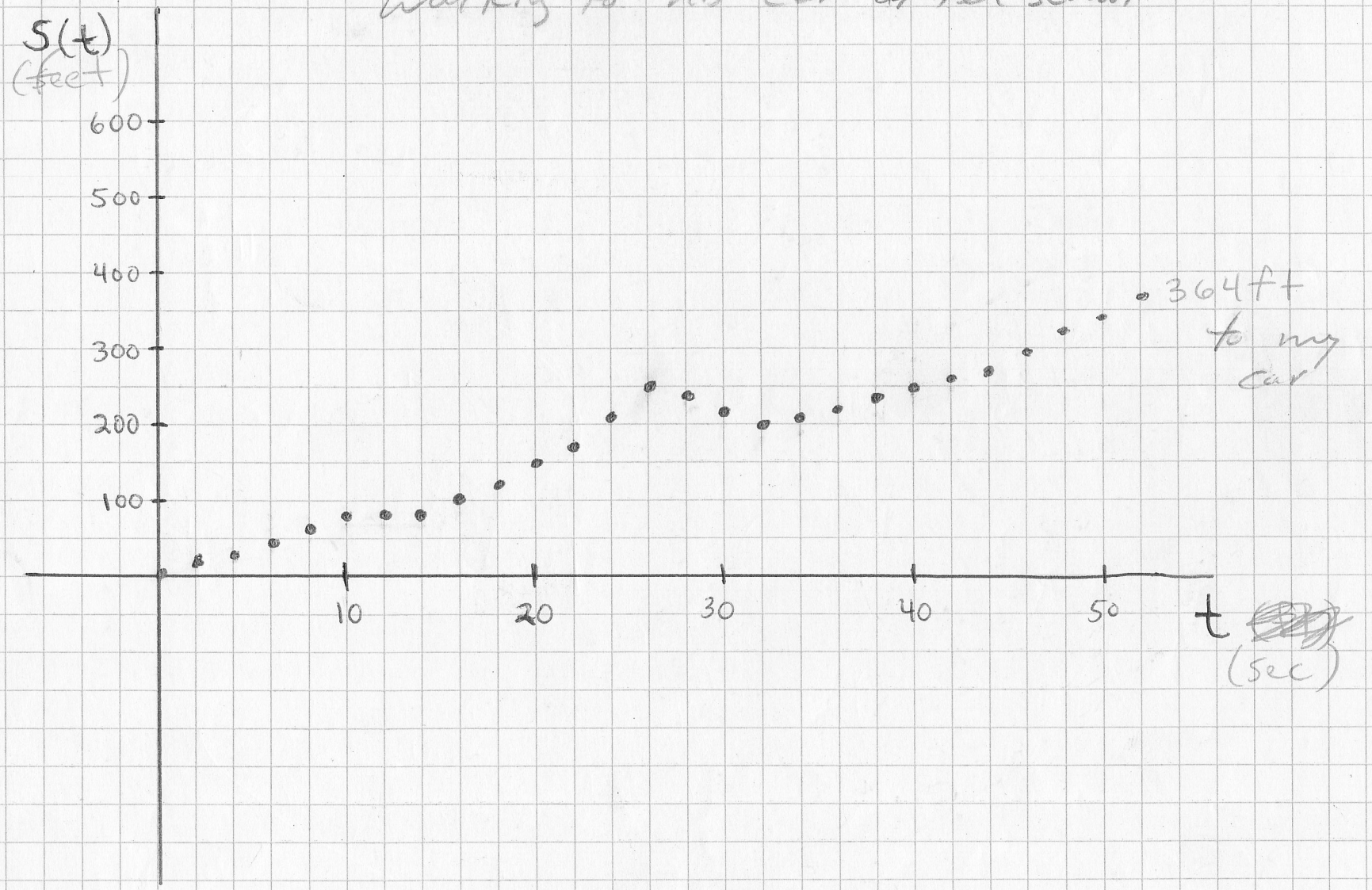
MR JURADO's Position vs. time graph for walking to his car after school



graph 6-1

Mr. Jurado's Walk to his Car

Look @ Graph 6-1: Position vs. time graph

Describe the walk:
The walk is 364 feet long
Mr. Jurado stopped 3 times but only changed directions twice.
Mr. Jurado changes direction @ $t = 26s$ and $t = 32s$.

V_{av} formula

$$\text{Average Velocity} = \frac{\text{final position} - \text{intial position}}{\text{final time} - \text{initial time}}$$

$$V_{av} = \frac{364 - 0}{52 - 0} = 7 \text{ ft/sec}$$

Average Velocity in mph

$$\frac{7 \text{ ft}}{1 \text{ sec}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = 4.773 \frac{\text{mi}}{\text{hr}}$$

Instantaneous velocity

Instantaneous Velocity is the velocity @ one "instantaneous" pt. in time. (1 t-value)

velocity position
$V(t) = x'(t)$

Q: ~~Was~~ Was Mr. Jurado's velocity pos. or neg @ $t = 40$?
A: Negative b/c the slope of the tangent line @ $t = 40$ is neg.

Remember ($\frac{dy}{dx} = m_{tan}$)

The sign on the velocity gives the direction of travel, the magnitude of the velocity is the speed, i.e.

Speed

$$\text{speed} = |\text{velocity}|$$

(speed: always positive)

Q: What was Mr. Jurado's position @ $t = 16$ s? @ $t = 26$ s? and @ $t = 32$ s?

A: $s(16) = 100$ ft $s(26) = 250$ ft $s(32) = 200$ ft

Q: What was the distance Mr. Jurado walked after the first 16 sec? 26 sec? 32 sec?

Dist. formula

total dist = total dist in pos direction + total dist in neg direction

$$d = |\text{final position} - \text{initial position}|$$

d: the distance in any one direction

A: for the first 16 sec $d = 100$ ft
for the first 26 sec $d = 250$ ft
for the first 32 sec $d = 300$ ft
(250 ft in pos. + 50 ft in neg.)

The dist. traveled depends on how often the particle changes direction. ∴ a dist. question uses both the position and velocity functions.

Displacement vs. Distance

Displacement formula

Displacement is the change in position

Displacement = final position − initial position

Q: When does displacement = distance?

A: When the particle doesn't change directions. If the particle changes its direction during the given time interval then the distance will not equal the displacement b/c you will now have to calculate the distance in the pos. direction and add the dist. from the neg direction.