4. The graph shows the velocity vs. time for a rolling ball.

a. Describe how the ball is moving.

away & slowing

b. $-2 \frac{m}{s^2}$ What is the ball's **acceleration**?

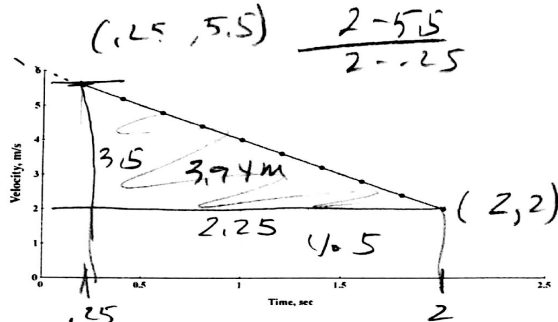*slope of v-t graph*

c. $5.5 \frac{m}{s}$ What is the ball's **initial velocity**? *on graph or $=6$ at $t=0$*

d. $V = 6 - 2t$ Write a general equation for the ball's velocity using the starting velocity and acceleration. $V = V_0 + at$

e. $2 m/s$ How fast would the ball be moving at the 2.0 seconds? $V = 6 - 2(2) = 2$

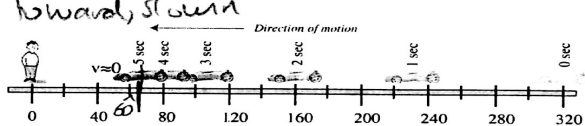f. $3 \, sec$ Calculate the time when the ball will stop. $0 = 6 - 2t$ $6/2 = t$

g. $\sim 8.4 m$ Calculate the ball's total **displacement** for the data shown.

$(.25, 5.5)$ $\dfrac{2 - 5.5}{2 - .25}$

3.5 $3.94m$

2.25 4.5 $(2, 2)$

$.25$ 2

Velocity, m/s · Time, sec

5. The changing positions of a car shown in the picture.

a. $V = 0, X_0 = 320 m$, *times*, Identify the values that are given. *Moving toward, slowing*

b. Describe the motion shown.

Moving toward observer & slowing

c. -255 Estimate the car's displacement.

$\Delta X = 65 - 320 = -255$

d. $-51 \frac{m}{s}$ Calculate the average velocity of the car from 0 to 5 seconds.

$V_{avg} = \dfrac{\Delta X}{\Delta t} = \dfrac{-255}{5} = 51 \frac{m}{s}$

e. $20 \frac{m}{s^2}$ Calculate the acceleration of the car.

$V = V_0 + at$

Assume a const

$V_0 = ?$ $V_{avg} = \dfrac{V_1 + V_2}{2}$

$V_{final} = 0$ $-51 = \dfrac{V_0 + 0}{2}$

$0 = 102 + a(5) \quad -102 = V_0$

Direction of motion — .5 sec, 4 sec, 3 sec, 2 sec, 1 sec, 0 sec

$v \approx 0$

0 40 60 80 120 160 200 240 280 320

6. A pumpkin is thrown directly upward with an **initial velocity** of 19.6 m/s.

a. $X_0 = 0, V_0 = 19.6, a = -9.8, V_{top} = 0, t = ?$ Identify the known values for this situation. (x, x_0, v, v_0, a, t)

b. $2 \, sec$ How much **time** will it take for the pumpkin to reach its maximum height?

c. $19.6 m$ How **high** will the pumpkin get?

$V = V_0 + at$

$0 = 19.6 + (-9.8)t$

$2 = t$

$X = \frac{1}{2}at^2 + V_0 t + X_0$

$= \frac{1}{2}(-9.8)(2)^2 + 19.6(2) + 0$