

HS.P.D.21, HS.P.D.22, HS.P.D.23, HS.P.D.24 Assessment

SITUATION: Your best friend Harry, has a cousin Larry and in 5 days from now he's going to get married. Before the wedding Harry and Larry go sky diving (they are going to jump out of a plane)! Harry as you know, has fallen out of his helicopter 3 times! Today, after jumping Harry realized he has forgotten his parachute! (Lucky for Larry he has his!) When Harry jumps the plane was traveling at a horizontal velocity of 60 m/s and was 125m above the ground.

- 1) In your own words, describe Harry's motion as he falls [HINT: include direction(s) and velocity(s)].

Harry is traveling with a constant velocity horizontally and accelerating towards the ground vertically.

- 2) Fill out the horizontal and vertical motion charts for the **position, velocity, and acceleration** of Harry as he falls.
Show all work and calculation on the next page.

Horizontal Motion (x direction)

time (sec)	x position (meters)	x velocity (m/s)	x acceleration (m/s ²)
0	0	60	0
1	60	60	0
2	120	60	0
3	180	60	0
4	240	60	0
5	300	60	0

Vertical Motion (y direction)

time (sec)	y position (meters)	y velocity (m/s)	y acceleration (m/s ²)
0	0	0	-9.8
1	-4.9	-9.8	-9.8
2	-19.6	-19.6	-9.8
3	-44.1	-29.4	-9.8
4	-78.4	-39.2	-9.8
5	-122.5	-49	-9.8

Use the following space to complete one calculation for the horizontal and vertical positions and velocities on the previous page (HS.P.D.21)

Horizontal Motion (x direction)

$$x_1 = 0 \text{ m}$$

$$x_2 = ?$$

$$v_{1x} = 60 \text{ m/s}$$

$$v_{2x} = ?$$

$$a_x = 0 \text{ m/s}^2$$

$$t = 1 \text{ sec}$$

$$v_{2x} = v_{1x} + a_x t$$

$$v_{2x} = 60 + (0)(1)$$

$$v_{2x} = 60 + 0$$

$$v_{2x} = 60 \text{ m/s}$$

$$x_2 = x_1 + v_{1x} t + \frac{1}{2} a_x t^2$$

$$x_2 = 0 + (60)(1) + \frac{1}{2}(0)(1)^2$$

$$x_2 = 0 + 60 + 0$$

$$x_2 = 60 \text{ m}$$

Vertical Motion (y direction)

$$y_1 = 0 \text{ m}$$

$$y_2 = ?$$

$$v_{1y} = 0 \text{ m/s}$$

$$v_{2y} = ?$$

$$a_y = -9.8 \text{ m/s}^2$$

$$t = 1 \text{ sec}$$

$$v_{2y} = v_{1y} + a_y t$$

$$v_{2y} = 0 + (-9.8)(1)$$

$$v_{2y} = 0 + -9.8$$

$$v_{2y} = -9.8 \text{ m/s}^2$$

$$y_2 = y_1 + v_{1y} t + \frac{1}{2} a_y t^2$$

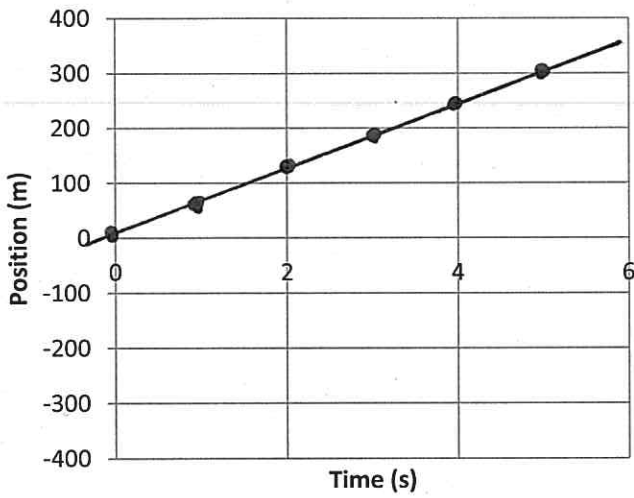
$$y_2 = (0) + (0)(1) + \frac{1}{2}(-9.8)(1)^2$$

$$y_2 = 0 + 0 + (-4.9)(1)$$

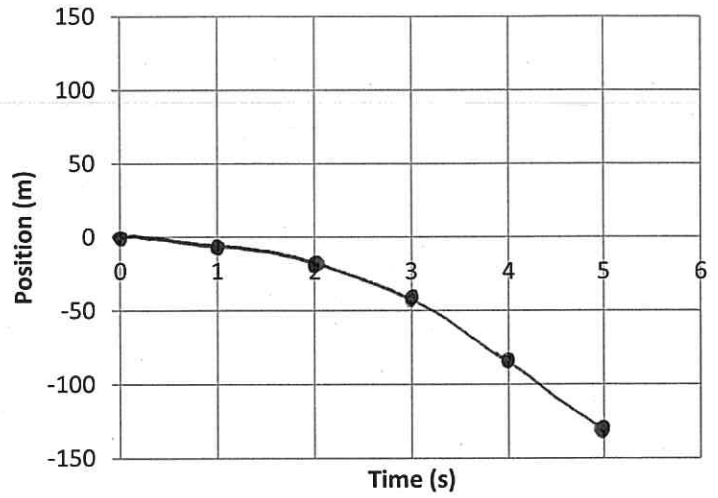
$$y_2 = -4.9 \text{ m}$$

3) Use the graphs below to plot the positions, velocities and acceleration from the tables in #2

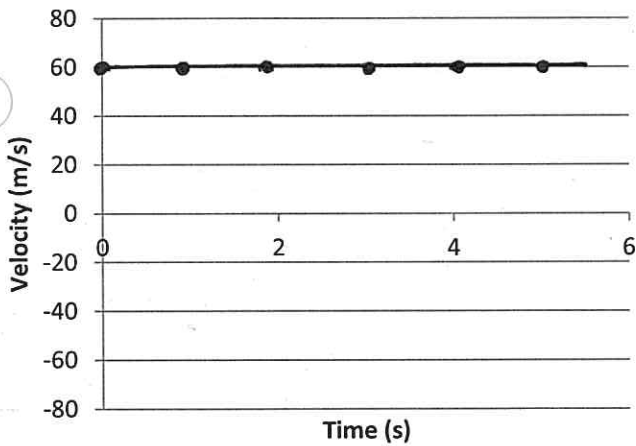
X vs Time



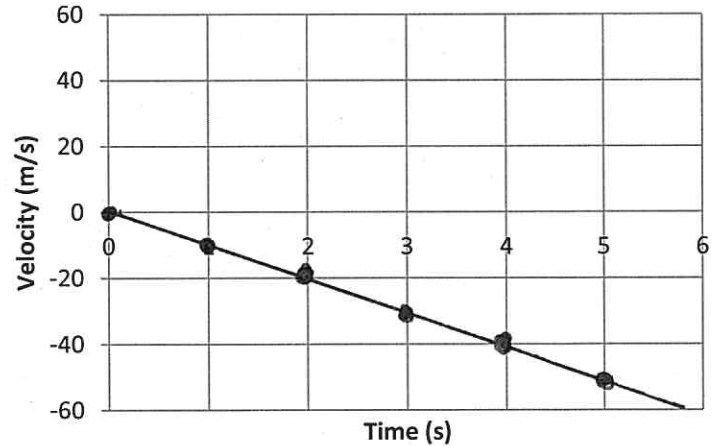
Y vs Time Graph



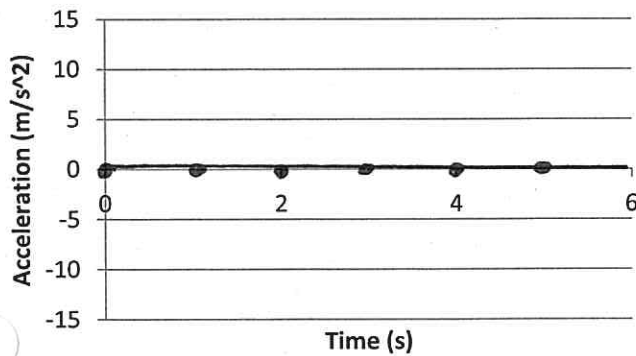
Vx vs Time



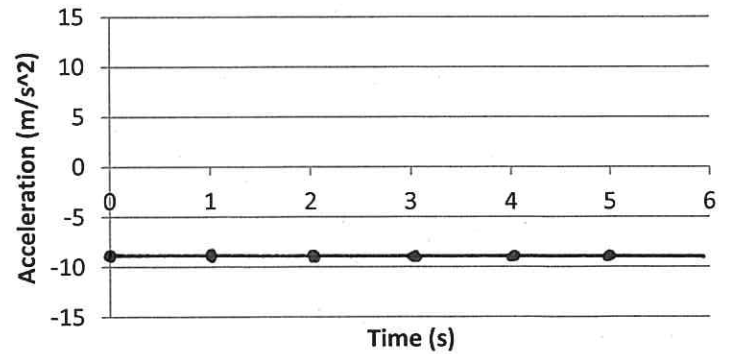
Vy vs Time



Ax vs Time



Ay vs Time



HS.P.D.22 _____

HS.P.D.23 _____

HS.P.D.24 _____