Answer on Question #63356 – Physics – Mechanics | Relativity

Question:

A spear was thrown at an angle and it stayed in the air for 7 second right before it hit the ground.

1) What is the peak height of the spear (dy peak)?
2) What is the initial vertical velocity (Vyi)?
3) If the spear landed 230m away from the thrower, what is the initial velocity? (launch Vi)
4) What is the angle that the spear was thrown?
5) When t = 3.5s what is Vx and Vy at that moment?
6) What is dx and dy when t= 3.5s?
7) When t= 4.9s what is Vx and Vy at that moment?
8) What is dx and dy when t= 4.9s?

Answer:

1) $dy_{peak} = \frac{gt^2}{8} = 60.025\ m;$

2) $v_{yi} = \frac{gt}{2} = 34.3\frac{m}{s};$

3) $v_i = \sqrt{v_{yi}^2 + \left(\frac{S}{t}\right)^2} = 47.5\frac{m}{s};$

4) $\theta = \arcsin(\frac{v_{iy}}{v_i}) = 46.23^0;$

5) $v_x = \frac{S}{t} = 32.86\frac{m}{s}, v_y = v_{iy} - gt = 0\frac{m}{s};$

6) $dx = v_x t = 115\ m, dy = v_{iy} y - \frac{gt^2}{2} = 60.025\ m;$

7) $v_x = \frac{S}{t} = 32.86\frac{m}{s}, v_y = v_{iy} - gt = 9.6\frac{m}{s};$

8) $dx = v_x t = 161\ m, dy = v_{iy} y - \frac{gt^2}{2} = 50.42\ m;$