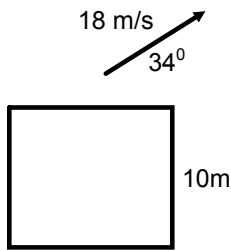


Bea and Bopp are have survived the fall from the cliff. Having survived their brush with death the are going to live life to its fullest. They are sitting on the top of their school launching flaming tennis balls at unsuspecting freshmen.

- What are the  $v_{ix}$  and  $v_{iy}$  of their flaming balls?
- How long are their balls in the air?
- How far from the school do the balls land?
- What is the velocity of the balls as they strike the unsuspecting freshmen?



$$\cos(34) = v_{ix}/18 \quad \sin(34) = v_{iy}/18$$

$$14.9 \text{ m/s and } 10.06 \text{ m/s}$$

$$-10\text{m} = 10.06t - 4.9t^2$$

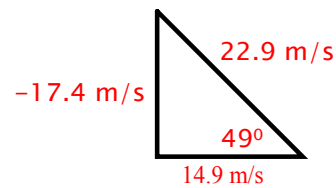
$$2.8\text{sec}$$

$$\Delta x = 14.9(2.8)$$

$$41.5 \text{ m}$$

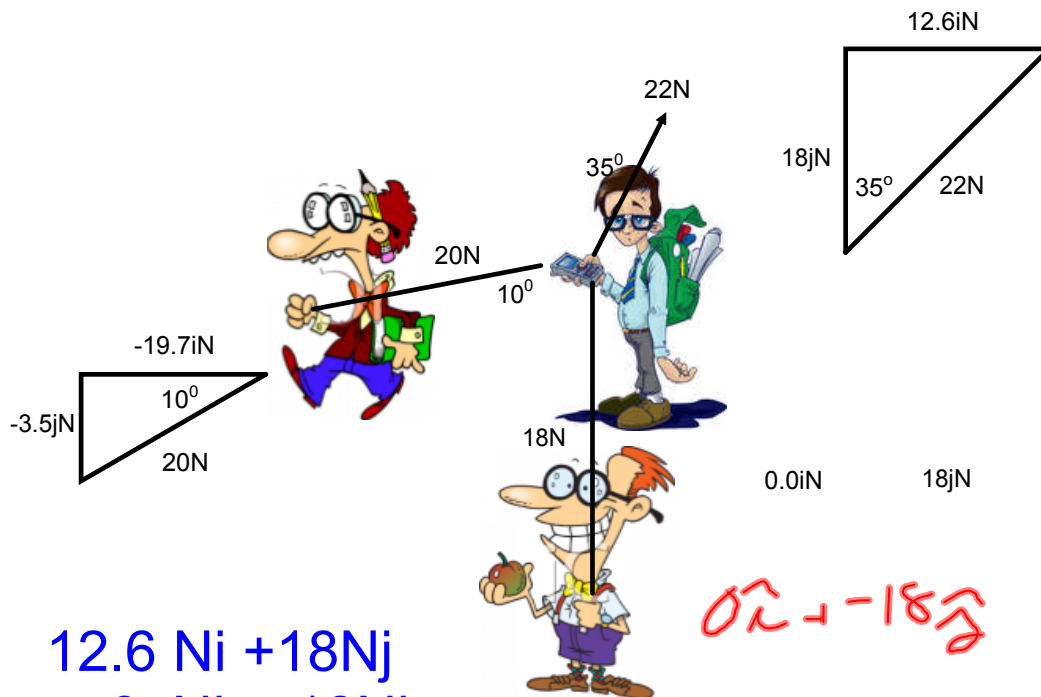
$$v_{iy} = 10.06 - (9.81)(2.8 \text{ sec})$$

$$-17.4 \text{ m/s}$$



P-Dynasty, Zanghi and Havis are all fighting over Bob's new calculator. P-Dynasty pulls with a force of 18N due south, JZ pulls with a force of 22N at 35° E of N and pH (aka litmus) pulls with a force of 20N at 10° S of W.

- What is the net force acting on the calculator?
- What direction will the calculator move?



$$\begin{array}{r}
 12.6 \text{ Ni} + 18\text{Nj} \\
 0 \text{ Ni} + -18\text{Nj} \\
 -19.7\text{Ni} + -3.5\text{Nj} \\
 \hline
 -7.1\text{Ni} + -3.5\text{Nj}
 \end{array}$$

**7.9N<sup>N</sup> @ 26° S of W**

You have been hired to eliminate all of the roaches from DL.

Traditional measures have not worked. You are a trained sniper and believe you can eliminate every last one of the roaches. You grab your BB gun and are perched on a lab table in this room. You put your infrared goggles on and wait for your prey.

- a. How long will the BB be in the air?
- b. How fast must you fire the BB to reach the roach?
- c. If the BB gun is 0.85m long, what is the acceleration of the BB in the gun?

$$-2\text{m} = 0 + 0.5(-9.81)t^2$$

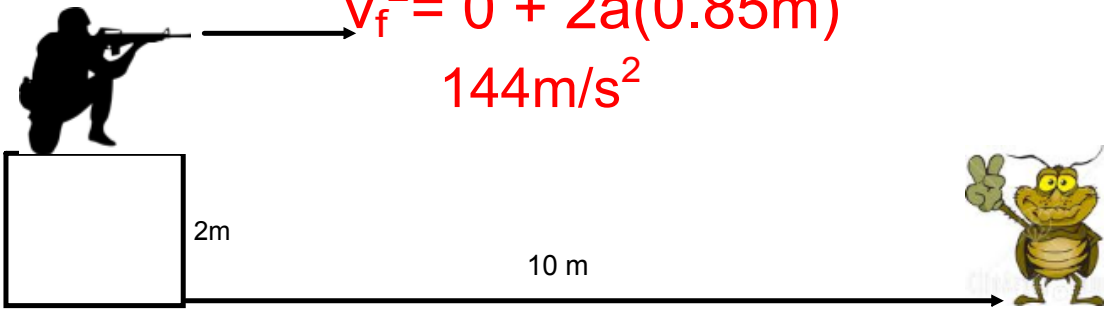
$$t = 0.64 \text{ sec}$$

$$10\text{m} = v_{ix}(0.64 \text{ sec})$$

$$15.67\text{m/s}$$

$$v_f^2 = 0 + 2a(0.85\text{m})$$

$$144\text{m/s}^2$$



Having run out of CO<sub>2</sub> for your gun you resort to a sling shot. You launch the BB at an angle of 65° towards a cock roach on the top of the cabinets. You strike the cock roach on your first try.

- How long will the BB be in the air?
- How far away is the roach?

