Crime Scene #1: Gangster Shooting

1.632 5m [ ] 1.627m
3m
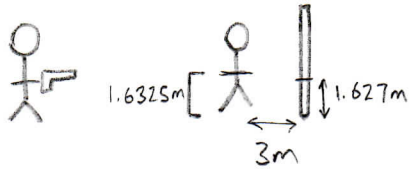
* Time it took to hit Horatio

$$\Delta y = V_{iy}\Delta t + \frac{1}{2}a\Delta t^2$$

$$0.0055 = \frac{1}{2}(9.8)\Delta t^2$$

$$0.0055 = 4.9\Delta t^2$$

$$\frac{0.0055}{4.9} = \Delta t^2$$

$$\sqrt{\frac{0.0055}{4.9}} = \sqrt{\Delta t^2}$$

$$0.0335_{sec} = \Delta t$$

$\Delta t = 0.0335$ sec

$\Delta x = 3m$ (distance bullet travelled after hitting Horatio's shoulder)

$$V_{ix} = \frac{\Delta x}{\Delta t}$$

$$V_{ix} = \frac{3}{0.0335 \text{ sec}}$$

$$\boxed{V_{ix} = 89.55 m/s}$$

compare this answer with the reduced velocity of the bullets from each firearm

30% slow (from shoulder)

0.357 magnum (Melv Redwood) = 442 m/s × 0.3 = 132.6 m/s
0.45 AcP FMJ (Aloisis Datacly) = 250 m/s × 0.3 = 75 m/s
0.38 Special (Janice Jackson) = 300 m/s × 0.3 = 90 m/s

∴ Janice Jackson committed the shooting, given that her firearm's 90m/s was closest matched to that which struck Horatio's shoulder