5.

a) 
\[ a = -g j \rightarrow v = \nu_0 - gtj = 2i - gtj \]
\[ s = s_{02t} - \frac{1}{2}gt^2j = 3.5j + 2ti - \frac{1}{2}gt^2j \]
\[ s = 2ti + \left(3.5 - \frac{1}{2}gt^2\right)j \]
when \( y=0, t= \text{sqrt}(7/g) \)
\[ 2 \times \text{sqrt}(7/g) = 0.94\text{ft} \]
speed \( = 2i - \text{sqrt}(7g)j = 15\text{ ft/s} \)

b) 
\[ t = \text{sqrt} \left(\frac{7}{9}\right) \rightarrow \frac{dy}{dx} = \frac{dy}{dt} = -g \frac{t}{2} = -g \frac{s\text{qrt} \left(\frac{7}{g}\right)}{2} = -\frac{s\text{qrt} \left(7g\right)}{2} \]
\[ \cot \theta = \frac{s\text{qrt} \left(7g\right)}{2}, \theta = 7.6^\circ \]

c) 
\[ |v| = s\text{qrt} \left(4 + 7g\right) \]
rebounce \( = 0.8 \times \text{sqrt} \left(4 + 7g\right) = 12.08\text{ft/s} \)
at \(90^\circ \) 
\[ d = \frac{\nu_o \sin(2\alpha)}{g} \text{ when } \nu_o = 12.08 \text{ and } \alpha = 82.38^\circ \]
d \( = 1.197\text{ ft}, \text{so ball strikes at } 2 \text{sqrt}(7/g) + 1.197 = 2.13\text{ft} \)