A gun fires a large, slow projectile upwards alongside your building. You have a window that is 9.00 ft from top to bottom. You time the arrival of the projectile at the bottom of your window at 4.00 s and the top at 4.10 s (after leaving the ground). Be careful about rounding off too soon in this problem.

(a) Calculate the initial velocity of the projectile when it left the ground.
(b) Calculate how far it is from the ground to the bottom of your window.

\[ t_2 = 4.10 \text{ sec} \]
\[ b = 9 \text{ ft} \]
\[ t_1 = 4.00 \text{ sec} \]

\[ \Delta y = V_0' t + \frac{1}{2} a t^2 \]
\[ V_0' = \frac{(\Delta y - \frac{1}{2} a t^2)}{\Delta t} \]
\[ = \left( \frac{9 + \frac{1}{2} (32)(0.1)^2}{0.1} \right) = 91.6 \text{ ft/sec} \]

Use \( V_0 \) as final velocity \( V_f \) for the period starting at the ground.

\[ V = V_0' + at \]
\[ = 91.6 \text{ ft/sec} \]
\[ V_0 = (91.6) + (32)(4) \]
\[ = (219.6) \text{ ft/sec} \rightarrow 220 \text{ ft/sec to 3 sig fig} \]

\[ V_0'^2 = V_0^2 + 2ad \]
\[ d = \frac{V_0'^2 - V_0^2}{2a} = \frac{(91.6)^2 - (220)^2}{2(32)} \]
\[ = 629.4 \text{ ft} \]