Worksheet for Exploration 2.6: Toss the Ball to Barely Touch the Ceiling

To show your coordination, you try to toss a ball straight upward so that it just barely touches the ceiling (position is given in meters and time is given in seconds). What initial velocity is required? In this Exploration the acceleration of the ball is -9.8 m/s². Calculate this initial velocity and then test your answer by typing the initial velocity in the text box and clicking the "set velocity and play" button. Restart.

i. Calculate the velocity required to just have the ball reach the ceiling. Check to see that this is correct by running the animation.

\[ V_{\text{launch}} = \]______

ii. For the speed in i, how fast is the ball moving halfway to the ceiling. Explain this result.

\[ V_{\text{half height}} = \]______

iii. At what time do you expect the ball to move at half the speed that it was launched at, and what height is that? Be able to predict these results.

\[ t_{\text{half speed}} = \]

\[ \text{height} = \]______