## Question:

Stones are thrown horizontally with the same velocity from the tops of two different buildings. One stone lands twice as far from the base of the building from which it was thrown as does the other stone. Find the ratio of the height of the taller building to the height of the shorter building

## Answer:

Distance from the base of the building to place where stone landing:

$$
l=v t
$$

where $v$ is velocity, $t$ is time.
Time can be found from:

$$
h=\frac{g t^{2}}{2}
$$

where $h$ is height of the building

$$
t=\sqrt{\frac{2 h}{g}}
$$

Therefore:

$$
\begin{gathered}
l_{1}=v \sqrt{\frac{2 h_{1}}{g}}, \quad l_{2}=v \sqrt{\frac{2 h_{1}}{g}} \\
\frac{l_{1}}{l_{2}}=\sqrt{\frac{h_{1}}{h_{2}}}=2 \\
\frac{h_{1}}{h_{2}}=4
\end{gathered}
$$

Answer: 4

