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Discussion Section #

REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

(a) Convert 75.2 m/s to mi/hr.
\[
\frac{75.2 \text{ m/s} \times 3.28 \text{ ft/m} \times \frac{1 \text{ mi}}{5280 \text{ ft}} \times \frac{3600 \text{ sec}}{1 \text{ hr}}}{\text{mi/hr}} = 168 \text{ mi/hr}
\]

(b) A rock is dropped on the moon. What is its speed after falling 175 m?
\[
\begin{align*}
V^2 &= V_o^2 + 2a(x-x_0) \\
V &= \sqrt{2(-1.67 \text{ m/s}^2)(-175 \text{ m})} = 24.7 \text{ m/s}
\end{align*}
\]

(c) On a small planet "g" is measured to be 1.75 m/s². Express this in ft/s²
\[
1.75 \text{ m/s}^2 \times \frac{3.28 \text{ ft/m}}{\text{m}} = 5.74 \text{ ft/s}^2
\]

(d) A drag racer accelerates from 0 to 200 mi/hr in 1/4 miles. Calculate the average acceleration in ft/s².
\[
\begin{align*}
V^2 &= V_o^2 + 2a(x-x_0) \\
a &= \frac{(200 \text{ m/hr})^2}{2(\frac{1}{4} \text{ mi})} \times \frac{5280 \text{ ft}}{\text{m}} \times \frac{1 \text{ hr}}{3600 \text{ sec}} = 32.1 \text{ ft/s}^2
\end{align*}
\]

(e) A sphere of unknown material has a radius of 3.50 cm. If its mass is 2.40 kg, calculate its density in kg/m³.
\[
\begin{align*}
V &= \frac{4}{3} \pi r^3 \\
\rho &= \frac{m}{V} = \frac{2.40 \text{ kg}}{\frac{4}{3} \pi (0.035 \text{ m})^3} = 1.34 \times 10^4 \text{ kg/m}^3
\end{align*}
\]