Problem 31

The speed limit on some interstate highways is roughly 100 km/h. (a) What is this in meters per second? (b) How many miles per hour is this?

Solution

Multiply by the appropriate conversion factors to get the desired units.

$$100\ \frac{\text{km}}{\text{h}} = 100\ \frac{\cancel{\text{km}}}{\cancel{\text{h}}} \times \frac{1000\ \text{m}}{1\ \cancel{\text{km}}} \times \frac{1\ \cancel{\text{h}}}{60\ \cancel{\text{min}}} \times \frac{1\ \cancel{\text{min}}}{60\ \text{s}} \approx 27.8\ \frac{\text{m}}{\text{s}}$$

$$100\ \frac{\text{km}}{\text{h}} = 100\ \frac{\cancel{\text{km}}}{\text{h}} \times \frac{1000\ \cancel{\text{m}}}{1\ \cancel{\text{km}}} \times \frac{1250\ \cancel{\text{ft}}}{381\ \cancel{\text{m}}} \times \frac{1\ \text{mi}}{5280\ \cancel{\text{ft}}} \approx 62.1\ \frac{\text{mi}}{\text{h}}$$