Exercise 24

Convert the following to SI units:

a. 8.0 in

b. 66 ft/s

c. 60 mph

d. $14\ \text{in}^2$

Solution

Use conversion factors to convert each quantity to SI units.

a. $$8.0\ \cancel{\text{in}} \times \frac{2.54\ \cancel{\text{cm}}}{1\ \cancel{\text{in}}} \times \frac{1\ \text{m}}{100\ \cancel{\text{cm}}} \approx 0.20\ \text{m}$$

b. $$66\ \frac{\cancel{\text{ft}}}{\text{s}} \times \frac{12\ \cancel{\text{in}}}{1\ \cancel{\text{ft}}} \times \frac{2.54\ \cancel{\text{cm}}}{1\ \cancel{\text{in}}} \times \frac{1\ \text{m}}{100\ \cancel{\text{cm}}} \approx 2.0 \times 10^1\ \frac{\text{m}}{\text{s}}$$

c. $$60\ \frac{\cancel{\text{mi}}}{\cancel{\text{h}}} \times \frac{5280\ \text{ft}}{1\ \cancel{\text{mi}}} \times \frac{12\ \cancel{\text{in}}}{1\ \text{ft}} \times \frac{2.54\ \cancel{\text{cm}}}{1\ \cancel{\text{in}}} \times \frac{1\ \text{m}}{100\ \cancel{\text{cm}}} \times \frac{1\ \cancel{\text{h}}}{60\ \cancel{\text{min}}} \times \frac{1\ \cancel{\text{min}}}{60\ \text{s}} \approx 27\ \frac{\text{m}}{\text{s}}$$

d. $$14\ \cancel{\text{in}}^2 \times \left(\frac{2.54\ \cancel{\text{cm}}}{1\ \cancel{\text{in}}}\right)^2 \times \left(\frac{1\ \text{m}}{100\ \cancel{\text{cm}}}\right)^2 \approx 0.0090\ \text{m}^2$$