Exercise 25

Convert the following to SI units:

a. 75 in

b. 3.45×10^6 yr

c. 62 ft/day

d. 2.2×10^4 mi^2

Solution

Use conversion factors to convert each quantity to SI units.

a. $$75 \cancel{\text{in}} \times \frac{2.54 \cancel{\text{cm}}}{1 \cancel{\text{in}}} \times \frac{1 \text{ m}}{100 \cancel{\text{cm}}} \approx 1.9 \text{ m}$$

b. $$3.45 \times 10^6 \cancel{\text{yr}} \times \frac{365 \cancel{\text{days}}}{1 \cancel{\text{yr}}} \times \frac{24 \cancel{\text{h}}}{1 \cancel{\text{days}}} \times \frac{60 \cancel{\text{min}}}{1 \cancel{\text{h}}} \times \frac{60 \text{ s}}{1 \cancel{\text{min}}} \approx 1.09 \times 10^{14} \text{ s}$$

c. $$62 \frac{\cancel{\text{ft}}}{\cancel{\text{day}}} \times \frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}} \times \frac{2.54 \cancel{\text{cm}}}{1 \cancel{\text{in}}} \times \frac{1 \text{ m}}{100 \cancel{\text{cm}}} \times \frac{1 \cancel{\text{day}}}{24 \cancel{\text{hr}}} \times \frac{1 \cancel{\text{hr}}}{60 \cancel{\text{min}}} \times \frac{1 \cancel{\text{min}}}{60 \text{ s}} \approx 2.2 \times 10^{-4} \frac{\text{m}}{\text{s}}$$

d. $$2.2 \times 10^4 \cancel{\text{mi}}^2 \times \left(\frac{5280 \cancel{\text{ft}}}{1 \cancel{\text{mi}}}\right)^2 \times \left(\frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}}\right)^2 \times \left(\frac{2.54 \cancel{\text{cm}}}{1 \cancel{\text{in}}}\right)^2 \times \left(\frac{1 \text{ m}}{100 \cancel{\text{cm}}}\right)^2 \approx 5.7 \times 10^{10} \text{ m}^2$$