Unit Conversions: A Short Drive Home

Suppose that you drive the 10.0 km from your university to home in 20.0 min.

Calculate your average speed (a) in kilometers per hour (km/h) and (b) in meters per second (m/s). [Note: Average speed is distance traveled divided by time of travel.]

$d = 10.0$ km

$t = 20.0$ min.

speed : $v = \frac{d}{t}$

(a) convert to $\frac{km}{hr}$. d in km already

$t \rightarrow hr$ $\quad t = 20 \text{ min} \left(\frac{1 \text{ hr}}{60 \text{ min}}\right)$

$t = 0.33333 \text{ hr}$

$v = \frac{d}{t} = \frac{10.0 \text{ km}}{0.33333 \text{ hr}} = 30.0003$

$$\boxed{v = 30.0 \frac{km}{hr}}$$

(b) convert to $\frac{m}{s}$ $\quad d = 10.0 \text{ km} \left(\frac{1000 \text{ m}}{1 \text{ km}}\right)$

$d = 10{,}000$ m

$$t = 20.0 \text{ min} \left(\frac{60 \text{ s}}{1 \text{ min}} \right) = 1200 \text{ s}$$

$$v = \frac{d}{t} = \frac{10000 \text{ m}}{1200 \text{ s}} = \boxed{8.33 \frac{\text{m}}{\text{s}}}$$