2.1 A car travels in the $+x$-direction on a straight and level road. For the first 4.00 s of its motion, the average velocity of the car is $v_{\text{av}-x} = 6.25$ m/s. How far does the car travel in 4.00 s?

$$v_{\text{av}-x} = \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1} \tag{1}$$

$$6.25 = \frac{\Delta x}{4.00\,\text{s} - 0.00\,\text{s}} \tag{2}$$

$$\Delta x = 25.0\,\text{m} \tag{3}$$

2.3 Trip Home. You normally drive on the freeway between San Diego and Los Angeles at an average speed of 105 km/h (65 mi/h), and the trip takes 1 h and 50 min. On a Friday afternoon, however, heavy traffic slows you down and you drive the same distance at an average speed of only 70 km/h (43 mi/h). How much longer does the trip take?

$$v_{av-x} = \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1} \tag{4}$$

$$105\,\text{km/h} = \frac{\Delta x}{1\,\text{h}\,50\,\text{min}} \tag{5}$$

$$\Delta x = (105\,\text{km/h})\left(\frac{11}{6}\,\text{h}\right) = 192.5\,\text{km} \tag{6}$$

$$70\,\text{km/h} = \frac{192.5\,\text{km}}{\Delta t} \tag{7}$$

$$\Delta t = \frac{192.5\,\text{km}}{70\,\text{km/h}} = 2.75\,\text{h} \tag{8}$$

$$\Delta\left(\Delta t\right) = (2.75\,\text{h})\left(\frac{60\,\text{min}}{1\,\text{h}}\right) - \left(\frac{11}{6}\,\text{h}\right)\left(\frac{60\,\text{min}}{1\,\text{h}}\right) = 55\,\text{min} \tag{9}$$

2.5 Starting from the front door of a ranch house, you walk 60.0 m due east to a windmill, turn around, and then slowly walk 40.0 m west to a bench, where you sit and watch sunrise. It takes you 28.0 s to walk from the house to the windmill and then 36.0 s to walk from the windmill to the bench, what are your (a) average velocity and (b) average speed?

$$v_{\text{av}-x} = \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1} \tag{10}$$

$$v_{\text{av}-x} = \frac{20.0\,\text{m}}{28.0\,\text{s} + 36.0\,\text{s}} \approx 0.313\,\text{m/s} \tag{11}$$

$$s_{\text{av}-x} = \frac{100.0\,\text{m}}{28.0\,\text{s} + 36.0\,\text{s}} \approx 1.56\,\text{m/s} \tag{12}$$