

Problem Set 1 Chap. 1 p. 14 # 3,5,9,17,20,23,26,27
Chap. 2 p. 30 # 1,16,58,60,64,67

Chapter 1 p. 14

3. It does not have any scientific basis.

5. It must: 1) account for the known data, 2) make predictions that can be tested, and 3) have a scientific basis.

9. The United States is the only major country that has not adopted the metric system.

17. 10^3 miles (3000 miles) or 10^3 kilometers (4800 km) or 10^6 m

$$20. (1 \text{ yr}) \left[\frac{365.25 \text{ days}}{1 \text{ yr}} \right] \left[\frac{24 \text{ h}}{1 \text{ day}} \right] \left[\frac{60 \text{ min}}{1 \text{ h}} \right] \left[\frac{60 \text{ s}}{1 \text{ min}} \right] = 3.16 \times 10^7 \text{ s}$$

$$23. (1 \text{ m}) \left[\frac{100 \text{ cm}}{1 \text{ m}} \right] \left[\frac{1 \text{ in}}{2.54 \text{ cm}} \right] = 39.4 \text{ in}$$

26.(a) 2.378×10^9 m (b) 3.24×10^{-3} ft

27.(a) 4300 g (b) 0.0000812 m

Chapter 2 p. 30

1. From the varying spaces we know that the puck moved different distances in equal amounts of time. The puck in this diagram speeded up, reached a maximum, and then slowed to (approximately) its initial speed.

16. The object is slowing down from C to D so the average speed in the interval is less than the instantaneous speed at C and greater than the instantaneous speed at D.

$$58. (100 \text{ mph}) \left[\frac{0.447 \text{ m/s}}{1 \text{ mph}} \right] = 44.7 \text{ m/s}$$

$$60. \bar{s} = \frac{d}{t} = \frac{26.2 \text{ miles}}{3 \text{ h}} = 8.73 \text{ mph}$$

$$64. d = \bar{s}t = (10 \text{ m/s})(8 \text{ h}) \left[\frac{60 \text{ min}}{1 \text{ h}} \right] \left[\frac{60 \text{ sec}}{1 \text{ min}} \right] \left[\frac{1 \text{ km}}{1000 \text{ m}} \right] = 288 \text{ km}$$

$$67. t = \frac{d}{\bar{s}} = \frac{100 \text{ m}}{25 \text{ m/s}} = 4 \text{ s} \quad \text{compared to } 10 \text{ s for humans}$$