

Day 8 - Rate Conversions

1. How many feet per second is 60 miles per hour?

$\frac{\text{miles}}{\text{hour}} \rightarrow \frac{\text{feet}}{\text{second}}$

$$\frac{60 \text{ miles}}{1 \text{ hour}} \cdot \frac{5,280 \text{ feet}}{1 \text{ mile}} \cdot \frac{1 \text{ hour}}{60 \text{ minutes}} \cdot \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{316,800 \text{ ft}}{3600 \text{ seconds}} = \boxed{88 \text{ ft per second}}$$

2. How many inches per second is 50 yards per hour?

$\frac{\text{yards}}{\text{hour}} \rightarrow \frac{\text{inches}}{\text{seconds}}$

$$\frac{50 \text{ yards}}{1 \text{ hour}} \cdot \frac{3 \text{ feet}}{1 \text{ yard}} \cdot \frac{12 \text{ inches}}{1 \text{ foot}} \cdot \frac{1 \text{ hour}}{60 \text{ minutes}} \cdot \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{1800 \text{ in}}{3600 \text{ seconds}} = \boxed{.5 \text{ inch per second}}$$

3. How many meters per week is 2.6 kilometers per day?

$\frac{\text{km}}{\text{day}} \rightarrow \frac{\text{m}}{\text{week}}$

$$\frac{2.6 \text{ km}}{1 \text{ day}} \cdot \frac{1,000 \text{ meters}}{1 \text{ km}} \cdot \frac{7 \text{ days}}{1 \text{ week}} = \boxed{\frac{18,200 \text{ meters}}{1 \text{ week}}}$$

4. How many kilograms per second are in 721 lbs per week? (Use 1 kg = 2.2 pound) $\frac{\text{pounds}}{\text{week}} \rightarrow \frac{\text{kg}}{\text{hour}}$

$$\frac{721 \text{ kg}}{1 \text{ week}} \cdot \frac{2.2 \text{ lbs}}{1 \text{ kg}} \cdot \frac{1 \text{ week}}{7 \text{ days}} \cdot \frac{1 \text{ day}}{24 \text{ hours}} = \frac{1586.2 \text{ lbs}}{168 \text{ hours}} = \boxed{\frac{9.44 \text{ lbs}}{1 \text{ hour}}}$$

5. Imagine that water is leaking from a container, at a rate of 1.2 ml/hour. If this rate does not change, how many milliliters of water will be lost in a week?

$\frac{\text{mL}}{\text{hour}} \rightarrow \frac{\text{mL}}{\text{week}}$

$$\frac{1.2 \text{ mL}}{1 \text{ hour}} \cdot \frac{24 \text{ hour}}{1 \text{ day}} \cdot \frac{7 \text{ days}}{1 \text{ week}} = \boxed{\frac{201.6 \text{ mL}}{1 \text{ week}}}$$

6. A pitcher throws a 98 mph fastball. How fast is that in feet per second? $\frac{\text{miles}}{\text{hour}} \rightarrow \frac{\text{feet}}{\text{second}}$

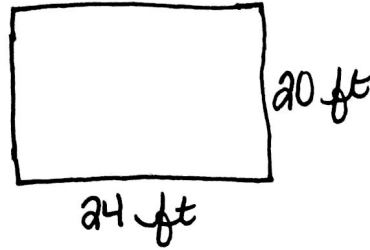
$$\frac{98 \text{ miles}}{1 \text{ hour}} \cdot \frac{5,280 \text{ feet}}{1 \text{ mile}} \cdot \frac{1 \text{ hour}}{60 \text{ minutes}} \cdot \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{517,440 \text{ feet}}{3600 \text{ seconds}} = \boxed{143.7 \text{ ft per second}}$$

7. A room measures 240 inches wide by 288 inches long. What is the perimeter of the room measured in feet?

~~(Use 2.54 cm = 1 in)~~

$$240 \text{ in} \times \frac{1 \text{ foot}}{12 \text{ in}} = 20 \text{ ft}$$

$$288 \text{ in} \times \frac{1 \text{ foot}}{12 \text{ in}} = 24 \text{ ft}$$



$$P = 20 + 20 + 24 + 24$$
$$= \boxed{88 \text{ feet}}$$

8. In my chemistry class, 28 students are each given 3 pens. If there are 6 pens in one package, priced at \$1.88 per package, what is the total cost of giving away pens?

$$28 \times 3 = 84 \text{ pens total}$$

$$84 \div 6 = 14 \text{ packages}$$

$$14 \times \$1.88 = \boxed{\$26.32 \text{ total}}$$