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1. How many feet are in 30 inches?

$$(30 \text{ inches}) \cdot \left(\frac{1 \text{ foot}}{12 \text{ inches}} \right) = 2.5 \text{ feet}$$

2. Three yards is how many centimeters?

$$\begin{aligned} 3 \text{ yards} &= (3 \text{ yards}) \cdot \left(\frac{3 \text{ feet}}{1 \text{ yard}} \right) \cdot \left(\frac{12 \text{ inches}}{1 \text{ foot}} \right) \cdot \left(\frac{2.54 \text{ centimeters}}{1 \text{ inch}} \right) \\ &= 274.32 \text{ centimeters} \end{aligned}$$

3. (TRIGONOMETRY) How many radians are in 3 complete revolutions?

$$(3 \text{ revolutions}) \cdot \left(\frac{2 \text{ radians}}{1 \text{ revolution}} \right) = 6 \text{ radians}$$

4. (PHYSICS) A train is traveling at 60 miles per hour. The brakes are applied and the train comes to a complete halt in 30 seconds. Find the rate of deceleration in feet per second squared.

$$v = v_0 + at \quad \text{(the formula to use)}$$

$$0 = \left(\frac{60 \text{ miles}}{1 \text{ hour}} \right) + a \cdot (30 \text{ seconds}) \quad \text{(solving for } a \text{ in this equation yields)}$$

$$a = -\left(\frac{60 \text{ miles}}{1 \text{ hour}} \right) \cdot \left(\frac{1}{30 \text{ seconds}} \right)$$

$$a = -\left(\frac{60 \text{ miles}}{1 \text{ hour}} \right) \cdot \left(\frac{1}{30 \text{ seconds}} \right) \cdot \left(\frac{5280 \text{ feet}}{1 \text{ mile}} \right) \cdot \left(\frac{1 \text{ hour}}{60 \text{ minutes}} \right) \cdot \left(\frac{1 \text{ minute}}{60 \text{ seconds}} \right)$$

$$a = -2.93 \text{ ft/s}^2$$

5. (CHEMISTRY) Liquid mercury has a density of 13.6 g/ml at 20°C. Find the mass in kilograms of 804 liters of mercury at 20 degrees Celsius.

$$\text{mass} = (\text{density}) \cdot (\text{volume}) \quad \text{(replacing the given values into this formula yields)}$$

$$= \left(\frac{13.6 \text{ grams}}{1 \text{ milliliter}} \right) \cdot \left(\frac{804 \text{ liters}}{1} \right)$$

$$= \left(\frac{13.6 \text{ grams}}{1 \text{ milliliter}} \right) \cdot \left(\frac{804 \text{ liters}}{1} \right) \cdot \left(\frac{1000 \text{ milliliters}}{1 \text{ liter}} \right) \cdot \left(\frac{1 \text{ kilogram}}{1000 \text{ grams}} \right)$$

$$= 10,934.4 \text{ kg}$$

