

1. You've just used 19.4 gallons of high-gloss red enamel to paint your old BMW. If the VOC (volatile organic compound) content of the enamel is 483 grams of VOC per liter of paint, how many pounds of VOC did you just emit into the atmosphere?

$$19.4 \text{ gal} \longrightarrow \text{lb VOC}$$

$$\searrow \text{L} \rightarrow \text{g} \nearrow$$

$$19.4 \text{ gal} \left(\frac{3.785 \text{ L}}{1 \text{ gal}} \right) \left(\frac{483 \text{ g VOC}}{1 \text{ L}} \right) \left(\frac{1 \text{ lb}}{453.6 \text{ g}} \right) = 78.2 \text{ lbs}$$

2 sig 2 sig
2 sf 2 units

2. The annual production of sodium hydroxide in the United States in 1994 was 25.83 billion pounds. The density of sodium hydroxide is 2.130 grams per cubic centimeter. How many cubic miles of sodium hydroxide were produced in 1994?

$$25.83 \text{ billion lbs} \longrightarrow \text{mi}^3 \text{ NaOH}$$

$$\searrow \text{g} \longrightarrow \text{cm}^3 \longrightarrow \text{in}^3 \longrightarrow \text{ft}^3$$

$$25.83 \times 10^9 \text{ lbs} \left(\frac{453.6 \text{ g}}{1 \text{ lb}} \right) \left(\frac{1 \text{ cm}^3}{2.130 \text{ g}} \right) \left(\frac{1 \text{ in}}{2.54 \text{ cm}} \right)^3 \left(\frac{1 \text{ ft}}{12 \text{ in}} \right)^3 \left(\frac{1 \text{ mi}}{5280 \text{ ft}} \right)^3$$

$$= 0.001320 \text{ mi}^3$$

2 sig 2 sig
2 sf 2 units

3. The longest recorded jump by a flea is 13.0 inches. How far is this jump in nm?

inches \rightarrow cm \rightarrow m \rightarrow nm

16

$$13.0 \text{ in} \left(\frac{2.54 \text{ cm}}{1 \text{ in}} \right) \left(\frac{1 \text{ m}}{100 \text{ cm}} \right) \left(\frac{10^9 \text{ nm}}{1 \text{ m}} \right) = 3.30 \times 10^8 \text{ nm}$$

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4. What volume, in liters, is occupied by 264.532 grams of mercury?
(The density of mercury is 13.6 g/ml.)

g \rightarrow mL \rightarrow L

14

$$264.532 \text{ g} \left(\frac{1 \text{ mL}}{13.6 \text{ g}} \right) \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) = 0.0195 \text{ L}$$

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5. How many hours would it take me to get to San Francisco if my average speed for the entire trip was 75 miles per hour? Assume the distance is 500.0 miles

mi \rightarrow hr

12

$$500.0 \text{ mi} \left(\frac{1 \text{ hr}}{75 \text{ mi}} \right) = 6.7 \text{ hrs}$$

2 2 2 2

42
42
16 hr