

U1-LM2B- Worksheet – Significant Figures and Unit Conversions

1. How many significant figures are in the following measurements?
AND What is the uncertainty in each of these measurements?

1304 mm **4 sig figs, uncertainty ± 1**

500.0 in **4 sig figs, uncertainty $\pm .1$**

40.002 Kg **5 sig figs, uncertainty $\pm .001$**

0.04320 gal **4 sig figs, uncertainty $\pm .00001$**

2030 g **3 sig figs, uncertainty ± 10**

0.01 yd **1 sig fig, uncertainty $\pm .01$**

2. Express the following in the proper number of significant figures:

3.4 in + 0.20 in + 14.123 in = **17.7 in**

12,000 in + 535 in + 25.0 in = **13000 in**

1.0327 miles - 1.00044 miles = **.0322 miles**

45 in X 3.25 in = **150 in²**

1200 in \div 4 in = **300**

3. Which is larger?

150 cm or 0.15 m? **150 cm**

2 L or 8.5 m³? **8.5 m³**

150 ft or 1500 cm? **150 ft**

4. Express 2.61 cubic feet in cubic millimeters.

$$\frac{2.61 \text{ ft}^3}{1 \text{ ft}^3} \times \frac{1728 \text{ in}^3}{1 \text{ in}^3} \times \frac{16.4 \text{ cm}^3}{1 \text{ cm}^3} \times \frac{1000 \text{ mm}^3}{1 \text{ cm}^3} = 7.40 \times 10^7 \text{ mm}^3$$

5. The density of water at 25 °C is 1 g/mL. Calculate the density of water in lb/ft³.
(1 lb = 454 g, 1ft = 12 in, 1 in = 2.54 cm and 1 cm³ = 1 mL)

$$\frac{1 \text{ g}}{1 \text{ mL}} \times \frac{1 \text{ lb}}{454 \text{ g}} \times \frac{1 \text{ mL}}{1 \text{ cm}^3} \times \frac{2.54^3 \text{ cm}^3}{1 \text{ in}^3} \times \frac{12^3 \text{ in}^3}{1 \text{ ft}^3} = 60 \text{ lb/ft}^3 = 62.4 \text{ lb/ft}^3$$

6. A swimmer completed a 1650. yd race in 14 minutes and 48 seconds. What is the swimmer's average speed in miles/hour? (1mile = 1760 yd)

$$\frac{1650 \text{ yd}}{888 \text{ sec}} \left| \frac{1 \text{ mile}}{1760 \text{ yd}} \right| \frac{3600 \text{ sec}}{1 \text{ hour}} = 3.801 \text{ mi/hr}$$

7. A cube of metal is 1.42 millimeters on an edge. Its mass is 0.0163 Kg. Express its density in g/ml (1 ml = 1 cm³)

$$\frac{1.42 \text{ mm}}{10 \text{ mm}} \left| \frac{1 \text{ cm}}{10 \text{ mm}} \right| = .142 \text{ cm} \quad \frac{0.0163 \text{ Kg}}{0.142^3 \text{ cm}^3} \left| \frac{1000 \text{ g}}{1 \text{ Kg}} \right| \frac{1 \text{ cm}^3}{1 \text{ mL}} = 5690 \text{ g/mL}$$

8. The price of gasoline is \$3.59 per gallon in Texas. How much does it cost to fill an 80.0 L tank? How much would it cost to travel 180. km driving at 25 mpg ? (1 gal = 3.78 L, 1 mi = 1.61 km)

$$\frac{80.0 \text{ L}}{3.78 \text{ L}} \left| \frac{1 \text{ gal}}{1 \text{ gal}} \right| \frac{\$3.59}{1 \text{ gal}} = \$75.98 = \$76.0$$

$$\frac{180 \text{ km}}{1.61 \text{ km}} \left| \frac{1 \text{ mi}}{25 \text{ mi}} \right| \frac{1 \text{ gal}}{1 \text{ gal}} \frac{\$3.59}{1 \text{ gal}} = \$16.05 = \$16.0$$

9. A car travels at a speed of 45 mi/hr. How many meters does it travel per second? (1 mi = 1.61 km)

$$\frac{45 \text{ mi}}{1 \text{ hr}} \left| \frac{1.61 \text{ km}}{1 \text{ mi}} \right| \frac{1000 \text{ m}}{1 \text{ km}} \left| \frac{1 \text{ hr}}{3600 \text{ sec}} \right| = 20. \text{ m/s}$$