Measurement Homework Answer Key

Quantitative measures use numbers and units, like 5.34 g/cm^3 or 21.48 grams.
Qualitative measures use only words, like blue, or cold, or soft.
Accurate measures are measures that you make that are close to correct or they are exactly correct.
Precise measures are measures that you make that are close together, they can be accurate, or not.

Element names	Element symbols	Element density
Titanium	Ti	4.506 g/cm^3
Niobium	Nb	8.57 g/cm^3
Silver	Ag	10.5 g/cm^3
Lead	Pb	11.3 g/cm^3
Mercury	Hg	13.5336 g/cm^3
Platinum	Pt	21.5 g/cm^3

$6.0 \times 10^4 \rightarrow \quad 0.6 \times 10^5$ $+\ 1.5 \times 10^5 \rightarrow +\ 1.5 \times 10^5$ 1.7×10^5	$7.2 \times 10^3 \rightarrow \quad 0.06 \times 10^4$ $+\ 2.2 \times 10^4 \rightarrow +\ 2.2 \times 10^4$ 2.3×10^4	$1.43 \times 10^5 \rightarrow \quad 14.3 \times 10^4$ $-\ 5.67 \times 10^4 \rightarrow +\ 2.2 \times 10^4$ 17×10^4 1.7×10^5
$5.60 \times 10^{12} \rightarrow \quad 560. \times 10^{10}$ $-\ 7.12 \times 10^{10} \rightarrow -\ 7.12 \times 10^{10}$ 553×10^{10} 5.53×10^{12}	4.0×10^4 $\times\ 6.0 \times 10^5$ 24×10^9 2.4×10^{10}	4.8×10^3 $\times\ 2.2 \times 10^2$ 11×10^5 1.1×10^6
1.4×10^{-5} $\times\ 5.67 \times 10^{-6}$ 7.9×10^{-11}	5.60×10^{12} $\times\ 7.102 \times 10^4$ 39.8×10^{16} 3.98×10^{17}	☺

$(6.0 \times 10^{15}) \div (4.0 \times 10^4) = 1.5 \times 10^9$	$(8.3 \times 10^5) \div (5.1 \times 10^2) = 1.6 \times 10^3$
$(3.04 \times 10^5) \div (9.89 \times 10^2) = 0.307 \times 10^3 = 3.07 \times 10^2$	$(3.40 \times 10^{25}) \div (2.1 \times 10^{21}) = 1.6 \times 10^4$

The "teapot rule" reminds you that it is proper to have a coefficient that is at least 1, and less than 10.
If your answer turns out to have a funky coefficient, you have to "teapot" your answer, meaning you must increase or decrease the coefficient, and then adjust your exponent to keep your converted answer equal. If coefficients increase, then exponents decrease. If coefficients decrease, then the exponent increases.
Teapots work this way, tip spout "down" and handle goes up proportionally.

You measure your height to be 68.4 inches, but your teacher wants you to convert that using dimensional analysis into MILES. (this is a small decimal number)
Use the units I gave you - stay off the internet. Answer in scientific notation.

$$\frac{68.4 \text{ inch}}{1} \times \frac{1 \text{ foot}}{12 \text{ inches}} \times \frac{1 \text{ mile}}{5280 \text{ feet}} = \frac{68.4}{63360} = 0.001079545 \text{ miles}$$

1.08×10^{-3} miles

You watched the women's marathon Olympic race and realized your true calling.
You want to run so you get to wear the cute wreath on your head, so you start training!
Convert 26.2 miles into millimeters using proper sig figs. Answer in scientific notation.

$$\frac{26.2 \text{ mi}}{1} \times \frac{5280 \text{ ft}}{1 \text{ mile}} \times \frac{12 \text{ inches}}{1 \text{ foot}} \times \frac{2.54 \text{ cm}}{1 \text{ inch}} \times \frac{10 \text{ mm}}{1 \text{ cm}} = 42{,}164{,}812.8 \text{ mm}$$

4.22×10^{7} mm

A swimming pool contains 379,300 gallons of water. How many milliliters of water is that?
(0.946 Liters = 1 quart) Answer in scientific notation.

$$\frac{379{,}300 \text{ gal}}{1} \times \frac{4 \text{ quarts}}{1 \text{ gal}} \times \frac{0.946 \text{ Liters}}{1 \text{ quart}} \times \frac{1000 \text{ mL}}{1 \text{ Liter}} = 1{,}435{,}271{,}200 \text{ mL}$$

1.435×10^{9} mL