

+
-
.
.
X

Exponent
EE
EXP

log
 10^x

Students

Academic Departments

Science, Eng. and Arch.

Syllabi

CHM 120

$.001 \text{ Kg}$	$.001 \text{ Km}$	$.001 \text{ KL}$
$\xrightarrow{\text{basic units}} 1 \text{ g}$	1 m	1 L
10 dg	10 dm	10 dL
100 cg	100 cm	100 cL
1000 mg	1000 mm	1000 mL
$1 \times 10^6 \mu\text{g}$	$1 \times 10^6 \mu\text{m}$	$1 \times 10^6 \mu\text{L}$
$1 \times 10^9 \text{ ng}$	$1 \times 10^9 \text{ nm}$	$1 \times 10^9 \text{ nL}$
$1 \times 10^{12} \text{ pg}$	$1 \times 10^{12} \text{ pm}$	$1 \times 10^{12} \text{ pL}$

$\uparrow$ micro
 $\uparrow$ nano
 $\uparrow$ pico

Given = the # that is
originally in the problem.

$$\frac{2.37\cancel{\text{g}} \times 1000\text{mg}}{1\cancel{\text{g}}} = 2370 \text{ mg}$$

$$\frac{\cancel{1000}}{\cancel{1000}} = 1$$

$$\frac{357 \text{ cL} \times 1 \text{ L}}{100 \text{ cL}} = 3.57 \text{ L}$$

C.

2 sig figs
 $\frac{2.0 \text{ m} \times 1 \times 10^9 \text{ nm}}{1 \text{ m}} =$

nm

$$2 \times 10^9$$

$$2000000000 \text{ nm}$$

1 EE 9
EXP
F

$$2.0 \times 10^9 \text{ nm}$$

↑

1-9

~~20.~~
~~.20~~

1G

EXP
EE

$$\frac{8.324 \times 10^{12} \text{ nm} \times 1 \text{ m} \times .001 \text{ km}}{1 \times 10^9 \text{ nm} \times 1 \text{ m}} = \text{km}$$

8324000000

8.324×10^{13}

$$\frac{8.324 \times 10^9}{1 \times 10^9} =$$

8.324 km

1f

$$\frac{5.4 \times 10^3 \text{ mL} \times 1 \text{ L} \times 100 \text{ cL}}{1000 \text{ mL} \times 1 \text{ L}} = \text{cL}$$

$$5.4 \text{ EE } (-) 3$$

(-/+)

$$5.4 \times 10^{-4} \text{ cL}$$

Significant Figures

3.46 3 sig figs
1 2 3

0.358604 6 sig figs
1 2 3 4 5 6

P
↑
decimal
present

0.026 2 sig figs
1 2

A
↑
decimal
absent

~~2.543 × 10⁻⁴~~ 4 sig figs

- ① Start counting when the # is between 1-9.
- ② Once you start counting you cannot stop counting until the end of the #.
- ③ The $\times 10^?$ does not count in Sig figs.

350050 5 sig figs
5 4 3 2 1

P

3×10^4 1 sig fig

A

2A.

2 sig figs

$$\left(\frac{9.5 \text{ gal} \times 4 \text{ qt} \times 946 \text{ mL}}{1 \text{ gal} \times 1 \text{ qt}} \right) =$$

mL

✓ $4 \text{ qt} = 1 \text{ gal}$
 $946 \text{ mL} = 1 \text{ qt}$

$$35948 \text{ mL}$$

$$3.5948 \times 10^4 \text{ mL}$$

$$3.6 \times 10^4 \text{ mL}$$

$$36000 \text{ mL}$$

≠

$$36 \text{ mL}$$

1+1

$$\frac{0.00043 \text{ cL} \times 1 \text{ L} \times .001 \text{ KL}}{100 \text{ cL} \times 1 \text{ L}} =$$

$$\frac{4.3 \times 10^{-7}}{100}$$

① All conversions have an ∞ # of sig figs.

$$1\text{ m} = 1000\text{ mm}$$

② Counting has an ∞ # of sig figs.

Quiz

① Metric - Metric Conversions

② Sig Figs

2B

$$\frac{0.0513 \text{ g} \times 1 \text{ lb}}{454 \text{ g}} = \text{lbs}$$

$$454 \text{ g} = 1 \text{ lb}$$

$$\boxed{1.1299559} \times 10^{-4} \text{ lb}$$
$$1.13 \times 10^{-4} \text{ lb}$$

2c

450. mm

= yds

✓ 1 m = 1000 mm

✓ $100\text{ cm} = 1\text{ m}$

✓ $2.54 \text{ cm} = 1 \text{ in}$

✓ 12 in = 1 ft

✓ 3ft = 1 yd

2D

$$\frac{110 \text{ gts} \times 946 \text{ mL} \times 1 \text{ L} \times .001 \text{ KL}}{1 \text{ gts} \times 1000 \text{ mL} \times 1 \text{ L}} =$$

$$\begin{aligned} \checkmark 946 \text{ mL} &= 1 \text{ gts} & \frac{104.06}{1000} &= \\ \checkmark 1000 \text{ mL} &= 1 \text{ L} & & \\ \checkmark .001 \text{ KL} &= 1 \text{ L} & .10406 \text{ KL} & \\ & & 1.0406 \times 10^{-1} \text{ KL} & \\ & & 1.0 \times 10^{-1} \text{ KL} & \end{aligned}$$

2E

$$\frac{7.28 \times 10^{-6} \text{ fm} \times 1 \text{ m} \times 100 \text{ cm}}{1 \times 10^{15} \text{ fm} \times 1 \text{ m}} = \text{cm}$$

$$\checkmark 1 \times 10^{15} \text{ fm} = 1 \text{ m}$$

$$\checkmark 100 \text{ cm} = 1 \text{ m}$$

$$\frac{7.28 \times 10^{-4}}{1 \times 10^{15}} = 7.28 \times 10^{-19} \text{ cm}$$

Metric to metric conversions
end up with the same # of
sig figs. that you started
with.

21

$$\frac{25 \text{ tons} \times 2000 \text{ lbs} \times 454 \text{ g} \times 100 \text{ cg}}{1 \text{ tons} \times 1 \text{ lb} \times 1 \text{ g}} = \text{cg}$$

✓ $2000 \text{ lbs} = 1 \text{ ton}$

✓ $454 \text{ g} = 1 \text{ lb}$

✓ $100 \text{ cg} = 1 \text{ g}$

$$2270000000 \text{ cg}$$

$$2.27 \times 10^9 \text{ cg}$$

$$2.3 \times 10^9 \text{ cg}$$

2F

$$\frac{12288 \text{ in} \times 1 \text{ ft} \times 1 \text{ mile}}{12 \text{ in} \times 5280 \text{ ft}} = \text{miles}$$

✓ $12 \text{ in} = 1 \text{ ft}$

✓ $5280 \text{ ft} = 1 \text{ mile}$

$$\frac{12288}{63360} = 0.19393939 \text{ miles}$$

$$\boxed{1.9393939} \times 10^{-1} \text{ miles}$$

$$1.9394 \times 10^{-1} \text{ miles}$$