

Dimensional Analysis Exam Review

1) How many kilometers are there in 2.34 meters?

g: 2.34 m

w: ? km

1000m = 1km

$$\frac{2.34 \text{ m}}{1000 \text{ m}} \times \frac{1 \text{ km}}{1} = \frac{2.34 \text{ km}}{1000}$$

0.00234 km

2) What conversion factor would you use to change kilocalories to calories?

g: kcal

w: ? cal

$1000 \text{ cal} = 1 \text{ kcal}$	$\frac{x \text{ kcal}}{1000 \text{ cal}}$	$\frac{1000 \text{ cal}}{1 \text{ kcal}}$
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k H D u d cm
 $1 \text{ m} = 100 \text{ cm}$
 $1 \text{ m} = 1000 \text{ mm}$
 $1000 \text{ m} = 1 \text{ km}$

$\frac{1000 \text{ cal}}{1 \text{ kcal}}$	$\frac{1 \text{ kcal}}{1000 \text{ cal}}$
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3) What conversion factor would you use to convert centimeters to meters?

g: x cm

w: ? m

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

$\frac{x \text{ cm}}{100 \text{ cm}}$	$\frac{1 \text{ m}}{100 \text{ cm}}$
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$\frac{100 \text{ cm}}{1 \text{ m}}$
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$\frac{1 \text{ m}}{100 \text{ cm}}$

4) 270 kg = _____ g

g: 270 kg
w: ? g
1000g = 1 kg

$$\frac{270 \text{ kg} \mid 1000 \text{ g}}{1 \text{ kg}} =$$

270000 g
or
 $2.7 \times 10^5 \text{ g}$

5) 2.5 L = _____ mL

g: 2.5 L
w: ? mL
1 L = 1000 mL

$$\frac{2.5 \text{ L} \mid 1000 \text{ mL}}{1 \text{ L}} =$$

2500 mL
or
 $2.5 \times 10^3 \text{ mL}$

6) 63 cm = _____ mm

g: 63 cm
w: ? mm

$$\frac{63 \text{ cm}}{1 \text{ cm}} \left| \frac{10 \text{ mm}}{1 \text{ cm}} \right. = \boxed{630 \text{ mm}}$$

10 mm = 1 cm

1 m = 100 cm

1 m = 1000 mm

$$\frac{63 \text{ cm}}{100 \text{ cm}} \left| \frac{1000 \text{ mm}}{100 \text{ cm}} \right. = \boxed{630 \text{ mm}}$$

7) 1 m² = _____ cm²

g: 1 m²
w: ? cm²

$$\frac{1 \text{ m}^2}{1 \text{ m}^2} \left| \frac{100^2 \text{ cm}^2}{1 \text{ m}^2} \right. = \boxed{10000 \text{ cm}^2}$$

1 m² = 100² cm²

8) How many seconds are there in 2.00 years? ^{3SF}

g: 2.00y
w: ? sec
1 y = 365d
1 d = 24hr
1 hr = 60min
1 min = 60sec

$$\frac{2.00y}{1y} \times \frac{365d}{1d} \times \frac{24hr}{1hr} \times \frac{60min}{1min} \times \frac{60sec}{1min}$$

=

63072000 sec
or
 6.31×10^7 sec

10) How many atoms of gold are in 7.00 g of gold?
(1 atom of gold = 3.271×10^{-22} g)

use

2nd

)

for
scientific
notation!

g: 7.00g Au

w: ? atoms Au

$$\frac{7.00 \text{g Au}}{3.271 \times 10^{-22} \text{g Au}} = \frac{7}{3.271 \times 10^{-22}}$$

$$2.14 \dots \times 10^{22}$$

$$\boxed{2.14 \times 10^{22} \text{ atoms Au}}$$

11) How many grams per milliliter are there in 5.78 kilograms per liter?

g/mL

kg/L

g: 5.78 kg/L
w: ? g/mL

1000g = 1kg
1L = 1000mL

$$\frac{5.78 \text{ kg}}{1 \text{ L}} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ L}}{1000 \text{ mL}} = \frac{5780 \text{ g}}{1000 \text{ mL}}$$

5.78 g/mL

12) An object is traveling at a speed of 7500.0 centimeters per second. How many kilometers per day is this?

cm/s

g: 7500.0 cm/s
w: ? km/d

100cm = 1m
1000m = 1km

60s = 1min
60min = 1hr
24hr = 1d

$$\begin{array}{c}
 7500.0 \text{ cm} \quad | \quad 1 \text{ hr} \quad | \quad 1 \text{ km} \quad | \quad 60 \text{ s} \quad | \quad 60 \text{ min} \quad | \quad 24 \text{ hr} \\
 \hline
 \cancel{\text{s}} \quad | \quad 100 \text{ cm} \quad | \quad 1000 \text{ m} \quad | \quad 1 \text{ min} \quad | \quad 1 \text{ hr} \quad | \quad 1 \text{ day}
 \end{array}$$

$$= \frac{648000000 \text{ km}}{100000 \text{ day}}$$

$$= \boxed{6480.0 \text{ km/d}}$$

13) The speed of a rocket is measured to be 145.3 kilometers per hour. How many meters per second is this?

g: 145.3 km/hr
w: ? m/s

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

$$1\text{hr} = 60\text{min}$$

$$1\text{min} = 60\text{sec}$$

$$\frac{145.3\text{km}}{\text{hr}} \times \frac{1000\text{m}}{1\text{km}} \times \frac{1\text{hr}}{60\text{min}} \times \frac{1\text{min}}{60\text{sec}} = \frac{145300}{3600}$$

40.361...

40.36 m/s

14) Chemists have determined that 18.0 grams of water consists of 6.02×10^{23} molecules. Assuming that a teaspoon holds 3.70 mL of water, determine the number of molecules in 1.00 teaspoon of water. (One gram of water equals one milliliter of water.)

g: 1.00 tsp
w: ? mlc

H₂O info: ²³
 $18.0\text{g} = 6.02 \times 10^{23} \text{ mlc}$
~~1 tsp = 3.70 ml~~
~~1g = 1ml~~

$$\frac{1.00 \text{ tsp}}{3.70 \text{ ml}} \times \frac{1 \text{ g}}{1 \text{ ml}} \times \frac{6.02 \times 10^{23} \text{ mlc}}{18.0 \text{ g}} = \frac{2.2274 \text{ E}24}{18}$$

1.2374... E23
 $1.24 \times 10^{23} \text{ mlc H}_2\text{O}$

15) You're throwing a pizza party for 15 and figure each person might eat 4 slices. How much is the pizza going to cost you? You call up the pizza place and learn that each pizza will cost you \$14.78 and will be cut into 12 slices. You tell them you'll call back. Do you have enough money?

g: 1 party
w: \$

~~1 party = 15 person~~
~~1 person = 4 slices~~
 1 pizza = \$14.78
~~1 pizza = 12 slices~~

1 party	15 persons	4 slices	1 pizza	\$14.78 =
1 party	1 person	12 slices	1 pizza	

886.8
 12
 \$73.90