

WKS 2-6 – Chem Honors
Dimensional Analysis WS 1

NAME Answer Key
 Period _____ Date _____

Use dimensional analysis (the “factor-label” method) to solve the following problems. **Show all work** and answer with the **correct sig figs** and **units**. Use any of the provided relationships as needed.

Part 1: Sols, Arks, meks etc....

Conversion factors

1 sol = 5 nats	36 sols = 1 dran	12 sols = 1 mek	1 sol = 3 arks	10 arks = 1.20 freds
----------------	------------------	-----------------	----------------	----------------------

1) 15 sols = ? nats

$$15 \cancel{\text{ sols}} \times \frac{5 \text{ nats}}{1 \cancel{\text{ sol}}} = \boxed{75 \text{ nats}}$$

4) 24 meks = ? drans meks → sols → drans

$$24 \cancel{\text{ meks}} \times \frac{12 \cancel{\text{ sols}}}{1 \cancel{\text{ mek}}} \times \frac{1 \text{ dran}}{36 \cancel{\text{ sols}}} = \boxed{8.0 \text{ drans}}$$

2) 0.50 drans = ? sols

$$0.50 \cancel{\text{ drans}} \times \frac{36 \cancel{\text{ sols}}}{1 \cancel{\text{ dran}}} = \boxed{18 \text{ sols}}$$

5) 6.5 freds = ? sols freds → arks → sols

$$6.5 \cancel{\text{ freds}} \times \frac{10 \cancel{\text{ arks}}}{1.20 \cancel{\text{ freds}}} \times \frac{1 \text{ sol}}{3 \cancel{\text{ arks}}} = 18.06 = \boxed{18 \text{ sols}}$$

3) 7.84 arks = ? freds

$$7.84 \cancel{\text{ arks}} \times \frac{1.20 \cancel{\text{ freds}}}{10 \cancel{\text{ arks}}} = 0.9408 = \boxed{0.941 \text{ freds}}$$

6) 18 arks = ? drans arks → sols → drans

$$18 \cancel{\text{ arks}} \times \frac{1 \cancel{\text{ sol}}}{3 \cancel{\text{ arks}}} \times \frac{1 \text{ dran}}{36 \cancel{\text{ sols}}} = 0.1666 = \boxed{0.17 \text{ drans}}$$

7) 60.0 freds = ? meks freds → arks → sols → meks

$$60.0 \cancel{\text{ freds}} \times \frac{10 \cancel{\text{ arks}}}{1.20 \cancel{\text{ freds}}} \times \frac{1 \cancel{\text{ sol}}}{3 \cancel{\text{ arks}}} \times \frac{1 \text{ mek}}{12 \cancel{\text{ sols}}} = 13.888 = \boxed{13.9 \text{ meks}}$$

Part 2: Real Units

Use the following conversion factors, as needed. Do not look up any conversion factors use any other conversion factors not provided in the problem.

1 mile = 1760 yds	16 oz = 1 lb	1 L = 1.057 qts	1 day = 24 hours
1 yd = 3 ft	2000 lbs = 1 ton	4 qts = 1 gal	1 hour = 60 mins
1 in = 2.54 cm	1 oz = 28.35 g	32 liquid oz = 1 qt	1 min = 60 secs
1 mile = 1.6093 km	1 kg = 2.205 lbs	1 qt = 2 pts	
1 m = 6.214 × 10 ⁻⁴ mile			

8) A runner competed in a 5.00-mile run. How many yards did she run?

Relationship: 1 mile = 1760 yds

$$5.00 \cancel{\text{ miles}} \times \frac{1760 \text{ yds}}{1 \cancel{\text{ mile}}} = 8800 = \boxed{8.80 \times 10^3 \text{ yds}}$$

- 9) In the Tour de France this year, cyclists rode 3,484.2 km 3,653.6 km in 21 days. How many miles did they go? [Hint: watch for unimportant information!]

Relationship: 1 mile = 1.6093 km

$$\underline{3,484.2 \text{ km}} \times \frac{1 \text{ mile}}{1.6093 \text{ km}} = \underline{2,165.0407} = \boxed{2,165.0 \text{ mi}}$$

- 10) Some steakhouses offer a 72-oz steak for free if you can eat it. How many pounds of meat would you have to swallow for a free dinner?

Relationship: 16 oz = 1 lb

$$\underline{72 \text{ oz}} \times \frac{1 \text{ lb}}{16 \text{ oz}} = \boxed{4.5 \text{ lbs}}$$

- 11) After eating your steak, perhaps you'd finish it off with a pound (1.00 lb) cake for dessert. What would the name of this cake be in grams? lb → oz → g

$$\underline{1.00 \text{ lb}} \times \frac{16 \text{ oz}}{1 \text{ lb}} \times \frac{28.35 \text{ g}}{1 \text{ oz}} = \underline{453.6} = \boxed{454 \text{ g}}$$

- 12) If you go to school for 180 days each school year and you are in school 7.00 hours each day, how many minutes are spent in school in four school years?

school yr → school days → hrs → min

$$4 \text{ school year} \times \frac{180 \text{ school days}}{1 \text{ school year}} \times \frac{7.00 \text{ hrs}}{1 \text{ school day}} \times \frac{60 \text{ min}}{1 \text{ hr}} = \underline{302,400} = \boxed{302,000 \text{ min or } 3.02 \times 10^5 \text{ min}}$$

- 13) A running back gained 225 yds in one game. How many meters did he go?

yds → mi → m

$$\underline{225 \text{ yds}} \times \frac{1 \text{ mi}}{1760 \text{ yd}} \times \frac{1 \text{ m}}{6.214 \times 10^{-4} \text{ mi}} = \underline{205.730} = \boxed{206 \text{ m}}$$

- 14) Soda is (used to be?) sold in 20-liquid oz bottles (1 bottle = 20.0 liquid oz). How many liters (L) would six of these bottles contain? [Be careful how you start this one!]

bottles → oz → qts → L

$$6 \text{ bottles} \times \frac{20.0 \text{ oz}}{1 \text{ bottle}} \times \frac{1 \text{ qt}}{32 \text{ oz}} \times \frac{1 \text{ L}}{1.057 \text{ qt}} = \underline{3.5477} = \boxed{3.55 \text{ L}}$$