Dimensional Analysis Worksheet 2

Use dimensional analysis (the "factor-label" method) to solve the following problems. **Show all steps** needed to convert from starting units to ending units. **Indicate all relationships needed** before setting up and solving the problem. Use any of the following relationships if needed:

1 mile = 1760 yds	16 oz = 1 lb	1 L = 1.06 qts	1 day = 24 hours
1 yd = 3 ft	2000 lbs = 1 ton	4 qts = 1 gal	1 hour = 60 mins
1 ft = 12 in	1 oz = 28.35 g	32 oz = 1 qt	1 min = 60 secs
1 mile = 1.61 km	1 kg = 2.2 lbs	1 qt = 2 pts	

1. A runner competed in a 5-mile run. How many yards did she run?
   Relationship: 1 mile = 1760 yds

   $$5 \text{ miles} \cdot \frac{1760 \text{ yds}}{1 \text{ mile}} = \quad \text{yds}$$

2. In the Tour de France, cyclists ride 3,653.6 km over 20 days. How many miles do they go? [Hint: watch for unimportant information!]
   Relationship: 1 mile = 1.61 km

   $$3653.6 \text{ km} \cdot \frac{1}{\quad \text{km}} = \quad \text{mi}$$

3. After a nice meal, perhaps you'd finish it off with a pound cake for dessert. What would the name of this cake be in grams?
   Relationships: 1 lb = 16 oz; 1 oz = 28.35 g

   $$1 \text{ lb} \cdot \frac{\quad \text{oz}}{1 \text{ lb}} \cdot \frac{28.35 \text{ g}}{1 \text{ oz}} = \quad \text{g} \quad \text{(A "453.6-g cake")}$$

4. In the US milk is sold by the gallon, while in Italy it is sold by the liter. How many liters of milk would you need to equal one gallon?
   Relationships: 1 L = 1.06 qts; 4 qts = 1 gal

   $$1 \text{ gal} \cdot \frac{\quad \text{qts}}{1 \text{ gal}} \cdot \frac{1 \text{ L}}{\quad \text{qt}} = \quad \text{L}$$

5. If you go to school for 180 days each year and each day is 7 hours long, how many hours are spent in school in one year?
   Information: day = hours (only for school)

   $$\frac{\quad \text{days}}{1 \text{ (school) year}} \cdot \frac{\quad \text{hrs}}{1 \text{ day}} = \frac{\quad \text{hrs}}{1 \text{ (school) year}}$$

Metric Measurement Conversion

Instructions:
Complete the following metric equalities.

__1__ kg = __1000__ g	__100__ cm = __1__ m	__1000__ mm = __1__ m	__1000__ ms = __1__ s
__1__ km = __1000__ m	__1000__ mL = __1__ L	__1000__ mg = __1__ g	1 Mg = 10^6 g
1 kL = 1000 L			

Convert the measurements below as indicated. You can use scientific notation for very large or small numbers.

1) 40 mL to L

$$\frac{40 \text{ mL}}{1} \cdot \frac{1 \text{ L}}{1000 \text{ mL}} = \quad \text{L}$$

2) 5400 L to kL

$$\frac{\text{L}}{1} \cdot \frac{1 \text{ kL}}{\text{L}} = \quad \text{kL}$$

3) 85 g to kg

$$\frac{\text{g}}{1} \cdot \frac{1 \text{ kg}}{\text{g}} = 0.085 \text{ kg}$$

4) 52 mg to g

$$\frac{52}{1} \cdot \frac{1 \text{ g}}{1000} = 0.052$$

5) 6300 m to km

$$\frac{\text{m}}{1} \cdot \frac{1}{1000 \text{ m}} = \quad \text{km}$$

6) 2.50 kg to g

$$\frac{\text{kg}}{1} \cdot \frac{1000 \text{ g}}{1 \text{ kg}} = \quad \text{g}$$

7) 18,600 g to kg

$$\frac{\text{g}}{1} \cdot \frac{1 \text{ kg}}{\text{g}} = \quad \text{kg}$$

8) 544 mL to L

$$\frac{\text{mL}}{1} \cdot \frac{1 \text{ L}}{\text{mL}} = \quad \text{L}$$

9) 1.92 L to mL

$$\frac{\text{L}}{1} \cdot \frac{\text{mL}}{1 \text{ L}} = \quad \text{mL}$$

10) 425 cm to m

$$\frac{\text{cm}}{1} \cdot \frac{1 \text{ m}}{\text{cm}} = \quad \text{m}$$

11) 7870 mL to L

$$\frac{\text{mL}}{1} \cdot \frac{\text{L}}{\text{mL}} = \quad \text{L}$$

12) 6.42 m to mm

$$\frac{\text{m}}{1} \cdot \frac{\text{mm}}{1 \text{ m}} = \quad \text{mm}$$

13) 1850 cm to m

$$\frac{\text{cm}}{1} \cdot \frac{1 \text{ m}}{\text{cm}} = \quad \text{m}$$

14) 11.4 km to m

$$\frac{11.4 \text{ km}}{1} \cdot \frac{1000 \text{ m}}{1 \text{ km}} = 11,400 \text{ m}$$

15) 3 m to mm

$$\frac{3 \text{ m}}{1} \cdot \frac{1000 \text{ mm}}{1 \text{ m}} = 3000 \text{ mm}$$

16) 25 Mg to g

$$\frac{25 \text{ Mg}}{1} \cdot \frac{10^6 \text{ g}}{1 \text{ Mg}} = 2.5 \cdot 10^7 \text{ g}$$

17) 74 cm to mm*

$$\frac{74 \text{ cm}}{1} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1000 \text{ mm}}{1 \text{ m}} = 740 \text{ mm}$$

18) 835 mg to kg*

$$\frac{835 \text{ mg}}{1} \cdot \frac{1 \text{ g}}{1000 \text{ mg}} \cdot \frac{1 \text{ kg}}{1000 \text{ g}} = 8.35 \cdot 10^{-4} \text{ kg}$$