8th Grade Assignment – Week #24

Group Assignments:

For Tuesday and Thursday:

- Work on *Proportions & Dimensional Analysis* **Group Sheet #2**: problems #1-5

- Look at *Proportions & Dimensional Analysis* **Practice Sheet #4**, and choose the more difficult ones to do in your group work. (The rest of the problems should be done individually.)

- Fill in the missing digits (indicated by "?").   (I have found 5 solutions to this!)

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a)      ??3
      x ??3
        3??
       ?3?0
    + ??300
      ?????
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Individual Work

- As much as you can, do the problems on *Proportions & Dimensional Analysis* **Practice Sheet #4**.
- *Flashcards*. Keep working on the flashcards from last week's assignment.

Proportions & Dimensional Analysis – Group Sheet #2

Tips for Density Problems:
- Density is weight per volume.
- The main density formula is: $D = \frac{W}{V}$

1) Calculate the density of a block…
   a) That weighs 8g and has a volume of 16 cm³.

   b) That weighs 60 oz and has a volume of 80 in³.

   c) That weighs 130kg and has a volume of 0.23 m³.

   d) That weighs 158 lb and has a volume of 3.7 ft³.

   e) Which one of the above blocks float in water? (Hint: Look up the density of water in the *Conversion Table*.)

2) How much does a cube of iron weigh that has 8-inch long edges?

3) 63 grams of mercury has a volume of how many milliliters?

4) A cylindrical bucket has both a diameter and a height of 10 inches.
   a) What is the volume of the bucket, both in cubic inches and in gallons?

   b) If the bucket is filled with water, what is the weight of the water?

   c) If the bucket is filled with mercury, what is the weight of the mercury?

5) Use the *Chain Method* to solve each problem. Show your work!
   a) Length: 528 mm ≈ _____ ft

   b) Volume. 3.29 ℓ ≈ _____ cups

   c) Speed: 7.2 $\frac{yd}{sec}$ ≈ _____ $\frac{km}{h}$

   d) Density: 1204 $\frac{lb}{ft^3}$ ≈ _____ $\frac{kg}{m^3}$

6) *Challenge!*
   ### The Grains of Rice Problem.
A wise man is granted a request. He requests that a single grain of rice be placed on the first square of a chess board, 2 grains on the second square, 4 grains on the third, 8 grains on the fourth, and so on, doubling with every square up until the last square - the 64th square.
   a) How many grains of rice are there on the whole chessboard (assuming that it would somehow fit)?

   b) How many 25-pound sacks of rice would this be, and if all the sacks were laid in a line end-to-end, how far would they stretch? (Assume that each sack is 20 inches long and contains around 400,000 grains of rice.)

   c) What is the volume of the rice? (Assume that there are 400 grains of rice in a tablespoon.)

Proportions & Dimensional Analysis — Practice Sheet #4

1) Find the fractional scale of a map that has a verbal scale of…
   a) 1 inch = 0.375 miles.

   b) 1 cm = 0.4 km.

2) A map has a fractional scale of 1:50 000.
   a) What distance on the map represents 15 km?

   b) This map is most likely which of the following:
      A map of a city
      A map of a state
      A map of a country

3) There are two maps of Japan on the wall of a classroom. The one next to the door has a scale of 1:2000 000, and the one next to the window has a scale of 1:5000 000. Which map is larger?

4) On a package of rice, the directions say to make 5 servings by adding 800mℓ of water to 300g of rice. How much rice and water are needed for 12 servings?

5) Phil can paint 3 chairs in 1 hour and 40 minutes.
   a) How long does it take him to paint 20 chairs?

   b) How many chairs can he paint in a 40-hour workweek?

The Intuitive Approach.

6) a) One hour is how many minutes?

   b) How do you convert mi/min into mph (mi/hr)?

   c) $3 \frac{mi}{min} =$ _____ mph

7) a) How many meters are in one km?

   b) How do you convert m/h into km/h?

   c) $6700 \frac{m}{h} =$ _____ $\frac{km}{h}$

8) a) One hour is how many seconds?

   b) How do you convert m/s into m/h?

   c) $8.3 \frac{m}{s} =$ _____ $\frac{m}{h}$

9) a) How do you convert m/s into km/h?

   b) $23 \frac{m}{s} =$ _____ $\frac{km}{h}$

10) a) How do you convert km/h into m/s?

    b) $45 \frac{km}{h} =$ _____ $\frac{m}{s}$

11) a) How do you convert ft/sec into mph?

    b) $14.8 \frac{ft}{sec} \approx$ _____ mph

Unit Conversions

12) $8.8 \text{ lb} \approx$ _____ kg

13) $8.8 \text{ kg} \approx$ _____ lb.

14) $20 \text{ mm} \approx$ _____ ft

15) $7800 \text{m}\ell \approx$ _____ pt

16) $36 \frac{km}{hr} =$ _____ $\frac{km}{min}$

17) $42 \frac{km}{hr} =$ _____ $\frac{m}{hr}$

18) $5 \frac{mi}{min} =$ _____ mph

19) $30 \text{ mph} \approx$ _____ $\frac{km}{hr}$

20) $36 \frac{km}{hr} =$ _____ $\frac{m}{s}$

21) How much does a block of solid gold weigh that is 10cm x 12cm x 24cm (the size of a tissue box)?

22) These exchange rates (as of 3/24/04) give the value of each currency in dollars.

    England: $1.850 \frac{\text{dollars \$}}{\text{pound £}}$

    Japan: $0.009378 \frac{\text{dollars \$}}{\text{yen ¥}}$

    Mexico: $0.09113 \frac{\text{dollars}}{\text{peso}}$

    a) One peso is worth about the same as which U.S. coin?
    b) One yen is worth about the same as which U.S. coin?
    c) One dollar is worth how much of each currency?

23) Milk in the U.S. costs $3.39/gal. Compare the milk prices given below by converting everything to $/gal. Use the *Chain Method!*

    a) Japan: $207 \frac{\text{yen}}{\ell}$

    b) Mexico: $8.50 \frac{\text{pesos}}{\ell}$