Dimensional Analysis Problems

DIRECTIONS: Solve each problem using dimensional analysis. You **MUST** use parenthesis and show **ALL** of your work INCLUDING **UNITS**. Every number must have a unit. Conversion factors are given below:

Conversions Factors

|  |  |  |
| --- | --- | --- |
| 1 hr = 60 min | 7 days = 1 week | 1 in. = 2.54 cm |
| 24 hrs = 1 day | 264.2 gal = 1 cubic meter | 1 kg. = 2.2 lbs. |
| 1 mi = 5,280 ft | 20 drops = 1 mL |  |
| 365 days = 1 year | 1 L = 1000 mL |  |
| 1.0 mi = 1.609 kM | 1 L = 1000 cc |  |
|  |  |  |

1.) How many miles will a person run during a 10 kilometer race?

2.) The moon is 250,000 miles away. How many feet is it from earth?

3.) A family pool holds 10,000 gallons of water. How many cubic meters is this?

4.) The average Cornerstone student is at school 450 minutes/day.

1. How many hours/day is this?
2. How many seconds is this?

5) How many seconds are there in 1 year?

6) Pepsi puts 355 ml of soda in a can.

1. How many drops is this?
2. How many cubic centimeters is this?

7) Change 60 miles/ hour to ft/sec (clue: both miles and hour must be change to other units)

8) A condor has a wing span of 3.05 m. What is the wing span in feet?

9) According to the Guinness Book of Records the heaviest baby ever born weighed 29 lbs 4 oz. (29.25 lbs). What was the baby's mass in kg? (Historical Note: The birth occurred in Effingham IL in 1939 and due to respiratory problems the baby died two hours later. The heaviest babies to survive weighed 22.5 lbs and were born in 1955 and 1982.)

10) Mark McGuire hit 70 home runs in the 1998 season. Given that there are 4 bases with 90 feet between each base, how many miles did he run that season just from home runs?

Bonus

Jabberwocky

Nonsense words taken from the poem *Jabberwocky* (from Lewis Carroll’s *Through the Looking* *Glass*)

There are 20 tumtum trees in the tulgey wood.

In each tulgey wood is one frumious Bandersnatch.

There are 5 slithy toves in 2 borogoves.

There are 2 mome raths per Jabberwock.

There are 2 Jubjub birds in 200 tumtum trees.

There are 200 mome raths in each borogove.

There are 5 Jubjub birds per slithy tove.

**If there are 5 frumious Bandersnatches, how many Jabberwocks should there be?**

12) A spaceship from another planet travels at a speed of 4.27 googs per mulm. There are 256 googs in a plotz and 12.3 plotz in a wraslm. If 3.4 tpocks equal one mulm, what is the ship’s speed in wraslm per tpock? Show your work. In this case, assume numbers with decimal places are measured but whole numbers are exact (we’ll pretend that “googs” are creatures!)