

Name _____

Date _____

Day 1 – Dimensional Analysis

- Converting from one unit to another.
- Conversions may be from the customary to metric system.

1. =

2. =

5. = ?

Look at problem 1 and 2. Describe a pattern that you notice.
Use this pattern to answer problem 3 and 4.

3. = ?

6. =

ss

4. =

Step 1: Write the units given.

Step 2: Select the appropriate conversion and write as a fraction (conversion factor).

Step 3: Multiply by the conversion factor.

(Place the units you want in the numerator and the units you want to cancel out in the denominator)

Step 4: Simplify (Do not forget to include units in your final answer!)

Common Conversions: SMALL							LARGE				
12 in	3feet	5280ft	60 sec	60 min	24hrs	365 days	10mm	100 cm	1000 m	1000g	1000 m/l
1 ft	1 yard	1 mile	1 min	1 hour	1 day	1 year	1 cm	1 m	1 km	1 kg	1 l
or	or	or	or	or	or	or	or	or	or	or	or
1 ft	1 yard	1 mile	1 min	1 hour	1 day	1 year	1 cm	1 m	1 km	1 kg	1 l
12 in	3feet	5280ft	60 sec	60 min	24hrs	365 days	10 mm	100 cm	1000m	1000g	1000 m/l
Standard Lengths			Standard Units of Time				Common Metric Measures				

DIMENSIONAL ANALYSIS PROBLEMS

Conversions Factors

1 hr = 60 min	1 min = 60 sec	1 ton = 2000 lbs	7 days = 1 week
24 hrs = 1 day	1 kg = 2.2 lbs	1 gal = 3.79 L	264.2 gal = 1 cubic meter
1 mi = 5,280 ft	1 kg = 1000 g	1 lb = 16 oz	20 drops = 1 mL
365 days = 1 yr	52 weeks = 1 yr	2.54 cm = 1 in	1 L = 1000 mL
0.621 mi = 1.00 km	1 yd = 36 inches	1 cc is 1 cm ³	1 mL = 1 cm ³

DIRECTIONS: Solve each problem using dimensional analysis. Every number must have a unit. Work must be shown. Conversion factors are given below

- 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 American student is in class 330 minutes/day. How many hours/day is this?

5) How many seconds are there in 1 year?

6) Lake Michigan holds 1.3×10^{15} gallons of water. How many liters is this?

7) Pepsi puts 355 ml of pop in a can. How many cm^3 is this?

8) Chicago uses 1.2×10^9 gallons of water /day. How many gallons per second must be pumped from the lake every second to supply the city?

9) Sixty miles/ hour is how many ft/sec?

10) Lake Michigan holds 1.3×10^{15} gallons of water. If just Chicago removed water from the lake and it never rained again, how many days would the water last? Chicago uses 1.2×10^9 gallons of water /day

11). How many minutes are in 180 days?

12). If a person weighs 125 lbs, 8 oz., how many kg does s/he weigh?

13). The distance from Santa Maria to Los Alamos is 16.25 mi. What is the distance in km?

14). Keisha took a 5-mile walk at the park on Saturday. How many kilometers did she walk?

15). If a projectile travels 3000 feet in one second, how far will it travel in 18 minutes?

16). A small herd of cattle consumes fourteen bales of hay in two weeks. How many bales will this herd consume in a year? (1 year = 52 weeks)

17). During the previous year, Zach's weather station measured 0.8 yards of rain. Express this amount in cm.

18). If a swimmer swims 85.4 yards in five minutes, how many meters will s/he swim in 70.0 seconds?

19). A skydiver falls about 176 feet per second. How many feet per hour is this?

20). How many grams are equivalent to 1.80×10^{-4} tons? (English tons)

21). Julius is riding his bike at a speed of 20 miles per hour. How many feet per minute is this?

22). Mr. Johnson pumped 12 gallons of gas into his car. How many liters of gas is that?

23). A quart of a liquid has a mass of 2.70 kilograms. How many quarts will take to weigh 100.0 pounds?

24). Sixty-two months is equivalent to how many seconds?

25). A car consumes 25.00 gallons of fuel when driving a distance of 400.0 km. How many gallons will it consume when driving 250.0 miles?

26). 0.0054 weeks is equivalent to how many minutes?

27). Charlie runs at a speed of 3 meters per second. About how many miles per hour does Charlie run?