

## General Physics

### Chapter 1: Physics and Measurement

#### 1.4 Dimensional Analysis

- 1.) What is dimensional analysis? What is it reliant on?
  
  
  
  
  
  
  
  
  
  
- 2.) Why can you multiply a number by a series of fractions and not change the value of the original number?
  
  
  
  
  
  
  
  
  
  
- 3.) Prove the product of time (measured in  $s$ ) and velocity (measured in  $m/s$ ) is a distance (measured in  $m$ ).

#### 1.5 Conversion of Units

4.) Write the following unit conversions:

a) 1 mile = \_\_\_\_\_ ft

b) 1 in = \_\_\_\_\_ cm

c) 1 mile = \_\_\_\_\_ km

5.) Use unit conversions and dimensional analysis to prove the mile to kilometer equivalent.

#### 1.6 Estimates & Orders of Magnitude Calculations

6.) Write each of the following in scientific notation:

- a) 2067000000
- b) 0.000642
- c)  $205 \times 380000$

## Dimensional Analysis

- 1.) Burritos are amazing. The standard burrito is 6 inches long and delicious. The moon is, at any given time, 238,900 miles from the earth. How many burritos away is the moon from the earth?

12 inches = 1 foot    5,280 feet = 1 mile    1 supreme = beans, guac and queso

Write in scientific notation.

- 2.) Craters be thirsty. A Big Gulp soft drink at 7-11 is 30 ounces. The Grand Canyon is big. Seriously. It has a volume of 5,450,000,000,000 cubic yards.

1 ounce = 1.805 cubic feet    1 cubic yard = 27 cubic feet

Write in scientific notation.

- 3.) Mo' money, mo (weight) problem. Money is awesome. And money in bin form... as in Scrooge McDuck's money bin... is beyond awesome. (Note: watching an episode of DuckTales is a homework assignment if you have never watched it)

A penny weighs 2.5 grams. Jeff Bezos, owner and founder of Amazon, has a net worth of \$145,400,000,000. What would be the weight, in pounds, of Jeff Bezos's fortune if he liquidated all of his assets and exchanged it for pennies?

1 pound = 454 grams

Write in scientific notation.

- 4.) Tim Janus is a great man. He holds the world record for longest belch at 18.1 seconds. Think about that for a second. Imagine it...

Anyway... How many world record Tim Janus belches are there in one year?

1 min = 60 sec      60 min = 1 hr      24 hr = 1 day      365 days = 1 yr

Write in scientific notation.

- 5.) Flatulence can be awkward. Especially public flatulence. And disruptive. But also funny. The world record for longest SUSTAINED (cannot stress this enough) fart is 2 minutes 48 seconds.

The Alamo Draft House is holding a Harry Potter marathon. All of the Harry Potter movies combined are 19 hours and 39 minutes long. How many consecutive world record, and incredibly disruptive farts, could be contained within one Harry Potter marathon?

- 6.) Always room for jello. A small box of jello makes 473 cubic centimeters of jello. The Great Pyramid at Giza has a volume of 91,230,000 cubic feet. How many boxes would it take to fill the entire pyramid with jello?

1 cubic inch = 16.387 cubic centimeters      1728 cubic inches = 1 cubic foot

Write in scientific notation

7.) Nate is going to be a rich man. Incredible advancements in fudge-related technologies have lead to the creation of fudge bladder protection system. If this technology had been available one hundred years ago, the titanic would never have sank.

One Phat Fudge container holds 1.12 ounces of fudge. The total volume of the Titanic was 14,293,562.5 cubic feet. How many packages of fudge would be necessary to fill up the Titanic?