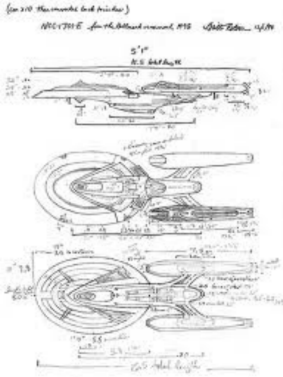


## Math 10 C - Unit 1: Measurement



# Proportions and Scales

## POS Checklist:

- 2.1 - Explain how proportional reasoning can be used to convert a measurement within or between SI and imperial systems.
- 2.4 - Justify, using mental mathematics, the reasonableness of a solution to a conversion problem.

And now for something completely different...

[http://www.youtube.com/watch?v=2PPF3aaZmUw&safety\\_mode=true&persist\\_safety\\_mode=1v](http://www.youtube.com/watch?v=2PPF3aaZmUw&safety_mode=true&persist_safety_mode=1v)

### Review: Questions/Go Over Two Systems of Measurement Worksheet

Review: Solve for the given variable.

a)  $\frac{x}{5} = \frac{6}{15}$

b)  $\frac{7}{12} = \frac{x}{4}$

c)  $\frac{13}{8} = \frac{5}{x}$

d)  $\frac{8}{x} = \frac{4}{9}$

\*What method is used to solve these problems?

**Proportions** - a statement of equality between two ratios



What?!? That basically means it's "making two ratios equal to each other".

We can use proportions to convert units (yay!) and solve other problems.

## Unit Conversions with Proportions

ex) 1 pound = 16 ounces. How many pounds is 50 ounces?

Step 1: Write out the conversion as a ratio  $\frac{1 \text{ lbs}}{16 \text{ oz}}$

Step 2: Write out the unknown and given value as a ratio. **MAKE SURE THE UNITS LINE UP!**

$$\frac{1 \text{ lbs}}{16 \text{ oz}} = \frac{x \text{ lbs}}{50 \text{ oz}}$$

Annotations: "same units on top" with arrows pointing to 1 lbs and x lbs; "same units on bottom" with arrows pointing to 16 oz and 50 oz.

Step 3: Cross multiply and divide

$$\frac{1 \text{ lbs}}{16 \text{ oz}} = \frac{x \text{ lbs}}{50 \text{ oz}} \rightarrow (1 \text{ lbs})(50 \text{ oz}) = (16 \text{ oz})(x \text{ lbs})$$

$$\frac{(1 \text{ lbs})(50 \text{ oz})}{(16 \text{ oz})} = (x \text{ lbs})$$

$$3.125 \text{ lbs} = x$$

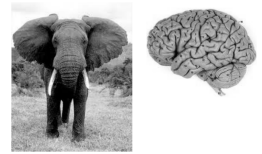
**This same method can be used for solving many different problems where one ratio is given.**

ex) On a map, a scale of 3 cm = 25 km is used.

a) The distance between two points on the map is 10 cm. What is this distance in real life?

b) What distance on the map would correspond to 150 km?

ex) The ratio of the mass of an elephant's brain to its body mass is 1:600. Estimate the brain mass of a 1650 kg elephant using proportional reasoning.



ex) A photograph of an African elephant has a scale of 1 cm represents 0.6 m. The elephant's trunk in the photograph measure 3.6 cm, what is the actual length of the elephant's trunk? Solve using proportional reasoning.

ex) On a map the distance from Calgary to Edmonton is 5.8 cm. The scale on the map is 1:5 000 000. Use proportional reasoning to determine the approximate distance from Calgary to Edmonton.

**Homework: page 15 Questions 1 –  
3a, 4, 5, 7, 8, 10, 15, 19**