North Montco Technical Career Center
Math-In-CTE

Lesson 1

Remember **M**y **D**ear **A**unt **S**ally (from left to right; **M**ultiply; **D**ivide; **A**dd, **S**ubtract)

Most of you probably know that a 305 cubic inch engine is considered to be equivalent to a 5-liter engine. Is a 302 cubic inch engine close enough in size to also be equivalent to a 5-liter engine?

How would you set up this problem in order to see if a 302 in3 can be called a 5.0 liter?

Example 1: Write the number that you are trying to convert (302 in^3) on the left side of an equal sign and leave enough space for your conversion factor. Include the unit with the number. Place the number 1 underneath this number. This helps to organize the math steps we will take. Write the unit of the number you are trying to convert to on the right side of the equal sign. Leave space for the answer.

Example: $\frac{302\ in^3}{1} =$ liter

Look up the conversion factor for liters to cubic inches (or cubic inches to liters) in the appendix.

Example: 1 liter = 61.024 in^3 [1 liter (L)=61.024 cubic inch (cu-in)]

Make a fraction out of your conversion by putting the number with the unit you are trying to find on top and the number with unit you are trying to convert from on the bottom.

Example: $\frac{1\ liters}{61.024\ inch}$

This is called a conversion factor.

Write the conversion factor to the right of the number you are trying to convert (i.e. to the left of the equal sign). Place a multiplication sign between the number and your conversion factor.

Example: $\frac{302\ in^3}{1} \times \frac{1\ liters}{61.024\ in^3} =$ liters

One of the reasons we include the units with our number is that it allows us to see if the units cancel out properly and leave us with the unit we want.

Example: $\frac{302\ \cancel{in}^3}{1} \times \frac{1\ liters}{61.024\ \cancel{in}^3} =$ liters

After the units have been canceled this what we have left to work with.

$$\frac{302}{1} \quad X \quad \frac{1 \text{ liters}}{61.024} \quad = \quad \text{liters}$$

Complete the problem by multiplying the two numerators by each other and the two denominators by each other.

$$\frac{302}{1} \quad X \quad \frac{1 \text{ liters}}{61.024} \quad = \quad \frac{302 \text{ liters}}{61.024}$$

Finally divide the numerator by the denominator.

$$\frac{302 \text{ liters}}{61.024} = 4.948 \text{ liters} = 4.9 \text{ liters (to the nearest 10th)}$$

Therefore a 302 in^3 should not be called a 5.0 liter engine.

Some might argue that 4.948 liters is close enough to 5 that a 302 can be called a 5 liter.

That's fine if that is your position but speaking from a purely mathematical position you would be required to call it a 5 liter not a 5.0 liter.

1. How many cubic inches are in a 600 cc (cubic centimeter) motorcycle?

2. In hybrid technology, motors that are electrically based are generally rated in watts. What is the horsepower rating of a hybrid electric motor that is rated at 25,000 watts?

3. If 1 mile/hour is equal to 0.447 meter/sec, how many miles/hour is 50 meters per second?

4. Which metric wrench is closest in size to a 7/16 inch wrench? (hint: change 7/16 to its decimal form and then do the conversion)

5. The lowest recommended caster setting on a Nissan is 45 minutes. What would this be in a fraction of a degree?

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Lesson 1 Worksheet

Name: _____ AM-1: _____ PM _____ Date: _____

1. How many feet is the 100 meter dash?

2. If your backyard is 37,560 square feet, what part of an acre is this?

3. You determine that you need 295 cubic feet of concrete to pour a driveway, how many cubic yards should you order?

4. A load of gravel weighs 3,500 pounds, how many tons is this?

5. How many hours are in 560 minutes?

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Lesson 1 Homework

Name: _____ AM-1: _____ PM _____ Date: _____

1. How many liters are there in a 350 in3 engine?

2. How many cubic inches are in a 7.3 liter diesel engine commonly found in many F 250 trucks?

3. How long in inches is a v-belt that is 132 centimeter long?

4. What is the horsepower load on a engine if you operate a 1500 watt amplifier?

5. How many liters are there in 1,570 ml?

6. How many cubic inches are there in a 700 cc snowmobile?

7. How fast in kilometer/hour is 70 miles/hour?

8. A shop ventilation system can move 150 cubic feet of air per minute? How many cubic yards would this be?

9. The lighting requirements for a conference room is 1.8 watts per square foot if incandescent lighting is used. How many watts would be needed to light a 2,400 ft2 conference room. (hint: think of 1.8 watts = 1 square foot)

10. How many acres would be in a lake that measures about 2 square miles in area?