Ch. 3 Worksheet CHM 130 Conversion Practice Problems

For conversions within the metric system, you must memorize the conversion (for example: 1000 mL = 1 L, or 1000 g = 1 kg should be memorized) Remember that metric conversions are exact ratios and thus will not limit your significant digits for the answer. First start with what you are given. Figure out what units you need. You will need to create a ratio (conversion factor) between the units given and the units needed. Ask yourself which unit is bigger. Put a "1" by that unit. Then ask how many of the smaller units are in the bigger unit. Put that number in front of the smaller unit. There is your conversion factor. Make sure the units cancel and you get the units you need. Always write your units down. Practice as many of the following as you need - the answers are below.

Given:

1 mile = 5280 feet, 1.609 km = 1 mile, 2.54 cm = 1 inch, 1 pound = 0.4536 kg, 1 quart = 946.4 mL.

1. How many pounds does 2.00 kg of cheese weigh?
2. How many mL are in 0.50 quarts?
3. How many inches are in 1.00 km?
4. How many feet are in 3.45 km?
5. How many km are in 5.00 miles?
6. How many yards are in 72.5 miles?
7. How many cc's are in 979 mL?
8. How many Kelvins are in -15.5^{o}C?
9. How many degrees Celsius are in 315 K?
10. How many degrees Fahrenheit are in 30.0^{o}C?
11. How many kL are in 8383 L?
12. How many cm are in 0.783 m?
13. How many meters are in 252 mm?
14. How many liters are in 2.52 x 10^4 mL?
15. How many mm are in 0.123 m?
16. If the mass of a lead ball is 23.5 g and the volume is 3.5 mL, what is the density of the lead ball?
17. If the density of carbon tetrachloride is 0.793 g/mL, and a sample has a volume of 9.29 mL, what is the mass?
18. If the density of propanol is 0.828 g/mL and a sample has a mass of 14.5 g what is the volume?
19. How many km are in 2.88 m?
20. How many cL are in 4.56 x 10^{-3} L?
21. A water sample of mass 0.0204 kg is how many liters? d (H_2O) = 1.00 g/mL
22. If gold's density is 19.32 g/mL, how much would a 0.0333 L sample weigh in grams?
23. Table salt has a density of 2.16 g/mL. If you used 2.00 mL on your food, how much in mg is that?
24. The density of ethanol is 0.802 g/mL. How much in grams does 9.85 x 10^{-2}L mass?
25. How many cg are in 0.497 g?
26. How many cg are in 2.49 x 10^3 mg?
27. How many mL are in 0.258 L?
28. What is the density in g/mL of a substance that masses 0.987 kg and has a volume of 4.52 x 10^{2}mL?
29. How much water in mL would 5.25 mg of copper displace? d (Cu) = 11.53 g/mL

Answers:

1. 2.00 kg (pound / 0.4536 kg) = 4.41 pounds
2. 0.50 quarts (946.4 mL / quart) = 470 mL
3. 1.00 km (mile / 1.609 km)(5280 feet / mile)(12 inch / ft) = 3.94 x 10^4 or 39,400 inches
4. 3.45 km (mile / 1.609 km)(5280 ft / mile) = 11,300 or 1.13 x 10^4 feet
5. 5.00 mile (1.609 km / mile) = 8.05 km
6. 72.5 miles (5280 ft / mile)(yd / 3 ft) = 1.28 x 10^5 or 128,000 yards
7. 979 cc (cc = mL)
8. -15.5^{o}C + 273 = 258K
9. 315K - 273 = 42°C
10. 86°F
11. 8383 L (kL / 1000 L) = 8.383 kL
12. 0.783 m (100 cm / m) = 78.3 cm
13. 252 mm (m / 1000 mm) = 0.252 m
14. 2.52 x 10^4 mL (L / 1000 mL) = 25.2 L
15. 0.123 m (1000mm / m) = 123 mm
16. 23.5 g / 3.5 mL = 6.7 g/mL
17. 9.29 mL (0.793 g/mL) = 7.37 g
18. 14.5 g (mL / 0.828 g) = 17.5 mL
19. 2.88 m (1 km / 1000 m) = 2.88 x 10^{-3} km
20. 4.56 x 10^{-3} L (100 cL / 1 L) = 4.56 x 10^{-1} or 0.456 cL
21. Since density of water = 1.000 g/mL: 0.0204 kg (1000g / kg)(1 mL / 1 g)(L / 1000 mL) = 0.0204 L
22. 0.0333 L (1000 mL / L)(19.32 g / mL) = 643 g
23. 2.00 mL (2.16 g / mL)(1000 mg / g) = 4320 mg
24. 9.85 x 10^{-2}L (1000mL / L)(0.802 g / mL) = 79.0 g
25. 0.497 g (100 cg / g) = 49.7 cg
26. 2.49 x 10^3 mg (g / 1000 mg)(100 cg / g) = 249 cg or 2.49 x 10^2 cg
27. 0.258 L (1000 mL / L) = 2.58 x 10^2 or 258 mL
28. 0.987 kg (1000 g / kg) = 987 g then divide by 4.52 x 10^2mL = 2.18 g/mL
29. 5.25 mg (g / 1000 mg)(1 mL / 11.53 g Cu) = 4.55 x 10^{-4} mL