

COLLEGE-PREP CHEMISTRY  
DIMENSIONAL ANALYSIS PROBLEMS

66.000mi. 1. Express 116,160 yards as miles.

\$ 3700.00  
2. A summer camp having 555 boys forms basketball teams (5 members per team). Each team is supplied with 2 practice basketballs. The basketballs are purchased at \$50.00 per 3 basketballs. What is the cost of the basketballs?

\$ 96.00  
3. A group plans to prepare 60 signs from plywood. They can make 4 signs from one sheet of plywood. The wood costs \$32.00 per 5 sheets. What would be the cost of the plywood for all the signs?

\$ 5643.75 gross  
\$ 2143.75 NET Profit  
4. A man raised 50 goats and then entered into a series of transactions. he traded all the goats for sheep at an exchange rate of 5 goats for 7 sheep. next he exchanged all the sheep for hogs at a rate of 4 sheep for 2 hogs weighing 250 lbs. each. he sold all the hogs at a market price of \$64.50 per 100 lbs. How much money did he make from the 50 goats? If he paid \$3000.00 for the goats and the feed in the trading time cost him \$500.00, what was his profit or loss? Calculate to the nearest cent.

5. Perform the following calculation, expressing your answer in scientific notation:

$$1.7 \times 10^{30} \cdot \frac{(2.0 \times 10^{-6})(4.0 \times 10^{18})}{(6.0 \times 10^2)(8.0 \times 10^{-21})}$$

NAME \_\_\_\_\_ DATE \_\_\_\_\_

# Dimensional Analysis (Factor-Label Method)

## Practice Problems (Level 1)

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Use dimensional analysis in solving each of the following problems.

- 0.014 m 1. Convert 14 mm to its equivalent measurement in m.
- 35,000 g 2. Convert 35 kg to its equivalent measurement in g.
- 0.057 L 3. Convert 57 mL to its equivalent measurement in L.
- 8800 cm/s 4. Convert a speed of 88 m/s to its equivalent in cm/s.
- 0.00945 g/mL 5. Convert a density of 9.45 g/L to its equivalent in g/mL.
- 48.3 g 6. The density of mercury metal is 13.6 g/mL. What is the mass of 3.55 mL of the metal?
- 510 g 7. The density of lead is 11.3 g/mL. What is the mass of 45 mL of the metal?
- 216 g 8. The density of salt (sodium chloride) is 2.16 g/mL. What is the mass of 100.0 mL of this solid?
- 83 km 9. A particle moves through a gas at a speed of 15 km/s. How far will it move in 5.5 s?
- $3.16 \times 10^{23}$  atoms 10. A mole of copper contains  $6.02 \times 10^{23}$  atoms. How many atoms are there in 0.525 moles?
- 168 g 11. A solution of barium nitrate contains 61.2 g per liter of solution. How many grams of barium nitrate is contained in 2.75 L of this solution?
- 0.123 g 12. A sample of seawater contains 0.00245 g of sodium chloride per mL of solution. How much sodium chloride is contained in 50.0 mL of this solution?

# Dimensional Analysis (Factor-Label Method)

## Practice Problems (Level 2)

Use dimensional analysis in solving each of the following problems.

1.  $1.59 \times 10^{-5}$  km. Convert 15.9 mm to its equivalent measurement in km.
- 982 cg 2. Convert 0.0982 hg to its equivalent measurement in cg.
- 13,455 kg 3. Convert 13,455 g to its equivalent measurement in kg.
- 20.4 m/s 4. Convert a speed of 73.5 km/hr to its equivalent in m/s.
- 4.52 kg/L 5. Convert a density of 4.52 g/mL to its equivalent in kg/L.
- 6.36 mL 6. The density of iron is 7.86 g/mL. What volume of iron will have a mass of 50.00 g?
- 0.0668 g 7. The density of helium gas is 0.178 g/L. What would be the mass of 375.0 mL of this gas?
- 0.00546 s 8. A particle moving through a gas at a speed of 45.8 m/s strikes one wall of the container, bounces off and hits the other wall 25.0 cm away. How long did it take to go from one wall to the other?
- 4.15 moles 9. A mole of sodium atoms contains  $6.02 \times 10^{23}$  atoms. How many moles would be needed in order to have  $25.0 \times 10^{23}$  atoms?
- $4.15 \times 10^{-23}$  moles 10. A mole of hydrogen atoms contains  $6.02 \times 10^{23}$  atoms. A section of outer space contains 25 atoms. How many moles of hydrogen is this?
- $1.1 \times 10^9$  km/hr 11. The speed of light is  $3.0 \times 10^{10}$  cm/s. Express this speed in km/hr.
- 94.2 mg 12. A sample of seawater contains 6.277 g of sodium chloride per liter of solution. How many mg of sodium chloride would be contained in 15.0 mL of this solution?

NAME \_\_\_\_\_ DATE \_\_\_\_\_

# Dimensional Analysis

## (Factor-Label Method)

### Practice Problems (Level 3)

Use dimensional analysis in solving each of the following problems.

- 92,100 cg 1. Convert 32.5 oz to its equivalent measurement in cg.
- 32.4 cm 2. Convert 3.55 yd to its equivalent measurement in cm.
- .30349 pt. 3. Convert 143.55 mL to its equivalent in pints.
- 16.0 m/s 4. Convert a speed of 35.8 mi/hr to its equivalent in m/s.
- 849 lbs/ft<sup>3</sup> 5. Convert a density of 13.6 g/mL to its equivalent in lb/ft<sup>3</sup>.
- $6.72 \times 10^{20}$  atoms 6. A mole of hydrogen atoms contains  $6.02 \times 10^{23}$  atoms and occupies 22.4 L. How many hydrogen atoms are contained in 25.00 mL of this gas?
- $1.7 \times 10^{-4}$  L 7. What volume of hydrogen would contain  $4.5 \times 10^{18}$  hydrogen atoms?
- $7.5 \times 10^{-6}$  mole How many moles of hydrogen would this be?
- 79.5 s 8. A molecule of hydrogen moves at a speed of 115 cm/s. How long will it take to travel the length of a football field (100 yd long)?
- $6.7 \times 10^8$  mi/hr 9. The speed of light is  $3.0 \times 10^{10}$  cm/s. Express this speed in mi/hr.
- 1.3 mole/L 10. A sample of seawater contains 0.075 g of sodium chloride per mL of solution. How many moles of sodium chloride are there per L of this solution? A mole of sodium chloride is equivalent to 58.5 g of sodium chloride.
- 8.8 ml 11. A doctor orders that a patient receive  $1.5 \times 10^{-3}$  mole of sodium chloride. The only solution available contains 1.00 g per 100 mL of solution. How much of this solution should the nurse give the patient?
- $1.08 \times 10^6$   $\mu$ g 12. A sample of air contains  $2.33 \times 10^{-4}$  mg of lead per mL of gas. This air passes through an office, the volume of which is  $3.25 \times 10^4$  L. Seven people normally work in this office. How many  $\mu$ g of lead will each person in the office receive from this sample of air?

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