CBGS Math Review for Chemistry Students   Name:
Summer 2014
Due first day of Chemistry class Fall 2014

Directions: Answer all questions to the best of your ability. Indicate with a star(*) any questions with content you do not recognize. Whenever appropriate, show detailed work in the space provided.

1.   Convert 124 dL into liters.

2.   If 1 cm = 2.54 inches, convert 8 m into yards.

3.   The speed of light is 6.7 x 10^8 miles per hour. Convert the speed of light into meters per second. Use the conversion 1 mile = 1609.34 m.

4.   The formula that relates mass, density, and volume is given by $d = \dfrac{m}{v}$. Solve the formula for volume.

5.   The following formula converts Fahrenheit temperatures into Celsius. Solve the formula for *F*.

$$^oC = \frac{5}{9}\left(^oF - 32^o\right)$$

6.   The gravitational force between two objects is directly proportional to the product of their point   masses and inversely proportional to the square of the distance between their centers as given by:
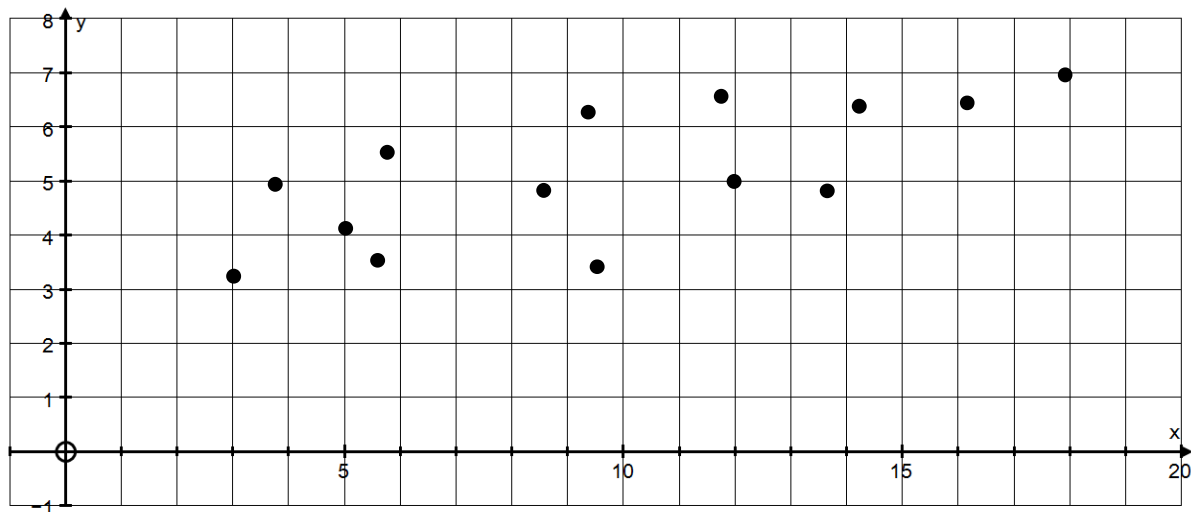
$$F = k \cdot \frac{m_1 \cdot m_2}{d^2} \qquad (\textit{Newton's Law of Universal Gravitation})$$

Solve the formula for m_2.

7. The combined gas law can be written as: $\dfrac{P_1 V_1}{T_1} = \dfrac{P_2 V_2}{T_2}$. Solve the formula for T_2 .

8. Find the mean of the set: 3.1, 2.8, 4.8, 3.9, 5.2, 6.1, 4.3

9.

a.   Estimate a line of best fit and draw it on the graph above.

b.   Does there appear to be a strong or weak correlation?

c.   Does there appear to be a positive or negative correlation.

d.   Determine the slope-intercept form of the equation of line of best fit, drawn in part (a).

10.   What is 12% of 315 mL?

11.   44 g is what percent of 55 g?

12.   Over an eight-week period, the mean length of gold fish you were studying increased from 4.3 cm to 4.8 cm. What is the percent of increase?

13.   Pre-1900 Chesapeake Bay submerged aquatic grasses covered 240,000 hectares. By 1997 this number had decreased to 28,031.75 hectares. Calculate the percent decrease in the SAV grass coverage.

14.   A chemist has a 40% HNO_3 solution and an 85% HNO_3 solution. He wants to know how much of each solution he needs to combine to make 500 ml of a 57% HNO_3 solution. Round the answer to the nearest hundredth if necessary.

(15+16)   The formula to calculate pH is given by: $pH = -\log\left[H^+\right]$, where H^+ is the concentration of hydrogen ions measured in moles per liter (M).

15.   What is the pH of an aqueous solution in which $[H^+] = 2.7 \times 10^{-3}$ M?

16.   What is the concentration of the hydrogen ion concentration in an aqueous solution with pH = 13.22?

17.   Ammonia is a compound consisting of a 1 : 3 ratio of nitrogen and hydrogen atoms. If a sample of ammonia contains 1563 nitrogen atoms, how many atoms of hydrogen are present?

18.   Methane is a compound consisting of a 1 : 4 ratio of carbon and hydrogen atoms. If a sample of methane contains 1565 atoms, how many carbon and hydrogen atoms are present?

19.   Convert the following from scientific notation to standard notation:

   a. 3.815×10^{-4}

   b. -4.001×10^{6}

20.   Convert the following from to standard notation scientific notation:

   a.   32,800,000,000

   b.   0.00000004162

21.   Re-write the following to be in correct scientific notation:

   a. 214×10^{9}

   b. 0.003×10^{14}

   c. 900×10^{-18}

22.   Compute the following in scientific notation and leave your answers in scientific notation:

   a. $(1.2 \times 10^{5}) + (5.35 \times 10^{6})$

   b. $(4.3 \times 10^{8}) \times (2.0 \times 10^{6})$

   c. $\dfrac{6.48 \times 10^{5}}{(2.4 \times 10^{4})(1.8 \times 10^{-2})}$