CHEMISTRY PATH PRE-TEST

ACADEMIC YEAR 2020-21

AN ALGEBRA 1 GRADE OF C OR HIGHER IS REQUIRED TO TAKE CHEMISTRY AT PATH MILFORD. IN ADDITION, STUDENTS SHOULD BE PROFICIENT IN THE FOLLOWING CONTENT.

Circle the correct answer.

1. $3 + 2(7-4) =$

A. 9   B. 13   C. 15   D. 31

2. $2^4 =$

A. 6   B. 8   C. 16   D. 24

3.   0.000786 written in scientific notation is

A. 7.86×10^{-3} B. 7.86×10^{-4} C. 7.86×10^3 D. 7.86×10^4

4. $\dfrac{9 \text{ cm}^3}{3 \text{ cm}^2} =$

A. 3 cm^5 B. 3 cm^1 C. 3 cm^{-1} D. 3 cm^{-5}

5.   If $2a = 3b$, and $a = 6$, what does b equal?

A. $b = 2$ B. $b = 4$ C. $b = 6$ D. $b = 12$

6.   Density is defined as mass per unit volume, or $D = \dfrac{m}{V}$.

Solve the density equation for the variable V.

A. $V = D + m$ B. $V = \dfrac{D}{m}$ C. $V = D \times m$ D. $V = \dfrac{m}{D}$

7. The value of a fraction is less than 1 when

   A. Numerator > denominator

   B. Denominator > numerator

Write the correct answer above the line.

8. Using the metric side of a ruler, measure the length of this line to the nearest 0.1 cm.

   _____

Circle the correct answer.

9. If a variable X is directly proportional to variable Y, it means:

   A. As Y increases, X increases.

   B. As Y increases, X decreases.

   C. There is no relationship between X and Y.

10. Which of the following is a unit of volume:

    A. cm   B. lb/in²   C. ft³   D. acres

11. Which of the following is a hypothesis?

    A.   The beaker weighs 4.65 g.

    B.   When the two solutions were mixed, they turned into a solid.

    C.   The liquid turned solid because there was a change in the molecular structure.

    D.   The solid turned back into a liquid when it was heated.

12. Ounce is to Pound as Centigram is to:

    A.   centimeter

    B.   gram

    C.   milligram

    D.   ounce

Write your answer for each section on the lines.

13. A cake recipe serves 10 people. It calls for 12 cups of sugar and 7 cups of flour.

How many cups of sugar are required to make a cake that serves 16 people? *Round your answer to the nearest tenth of a cup.*

_____ cups of sugar

How many cups of flour are required to make a cake that serves 22 people? *Round your answer to the nearest tenth of a cup.*

_____ cups of flour

14. degrees Fahrenheit = $\dfrac{9}{5}$ (degrees Celsius) + 32

60 degrees Celsius equals how many degrees Fahrenheit? *Round to the nearest whole number.*

_____

100 degrees Fahrenheit equals how many degrees Celsius? *Round to the nearest whole number.*

_____

Circle the correct answer.

15. $$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

In this equation, P = pressure, V = volume and T = temperature.

At a constant pressure,

A. volume is directly proportional to temperature.

B. volume is inversely proportional to temperature.

16. Use the equation in #15 to answer the following:

At a constant temperature,

A. Pressure and volume are inversely proportional.

B. Pressure and volume are directly proportional.

17. Reduce the following fraction: $\dfrac{apple \times orange^3 \times banana}{apple^2 \times lemon \times orange}$

A. $\dfrac{Apple^3 \times orange^2 \times banana}{lemon}$

B. $\dfrac{Orange^2 \times banana}{apple \times lemon}$

C. $\dfrac{Apple^{-1} \times lemon \times banana}{orange^2}$

D. $\dfrac{Orange \times banana}{apple \times lemon}$

18. Find the greatest common factor of the numbers: 8, 10, 4 and 2.

   A. 4

   B. 8

   C. 2

   D. 1

19. Find the greatest common factor of the numbers: 5, 9 and 2.

   A. 2

   B. 1

   C. 5

   D. 3

20. Given that A - (X x Z) < 0, solve for X. Find the range for X when A = 41,200 and Z = 42. *You may use a calculator.*

   A. X > AZ;   X > 981

   B. X > $\underline{A}$;   X > 981

        Z

   C. X > AZ;   X > -981

   D. X > $\underline{A}$;   X < -981

        Z

21. Given the equation: rate x time = distance, find the rate when distance = 125 km and time = 3.5 hours. *You may use a calculator.*

   A. 35.7

   B. 36 km/h

   C. 35.7 km

   D. 36 hours

22. If brass is 25% (by weight) copper, how many grams of copper are in 12 grams of brass? *You may use a calculator.*

A. 3 g

B. 37 g

C. 48 g

D. 300 g

Name:_____

Chemistry   Math Skills Pretest

Objective: SWBAT reassess math skills and apply those skills to chemistry related problems.

    I. Part One: Basic Skills   *You may use a calculator.*

Addition	*Subtraction*
$\begin{array}{r} 212 \\ +\ 576 \end{array}$ $\begin{array}{r} 48 \\ +17 \end{array}$ $\begin{array}{r} 1293 \\ +\ 123 \end{array}$	$\begin{array}{r} 512 \\ -\ 276 \end{array}$ $\begin{array}{r} 48 \\ -17 \end{array}$ $\begin{array}{r} 1293 \\ -\ 123 \end{array}$
Multiplication $12 * 7 =$ $76 * 43 =$ $298 * 14 =$	*Division* $175 / 5 =$ $212 / 4 =$ $63 / 9 =$
Factoring $2(4+5) =$ $6(4+4) =$ $9(15-2)+7 =$	*Algebra* $2(4+x)$ $x = 1$ $6(4+x)$ $x = 4$ $9(15-x)$ $x = 2$
Write the following numbers in <u>scientific notation</u>: 654,000 0.000000251 10034000	*Write the following in decimal form:* 4×10^5 3.4×10^{-6} 3.00102×10^4
Addition and Subtraction $(3.5 \times 10^4) + (4.1 \times 10^3)$ $(7.2 \times 10^{-6}) - (8.2 \times 10^{-7})$	*Multiplication and Division* $(3.5 \times 10^{17}) * (2 \times 10^7)$ $(6 \times 10^6) / (4 \times 10^5)$

II. Part 2: Applied Math

a. Rearranging Equations
   1. Solve the following equation for m $d = \dfrac{m}{V}$

   2. Solve the following equation for P $PV = nrt$

   3. Solve the following equation for n $PV = nrt$

b. Multi Variable Algebra   You may use a calculator.
   1. Given the following, use the equation $PV = nrt$ to solve for P
      V= 20 ml
      N = 5 moles
      R = .0821 K mole/ L atm
      T = 298 K
      P= ?

c. Unit Conversions
   1. Convert 3.2 feet into inches (1 ft = 12 inches)

   2. Convert 2.4 kilograms into grams (1 kg =1000g)

   3. Convert 6 years into seconds

d. Graphing
   1. Graph the following data

X	Y
3	6
2	4
1	2
-1	-2