Name_____
Date_____
Period_____

Mathematics Diagnostic

Directions: This is a diagnostic to see where you are in your mathematical readiness for Chemistry. Use Calculators as needed.

A. Dimensional Analysis: Directions convert the given quantities into the indicated unit. Be sure to use the unit conversions.

1. 100 mL into L

2. 320 cups into gallons

3. 4000 m into kilometers

4. 45 grams into pounds.

5. 2.2 oz into kilograms

6. 200 mL into cubic cm.

B. Algebra Manipulation: Solve each equation for the indicated variable.

7. PV = nRT, for n.

8. $\rho = \frac{m}{V}$, for V

9. $pH = -\log\left[H^+\right]$, for $\left[H^+\right]$

10. $c = \lambda f$, for λ

11. $\Pi = icRT$, for T

12. $K = \frac{1}{2}mv^2$, for v

C. Scientific Notation: Convert the following to scientific or decimal notation

13. 0. 000 000 000 000 000 000 162

14. 300 000 000

15. 0. 000 000 000 0667

16. $101.3 \cdot 10^5$

17. $9.0 \cdot 10^9$

18. $6.626 \cdot 10^{-15}$

D. Multiplication and Division using scientific Notation: Find the following quotients or products.

19. $\frac{3.12 \cdot 10^4}{4.5 \cdot 10^{-5}}$

20. $\left(3.14 \cdot 10^6\right)\left(2.12 \cdot 10^{-3}\right)$

21. $\frac{6.67 \cdot 10^{-11}}{9.0 \cdot 10^{9}}$

22. $\left(6.022 \cdot 10^{23}\right)\left(8.31 \cdot 10^{1}\right)$

23. $\frac{1.675 \cdot 10^{-27}}{9.11 \cdot 10^{-31}}$

24. $\left(4.13 \cdot 10^{2}\right)\left(2.13 \cdot 10^{-2}\right)$

E. Graphing/Average rate of change of functions

25. Given a function $f(t) = t^2 - 2t + 4$ which measures distance in meters, and time in seconds. Consider the time intervals: $[1s, 4s] \& [0s, 5s]$

a. Find the average rate of change for 1s to 4s.
b. Find the average rate of change for 0s to 5s.
c. Graph the function on the coordinate plane.