

Math Skills Needed for Chemistry

Big Picture:

1. Understand place value.
2. Know your multiplication facts.
3. Know how to add, subtract, multiply, and divide fractions.
4. Know how to add, subtract, multiply, and divide negative numbers.

PRE-ALGEBRA Skills:

5. Know the order of operations:
 - 1st: parentheses
 - 2nd: exponents
 - 3rd: multiply/divide (whichever operation comes first, left to right)
 - 4th: add/subtract (whichever operation comes first, left to right).
6. Understand reciprocal or inverse.
The inverse of 2 is $\frac{1}{2}$. The inverse of $\frac{1}{3}$ is 3
7. Understand Greatest Common Multiple (GCM) and Least Common Factor (LCF).
8. Know how to average a set of numbers.
9. Know how to add, subtract, multiply, and divide decimals.
10. Be able to convert from a % to a decimal and from a decimal to a %.

PRE-ALGEBRA, ALGEBRA I, and ALGEBRA II Skills:

11. Understand that the 'number one' can be written as a fraction of two equal values like $2.5\text{cm} = 1 \text{ inch}$, therefore $2.5\text{cm}/1 \text{ inch} = 1$. Any number multiplied by such a fraction (that equals one) is the same number.

Ex. $1/3 \times 6/6 = 6/18$ which still equals $1/3$.

Ex. $5\text{cm} \times (1 \text{ inch}/2.5\text{cm}) = 2 \text{ inches}$. Therefore, $5\text{cm} = 2 \text{ inches}$.

12. Understand exponents. $A^2 = A \times A$ $4 = 2^2$ $8 = 2^3$ $9 = 3^2$

$$10^6 = 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 1,000,000$$

$$(1/2)^3 = 1/2 \times 1/2 \times 1/2 = 1/8$$

13. Know what to do with exponents when multiplying or dividing.

$$2 \times 10^3 \times 12 \times 10^2 = 24 \times 10^{(3+2)} = 24 \times 10^5$$

$$(12 \times 10^4) / (6 \times 10^2) = 2 \times 10^{(4-2)} = 2 \times 10^2$$

ALGEBRA I and ALGEBRA II Skills:

14. Be comfortable using your scientific calculator correctly.

ALGEBRA I Skills:

15. Understand negative exponents. $A^{-2} = 1 / A^2$

$$10^{-6} = 1 / (10 \times 10 \times 10 \times 10 \times 10 \times 10) = 0.000001$$

16. Understand how to read and get information from a table and from a line graph.

17. $A = B/C$

Given any two of the three variables, solve for the third.

$$C = B/A$$

$$B = A \times C$$

ALGEBRA II Skills:

18. Understand the concept of 'directly proportional' - as one variable increases, so does the other variable. Ex. the sale of new automobiles in the city is directly proportional to the income of the families in the city.

19. Understand the concept of 'inversely proportional' - as one variable increases, the other variable decreases. Ex. the older a person gets, the slower he runs.

20. Logarithms

$$2^x = 16 \quad \log_2(16) = x \quad \text{and solve } x = 4$$

$$10^{2.5} = x \quad \log(x) = 2.5 \quad \text{and solve } x = 316$$