



Unit 0: Math Skills - Things To Memorize

1. Scientific Notation:

- Scientific Notation always has three parts: the *coefficient*, the *base*, and the *exponent*:

$$\text{Coefficient} \rightarrow 6.022 \times 10^{23} \leftarrow \text{Exponent}$$

\uparrow
Base

- In scientific notation the base is always 10.
- A negative in front of the coefficient means the whole number is negative.
- A negative exponent means the number is very small (close to zero).
- The exponent counts how many places the decimal moved, NOT the number of zeroes.
- When comparing numbers in scientific notation, look at (in order):
 - Negatives in front of the coefficient.
 - Exponents
 - Coefficients
- To multiply, multiply coefficients, then ADD exponents.
- To divide, divide coefficients, then SUBTRACT exponents.
- To raise to a power, raise the coefficient to the power, then MULTIPLY exponents.
- To enter scientific notation on the calculator use the “EE” key. 6.022×10^{23} is entered as 6.022E23. Calculator notation should never be handwritten.

2. Algebra:

- To solve for something in the top of a fraction, multiply by the bottom.

$$A = \frac{B}{C} \quad \longrightarrow \quad A \times C = \frac{B}{\cancel{C}} \times \cancel{C} \quad \longrightarrow \quad AC = B$$

- To solve for something in the bottom of a fraction, make sure the fraction is isolated on one side of the equation. Then, switch the bottom with the other side:

$$A = \frac{B}{C} \rightarrow C = \frac{B}{A}$$

- To solve for a variable, undo steps using inverse operations:
 - Addition \leftrightarrow Subtraction
 - Multiplication \leftrightarrow Division
 - Squared \leftrightarrow Square Root (more like Exponents \leftrightarrow nth roots)
 - \sin , \cos , and $\tan \leftrightarrow \sin^{-1}$, \cos^{-1} , \tan^{-1}



Name: _____

3. Trigonometry

- Remember: SOH-CAH-TOA. It means:

$$\sin(\theta) = \frac{\text{opp}}{\text{hyp}} \qquad \cos(\theta) = \frac{\text{adj}}{\text{hyp}} \qquad \tan(\theta) = \frac{\text{opp}}{\text{adj}}$$

- Hypotenuse is always the longest side.
- Cut the angle of interest in half and draw a line across the triangle to find the opposite side.
- The adjacent side and the hypotenuse create the angle.
- To find a side, use regular functions (\sin , \cos , \tan)
- To find an angle use inverse functions (called \arcsin , \arccos , \arctan or \sin^{-1} , \cos^{-1} , \tan^{-1})
- All trigonometric functions need an argument - They never go anywhere without (θ) .

4. Arc Length

- 2π radians = 360° = 1 full rotation
- 1 radian is the angle where the radius = the arc length $\approx 57.2958^\circ$
- To use the arc-length formula, all angles must be measured in radians.