

Unit 6: MATHS

Basic Algebra

Under this very broad subheading, I will give some examples of how to rearrange mathematical statements, that you can use to simplify expressions and solve equations for unknowns.

Simplifying

We can collect like terms in equations to make them simpler to express.

$$4x + 2y - 8x + y$$

Here, 2 terms, $4x$ and $-8x$, are a product of x . Together they are equal to $(4 - 8)x = -4x$. If we do the same for the y terms and take the sum the result we get a totally simplified expression, $3y - 4x$.

$$\frac{4x}{y} + \frac{3x}{2} - \frac{2y}{2} + 2x$$

Here we can have 3 factor that we cannot simplify, x , y and x/y . Using the same method as above, we take the 2 x terms and substitute them for their the sum of the two.

$$\frac{3x}{2} + 2x = \frac{3x}{2} + \frac{4x}{2} = \frac{7x}{2}$$

Now to simplify $2y/2$:

$$\frac{2y}{2} = \frac{2}{2} \times y = 1 \times y = y$$

So, the simplified expression:

$$\frac{4x}{y} + \frac{7x}{2} - y$$

Trigonometry

Trigonometry encompasses the studies of ratios including side lengths and angles of triangles. I will cover how to solve a triangle side or angle using trigonometry.

There is two trig equations we will be using: the Sine rule and Pythagorus's equation.

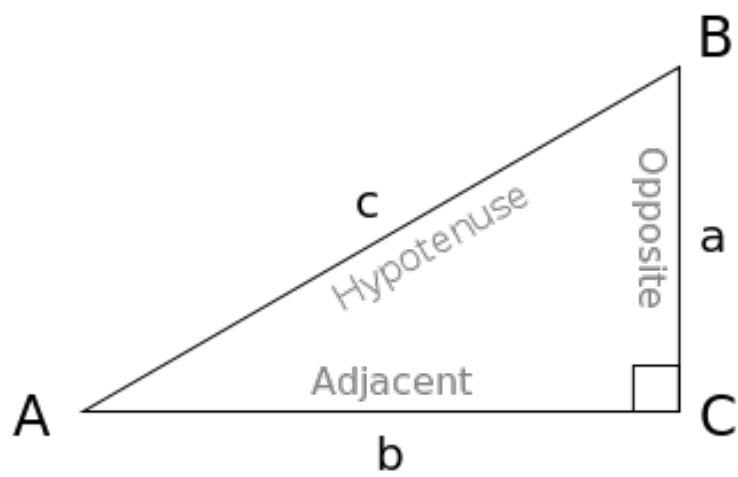


Figure 1: trig triangle

The Sine Rule

$$\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$

Pythagorus

$$a^2 + b^2 = c^2$$

Matrices

$$\begin{pmatrix} 4 & 2 \\ 3 & 5 \end{pmatrix} \times \begin{pmatrix} 2 & 6 \\ 1 & 8 \end{pmatrix}$$

Vectors

Applied Mechanics

SUVAT