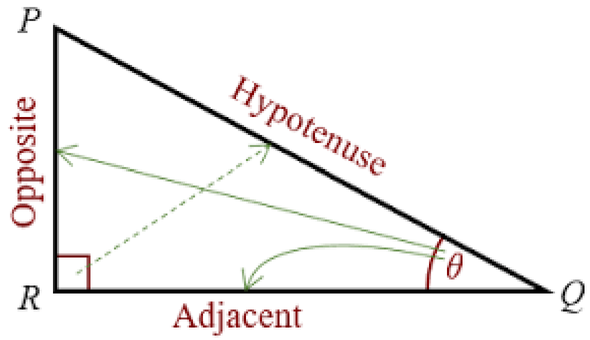
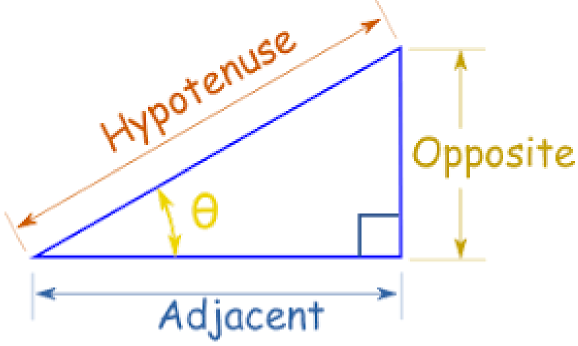
These are the basic trigonometric functions representing the fundamental relationships between the angles and sides of a right triangle.

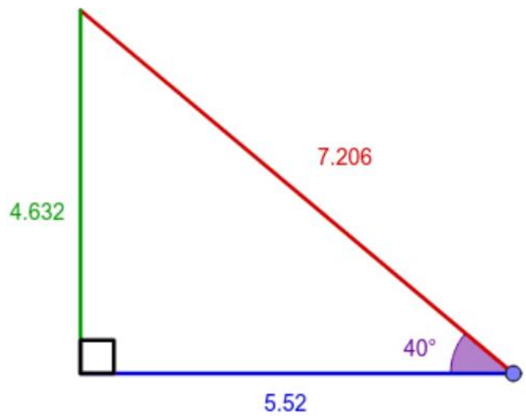
<u>**Sine (sin):**</u> In a right triangle, the sine of an angle is the ratio of the length of the opposite side to the length of the hypotenuse. **Equation:** sin(θ) = opposite / hypotenuse

<u>**Cosine (cos):**</u> In a right triangle, the cosine of an angle is the ratio of the length of the adjacent side to the length of the hypotenuse. **Equation:** cos(θ) = adjacent / hypotenuse

<u>**Tangent (tan):**</u> In a right triangle, the tangent of an angle is the ratio of the length of the opposite side to the length of the adjacent side. **Equation:** tan(θ) = opposite / adjacent







$$\sin 40^\circ = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{4.632}{7.206} = 0.643$$

$$\cos 40^\circ = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{5.52}{7.206} = 0.766$$

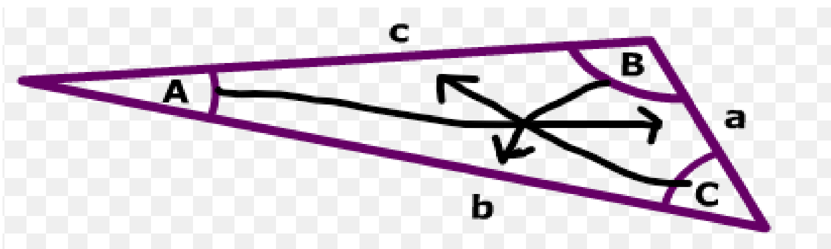
$$\tan 40^\circ = \frac{\text{opposite}}{\text{adjacent}} = \frac{4.632}{5.52} = 0.839$$

<u>**Sine Rule:**</u>

The Sine Rule is used in trigonometry to find missing lengths or angles in any triangle (not just right-angled triangles). It states that the ratio of the length of a side to the sine of its opposite angle is the same for all sides and angles in a triangle:

a / sin(A) = b / sin(B) = c / sin(C)

where a, b, and c are the lengths of the sides, and A, B, and C are the opposite sides.

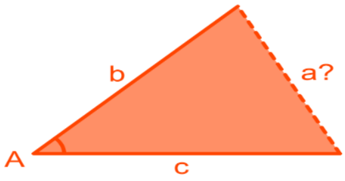


Cosine Rule:

The Cosine Rule, also useful for any type of triangle, relates the lengths of a triangle's sides to the cosine of one of its angles. It's given by:

$$c2 = a2 + b2 - 2ab\cos(C)$$

where a, b, and c are the sides of the triangle and C is the angle opposite side c.



Trigonometry Graphs:

Trigonometric graphs represent how the values of sin, cos, and tan functions change with the angle. They are periodic functions, repeating their values in regular intervals.

Graph of sine: starts at 0, peaks at 1, dips to -1, and returns to 0 over a period of 2π radians (360 degrees).

Graph of cosine: similar to the sine graph, starts at 1, peaks at 1, dips to -1, and returns to 0 over a period of 2π radians (360 degrees).

Graph of tangent: rises to infinity, drops to negative infinity, and repeats every π radians (180 degrees), with undefined values at $\frac{\pi}{2}$ and its multiples.