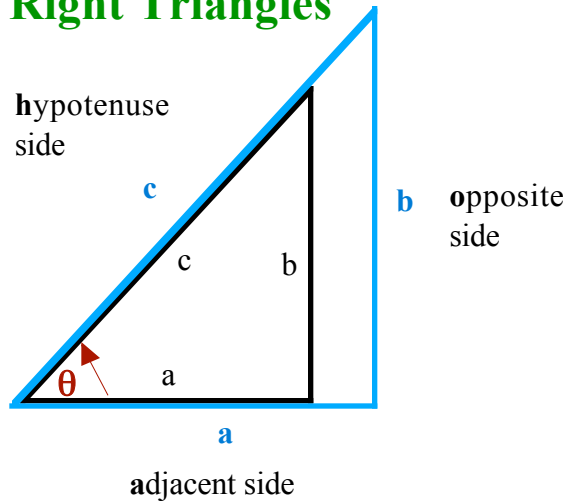


Trigonometry

Similar Right Triangles



Trigonometry is the mathematics that deals with the ratios of the lengths of the sides of a right triangle.

It's this simple!

Can you see the relationship between the sides of these two similar triangles?

Will I get **a**, **b** and **c** if I multiply **a**, **b** and **c** by some number? Yep!

Since the two right triangles (black and blue) are similar, their respective sides are in proportion to one another. We could add more similar triangles to the diagram if we wanted.

So, let's find the ratio of the lengths of the sides of the black right triangle.

$$\frac{b}{c} \qquad \frac{a}{c} \qquad \frac{b}{a}$$

I suppose we could give these ratios names since they will be used a lot.

$$\begin{array}{ccc} \frac{b}{c} & \frac{a}{c} & \frac{b}{a} \\ \text{Sine} & \text{Cosine} & \text{Tangent} \end{array}$$

We will use the angle θ in the diagram to distinguish the angle of the right triangle that we are using.

$$\text{Sine } (\theta) = \frac{b}{c} \qquad \text{Cosine } (\theta) = \frac{a}{c} \qquad \text{Tangent } (\theta) = \frac{b}{a}$$

The sine of an angle is the ratio of the opposite side to the hypotenuse.

The cosine of an angle is the ratio of the adjacent side to the hypotenuse.

The tangent of an angle is the ratio of the opposite side to the adjacent side.

$$\text{Sine } (\theta) = \frac{o}{h} \qquad \text{Cosine } (\theta) = \frac{a}{h} \qquad \text{Tangent } (\theta) = \frac{o}{a}$$

The sine of an angle is the ratio of the opposite side to the hypotenuse.

The cosine of an angle is the ratio of the adjacent side to the hypotenuse.

The tangent of an angle is the ratio of the opposite side to the adjacent side.

a mnemonic
"SohCahToa"

*Using the lengths of the sides of the **blue triangle** will produce the same ratios as the black triangle.*