

Right Triangles and Trigonometry

Every trig question on the SAT is built on one right triangle and three ratios. Learn to label the triangle correctly from the angle you are given, and the rest is just picking the right ratio.

1

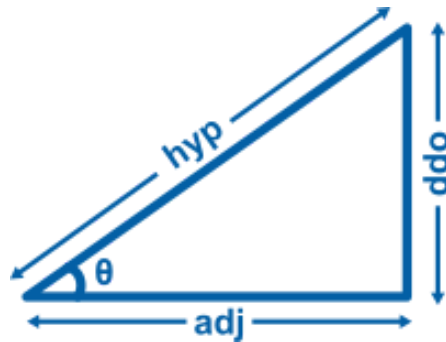
What this topic actually tests

This section tests the relationships between the sides and angles of a right triangle. That covers the **Pythagorean theorem**, the core three core trig ratios - **sine, cosine, and tangent** - along with the connection between them.

The one habit that makes this whole section easier: before touching any ratios, relabel the triangle's side as **opposite, adjacent** and **hypotenuse** relative to the specific angle the question is asking about. That labeling changes depending in which angle you are focused on.

2

Labeling the triangle



Opposite – the side directly across from angle θ , not touching it at all.

Adjacent – the side that touches angle θ but not the hypotenuse.

Hypotenuse – the longest side, always across from the right angle and it never changes no matter which acute angle you are focused on.

3

The three core relation

SOH**Sine**

$$\sin \theta = \text{opp} / \text{hyp}$$

Ratio of the side opposite to the hypotenuse.

CAH**Cosine**

$$\cos \theta = \text{adj} / \text{hyp}$$

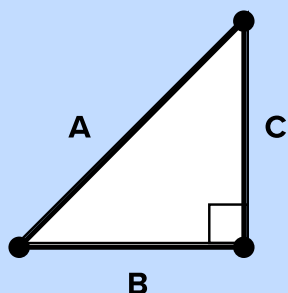
Ratio of the side adjacent to the angle to the hypotenuse.

TOA**Tangent**

$$\tan \theta = \text{opp} / \text{adj}$$

Ratio of the opposite side to the angle to the adjacent side.

Pythagorean theorem



The Pythagorean theorem is a fundamental rule in geometry that shows the relationship between the lengths of the sides in a right triangle

$$A^2 = B^2 + C^2$$

$$(\text{Hypo})^2 = (\text{Base})^2 + (\text{perpendicular})^2$$

4

Trignometry Table

	0°	30°	45°	60°	90°
sin	0	1/2	1/√2	√3/2	1
cos	1	√3/2	1/√2	1/2	0
tan	0	1/√3	1	√3	∞
csc	∞	2	√2	2/√3	1
sec	1	2/√3	1/√2	2	∞
cot	∞	√3	1	1/√3	0