

Section 5.2: The Six Trigonometric Ratios

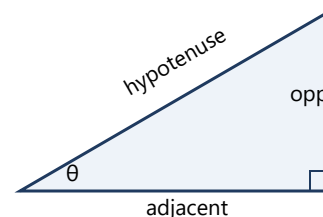
MATH 130 · Wednesday, November 4 · Quiz 10 on Wednesday, November 11 Name _____

Measured from angle θ in a right triangle:

$$\sin \theta = \text{opp/hyp} \quad \cos \theta = \text{adj/hyp} \quad \tan \theta = \text{opp/adj}$$

$$\csc \theta = \text{hyp/opp} \quad \sec \theta = \text{hyp/adj} \quad \cot \theta = \text{adj/opp} \quad (\text{the reciprocals})$$

$$\text{Missing side: } a^2 + b^2 = c^2.$$



1 · All six ratios from the sides

Write each ratio as a fraction in lowest terms.

Model The legs are 20 and 21 and the hypotenuse is 29. Angle θ is opposite the side of length 20. Find all six ratios.

1

The legs are 12 and 35 and the hypotenuse is 37. Angle θ is opposite the side of length 12. Find all six ratios.

2 · Find the missing side first

Model The hypotenuse is 13 and the side adjacent to θ is 5. Find $\sin \theta$ and $\tan \theta$.

2

The hypotenuse is 25 and the side opposite θ is 7. Find $\cos \theta$ and $\tan \theta$.

3 · Variables for side lengths

Model In right triangle ABC, the right angle is at C. Side a is opposite A, b is opposite B, and c is the hypotenuse. Write $\sin A$ and $\cos A$.

3

In the same triangle, write $\cos B$, $\tan B$ and $\sec B$.

4 · Calculator values

Check that your calculator is in **degree mode** first: $\tan 45^\circ$ should be 1. Round to four decimal places.

Model $\sin 37^\circ$ $\cos 58^\circ$ $\tan 22^\circ$

4 $\sin 71^\circ$ $\cos 14^\circ$ $\tan 63^\circ$

Check yourself: sine and cosine of an acute angle are always between 0 and 1. The hypotenuse is always the longest side, so csc and sec are always greater than 1. $\tan \theta$ can be any positive number.