

Trigonometric Ratios Guide Notes

Trigonometric Ratios are ratios of the measure of two sides of a right triangle.

Common trigonometric ratios are: *sine*(*sin*), *cosine*(*cos*), *tangent*(*tan*), *cosecant*(*csc*), *secant*(*sec*) and *cotangent*(*cot*).

$$\sin \angle A = \frac{\text{measure of leg opposite to } \angle A}{\text{measure of hypotenuse}} = \frac{\overline{BC}}{\overline{AB}}$$

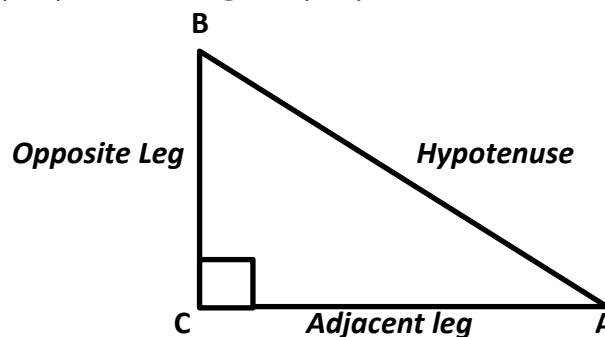
$$\cos \angle A = \frac{\text{measure of leg adjacent to } \angle A}{\text{measure of hypotenuse}} = \frac{\overline{CA}}{\overline{AB}}$$

$$\tan \angle A = \frac{\text{measure of leg opposite to } \angle A}{\text{measure of leg adjacent to } \angle A} = \frac{\overline{BC}}{\overline{CA}}$$

$$\csc \angle A = \frac{1}{\sin \angle A} = \frac{\text{measure of hypotenuse}}{\text{measure of leg opposite to } \angle A} = \frac{\overline{AB}}{\overline{BC}}$$

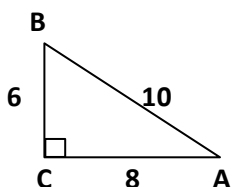
$$\sec \angle A = \frac{1}{\cos \angle A} = \frac{\text{measure of hypotenuse}}{\text{measure of leg adjacent to } \angle A} = \frac{\overline{AB}}{\overline{CA}}$$

$$\cot \angle A = \frac{1}{\tan \angle A} = \frac{\text{measure of leg adjacent to } \angle A}{\text{measure of leg opposite to } \angle A} = \frac{\overline{CA}}{\overline{BC}}$$



Sample Problem 1: Find *sin*, *cos*, *tan*, *csc*, *sec* and *cot* of each acute angle of the right triangle *ABC*.

a.



$$\sin \angle A =$$

$$\sin \angle B =$$

$$\cos \angle A =$$

$$\cos \angle B =$$

$$\tan \angle A =$$

$$\tan \angle B =$$

$$\csc \angle A =$$

$$\csc \angle B =$$

$$\sec \angle A =$$

$$\sec \angle B =$$

$$\cot \angle A =$$

$$\cot \angle B =$$

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Sample Problem 2: Use your calculator to calculate the following (correct to 2 decimal places).

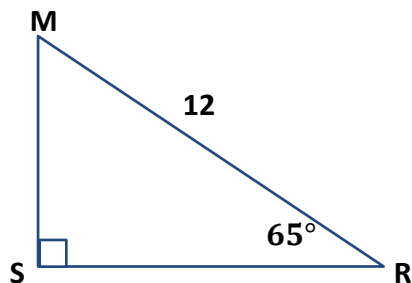
- a. $\sin 45^\circ =$
- b. $\cos 60^\circ =$
- c. $\tan 30^\circ =$
- d. $\sin 75^\circ =$

Sample Problem 3: Use your calculator to calculate the following.

- a. $\sin \angle B = 0,886$ $\angle B =$
- b. $\cos \angle A = 0,309$ $\angle A =$
- c. $\tan \angle B = 1,000$ $\angle B =$
- d. $\sin \angle A = 0,707$ $\angle A =$

Sample Problem 4: Use trigonometric ratios and Pythagorean Theorem to find the values of missing sides and angles.

a.

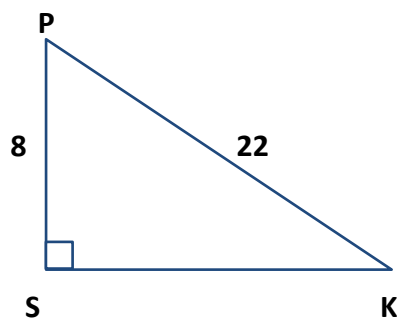


$$\begin{aligned}\overline{MR} &= 12 \\ \overline{MS} &=? \\ \overline{SR} &=?\end{aligned}$$

$$\begin{aligned}\angle R &= 65^\circ \\ \angle M &=?\end{aligned}$$

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b.



$$\overline{PS} = 8$$

$$\overline{PK} = 22$$

$$\overline{SK} = ?$$

$$\angle P = ?$$

$$\angle K = ?$$

If $\angle A$ and $\angle B$ are the acute angles of a right triangle, then $\sin \angle A = \cos \angle B$

Since the measures of these acute angles of a right triangle add to 90° , we know these acute angles are complementary.

$$\sin \angle A = \cos(90^\circ - \angle A)$$

$$\sin \angle B = \cos(90^\circ - \angle B)$$

$$\cos \angle A = \sin(90^\circ - \angle A)$$

$$\cos \angle B = \sin(90^\circ - \angle B)$$

Sample Problem 5: Find the value of θ that makes each statement true.

a. $\sin \theta = \cos(\theta + 46^\circ)$

b. $\cos \theta = \sin(\theta - 30^\circ)$