Math 3 Name **KEY**

Unit 1.4 Trigonometric Functions of Acute Angles PRACTICE

Find the trigonometry function values of the most commonly used angles. $30°$, $45°$, and $60°$

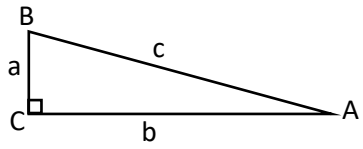
1)

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\csc\theta$	$\sec\theta$	$\cot\theta$
$30°$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$	$\sqrt{3}$
$45°$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
$60°$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2	$\frac{\sqrt{3}}{3}$

For each trigonometric function in Column I, choose its value from Column II.

Column I		**Column II**	
2) $\sin 30°$	C	A. $\sqrt{3}$	B. 1
3) $\cos 45°$	H	C. $\frac{1}{2}$	D. $\frac{\sqrt{3}}{2}$
4) $\tan 45°$	B	E. $\frac{2\sqrt{3}}{3}$	F. $\frac{\sqrt{3}}{3}$
5) $\sec 60°$	G	G. 2	H. $\frac{\sqrt{2}}{2}$
6) $\csc 60°$	E	I. $\sqrt{2}$	J. $\frac{\sqrt{2}}{3}$

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using Pythagorean theorem, and then find the values of the six trigonometric functions for angle B. Rationalize denominators when applicable.



7) $a = 5,\ b = 12$ c = 13

sin B = $\frac{12}{13}$ cos B = $\frac{5}{13}$ tan B = $\frac{12}{5}$ csc B = $\frac{13}{12}$ sec B = $\frac{13}{5}$ cot B = $\frac{5}{12}$

8) $a = 3,\ b = 5$ c = $\sqrt{34}$

sin B = $\frac{5\sqrt{34}}{34}$ cos B = $\frac{3\sqrt{34}}{34}$ tan B = $\frac{5}{3}$ csc B = $\frac{\sqrt{34}}{5}$ sec B = $\frac{\sqrt{34}}{3}$ cot B = $\frac{3}{5}$

9) $a = 6,\ c = 7$ b = $\sqrt{13}$

sin B = $\frac{\sqrt{13}}{7}$ cos B = $\frac{6}{7}$ tan B = $\frac{\sqrt{13}}{6}$ csc B = $\frac{7\sqrt{13}}{13}$ sec B = $\frac{7}{6}$ cot B = $\frac{6\sqrt{13}}{13}$

10) $b = 7,\ c = 12$ a = $\sqrt{95}$

sin B = $\frac{7}{12}$ cos B = $\frac{\sqrt{95}}{12}$ tan B = $\frac{7\sqrt{95}}{95}$ csc B = $\frac{12}{7}$ sec B = $\frac{12\sqrt{95}}{95}$ cot B = $\frac{\sqrt{95}}{7}$

Write each function in terms of its cofunction. Assume that all angles in which an unknown appears are acute angles.

11) $\cot 73°$ $\tan 17°$

12) $\sec 39°$ $\csc 51°$

13) $\cos(\alpha + 20°)$ $\sin(70° - \alpha)$

14) $\cot(\theta - 10°)$ $\tan(100° - \theta)$

15) $\tan 25.4°$ $\cot 64.6°$

16) $\sin 38.7°$ $\cos 51.3°$

17) With a calculator, evaluate $\sin(90° - A)$ and cos A for various values of A.
(Include values greater than 90° and less than 0°.)
What do you find?

The results are the same.

Find the solution for each equation. Assume that all angles in which an unknown appears are acute angles.

18) $\tan \alpha = \cot(\alpha + 10°)$ $40°$

19) $\cos \theta = \sin 2\theta$ $30°$

20) $\sin(2\theta + 10°) = \cos(3\theta - 20°)$ $20°$

21) $\sec(\beta + 10°) = \csc(2\beta + 20°)$ $20°$

22) $\tan(3B + 4°) = \cot(5B - 10°)$ $12°$

23) $\cot(5\theta + 2°) = \tan(2\theta + 4°)$ $12°$

For each expression, give the exact value.

24) $\tan 30°$ $\frac{\sqrt{3}}{3}$

25) $\cot 30°$ $\sqrt{3}$

26) $\sin 30°$ $\frac{1}{2}$

27) $\cos 30°$ $\frac{\sqrt{3}}{2}$

28) $\sec 30°$ $\frac{2\sqrt{3}}{3}$

29) $\csc 30°$ 2

30) $\csc 45°$ $\sqrt{2}$

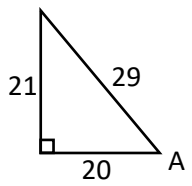
31) $\sec 45°$ $\sqrt{2}$

32) $\cos 45°$ $\frac{\sqrt{2}}{2}$

33) $\cot 45°$ 1

Find exact values or expressions for sin A, cos A, and tan A.

34)

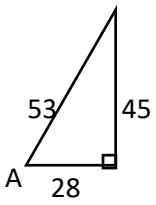


$\sin A = \frac{21}{29}$

$\cos A = \frac{20}{29}$

$\tan A = \frac{21}{20}$

35)

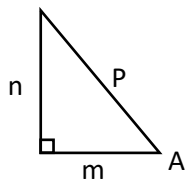


$\sin A = \frac{45}{53}$

$\cos A = \frac{28}{53}$

$\tan A = \frac{45}{28}$

36)

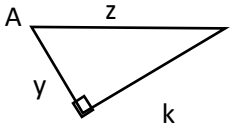


$\sin A = \frac{n}{p}$

$\cos A = \frac{m}{p}$

$\tan A = \frac{n}{m}$

37)



$\sin A = \frac{k}{z}$

$\cos A = \frac{y}{z}$

$\tan A = \frac{k}{y}$