
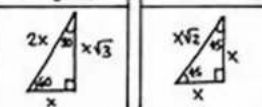
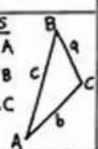


Demystifying Trigonometry: Comprehensive Notes for Precalculus Students

Trigonometry					DEGREES		RADIAN	
Deg.	Rad.	Sine	Cosine	Tangent	105°	$\frac{7\pi}{12}$	$\frac{5\pi}{12}$	75°
30	$\pi/6$	0.5	$\sqrt{3}/2$	$1/\sqrt{3}$	120°	$2\pi/3$	$\pi/3$	60°
45	$\pi/4$	$1/\sqrt{2}$	$1/\sqrt{2}$	1	135°	$3\pi/4$	$\pi/4$	45°
60	$\pi/3$	$\sqrt{3}/2$	0.5	$\sqrt{3}$	150°	$5\pi/6$	$\pi/6$	30°
90	$\pi/2$	1	0	UND.	165°	$11\pi/12$	$\pi/12$	15°
120	$2\pi/3$	$\sqrt{3}/2$	-0.5	$-\sqrt{3}$	180°	π	0	0, 360°
135	$3\pi/4$	$1/\sqrt{2}$	$-1/\sqrt{2}$	-1	195°	$13\pi/12$	$\pi/12$	15°
150	$5\pi/6$	0.5	$-\sqrt{3}/2$	$-1/\sqrt{3}$	210°	$7\pi/6$	$\pi/6$	30°
180	π	0	-1	0	225°	$5\pi/4$	$\pi/4$	45°
210	$7\pi/6$	-0.5	$-\sqrt{3}/2$	$1/\sqrt{3}$	240°	$4\pi/3$	$\pi/3$	60°
225	$5\pi/4$	$-1/\sqrt{2}$	$-1/\sqrt{2}$	1	255°	$17\pi/12$	$\pi/12$	15°
240	$4\pi/3$	$-\sqrt{3}/2$	-0.5	$\sqrt{3}$	270°	$3\pi/2$	0	0, 360°
270	$3\pi/2$	-1	0	UND.	285°	$19\pi/12$	$\pi/12$	15°
300	$5\pi/3$	$\sqrt{3}/2$	0.5	$-1/\sqrt{3}$	300°	$5\pi/3$	$\pi/3$	60°
315	$7\pi/4$	$1/\sqrt{2}$	$1/\sqrt{2}$	-1				
330	$11\pi/6$	-0.5	$\sqrt{3}/2$	$1/\sqrt{3}$				
0, 360	2π	0	1	0				

	SOH Y/R	CAH X/R	TOA Y/X	Degrees-Radians $n^\circ = n^\circ \left(\frac{\pi}{180} \text{ rad} \right)$	Def. of Radian $s = r\theta$ s-Arc Length
				Radians-Degrees $n \text{ rad} = n \text{ rad} \left(\frac{180}{\pi} \right)$	

All Smart Trig Classes	30-60-90 $\pi/6 - \pi/3 - \pi/2$	45-45-90 $\pi/4 - \pi/4 - \pi/2$	DERIVATIVES OF BASIC TRIG FUNCTIONS x is in radians $\frac{d}{dx} \sin x = \cos x$ $\frac{d}{dx} \cos x = -\sin x$ $\frac{d}{dx} \sec x = \sec x \tan x$ $\frac{d}{dx} \tan x = \sec^2 x$ $\frac{d}{dx} \cot x = -\csc^2 x$ $\frac{d}{dx} \csc x = -\csc x \cot x$ $\frac{d}{dx} \sin u = \cos u \cdot u'$ $\frac{d}{dx} \tan u = \sec^2 u \cdot u'$ $\frac{d}{dx} \sec u = \sec u \tan u \cdot u'$ $\frac{d}{dx} \cos u = -\sin u \cdot u'$ $\frac{d}{dx} \cot u = -\csc^2 u \cdot u'$ $\frac{d}{dx} \csc u = -\csc u \cot u \cdot u'$
			

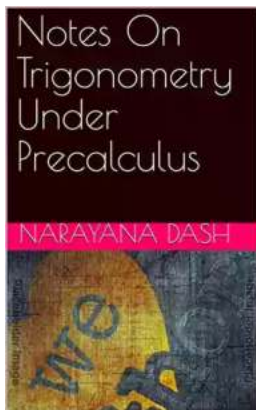
TRIG IDENTITIES		$\sin(x+y) = \sin x \cos y + \cos x \sin y$ $\sin\left(\frac{\pi}{2} - \theta\right) = \cos \theta$ $\sin(x-y) = \sin x \cos y - \cos x \sin y$ $\cos\left(\frac{\pi}{2} - \theta\right) = \sin \theta$ $\cos(x+y) = \cos x \cos y - \sin x \sin y$ $\cos(x-y) = \cos x \cos y + \sin x \sin y$ $\tan\left(\frac{\pi}{2} - \theta\right) = \cot \theta$ $\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$ $\tan(x-y) = \frac{\tan x - \tan y}{1 + \tan x \tan y}$	
$\sin^2 x + \cos^2 x = 1$ $\tan^2 x + 1 = \sec^2 x$ $1 + \cot^2 x = \csc^2 x$ $\sin 2x = 2 \sin x \cos x$ $\cos 2x = \cos^2 x - \sin^2 x$ $\cos 2x = 2 \cos^2 x - 1$ $\cos 2x = 1 - 2 \sin^2 x$ $\tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$	$\sin\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 - \cos x}{2}}$ $\cos\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 + \cos x}{2}}$ $\tan\left(\frac{x}{2}\right) = \pm \sqrt{\frac{1 - \cos x}{1 + \cos x}}$ $\sin^2 x = \frac{1 - \cos 2x}{2}$ $\cos^2 x = \frac{1 + \cos 2x}{2}$	THE LAW OF COSINES $a^2 = b^2 + c^2 - 2bc \cos A$ $b^2 = a^2 + c^2 - 2ac \cos B$ $c^2 = a^2 + b^2 - 2ab \cos C$	
$\csc x = \frac{1}{\sin x}$ $\sec x = \frac{1}{\cos x}$ $\tan x = \frac{\sin x}{\cos x}$ $\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x}$	THE LAW OF SINES $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$		

Welcome to an in-depth exploration of trigonometry, an essential branch of mathematics. In this article, we will provide comprehensive notes on trigonometry under the precalculus curriculum. Whether you are a student seeking to ace your

exams or simply someone interested in diving into the fascinating world of trigonometry, this article is your ultimate resource!

The Significance of Trigonometry

Trigonometry is the study of relationships between angles and sides of triangles. It finds application in a wide range of fields, including physics, engineering, architecture, and navigation. By understanding the concepts and principles of trigonometry, you can unlock the ability to solve complex problems involving angles, triangles, and periodic phenomena.



Notes On Trigonometry Under Precalculus

by Narayana Dash (Kindle Edition)

★★★★☆ 4 out of 5

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Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 555 pages
Lending : Enabled
X-Ray for textbooks : Enabled



Key Concepts in Trigonometry

1. Right Triangles:

Trigonometry primarily deals with right triangles, which are triangles possessing a right angle (90 degrees). In a right triangle, we have three primary sides:

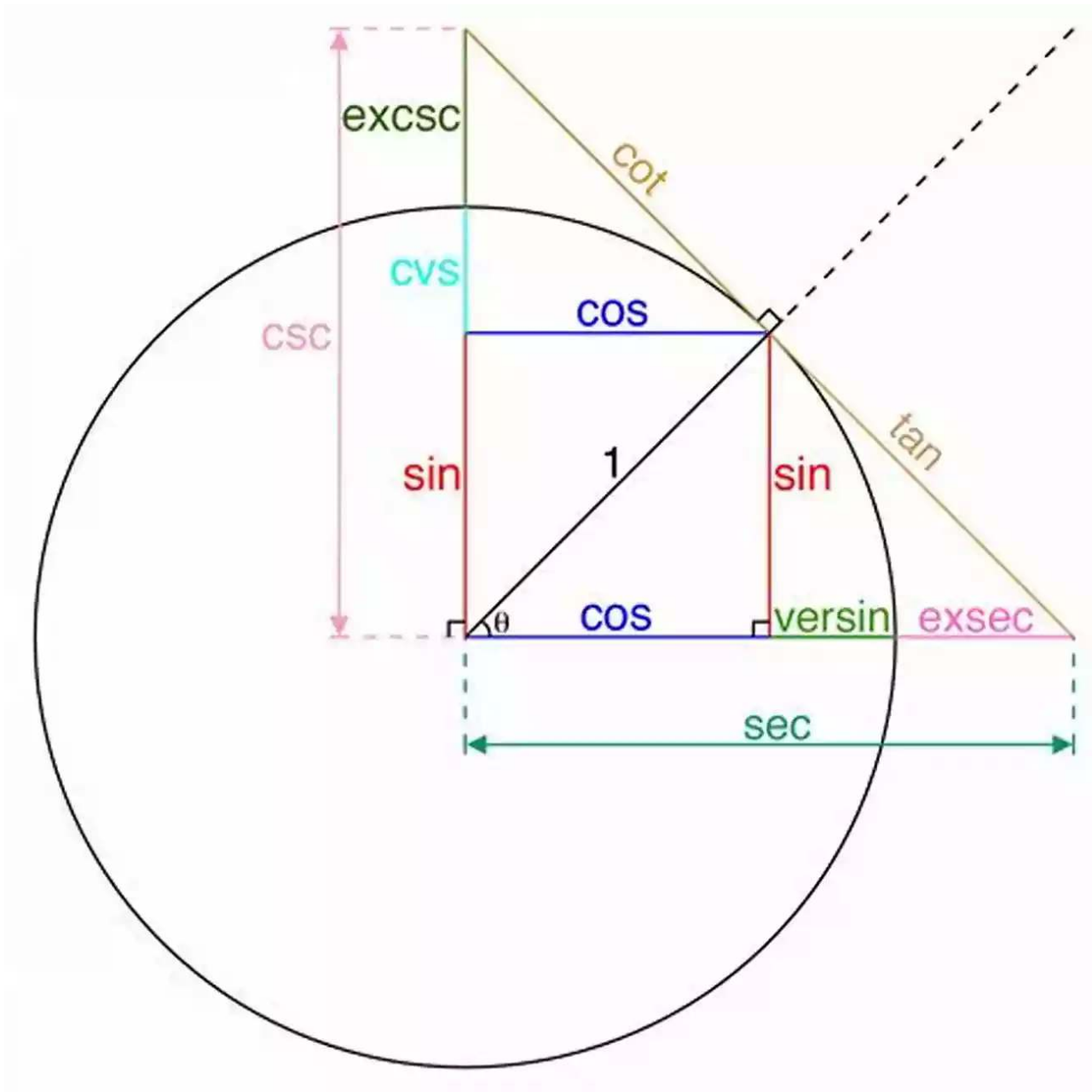
- Hypotenuse: The side opposite the right angle.

- Adjacent side: The side adjacent to a given angle of interest.
- Opposite side: The side opposite the given angle of interest.

2. Trigonometric Functions:

The three fundamental trigonometric functions are:

- Sine (sin): The ratio of the length of the opposite side to the length of the hypotenuse.
- Cosine (cos): The ratio of the length of the adjacent side to the length of the hypotenuse.
- Tangent (tan): The ratio of the length of the opposite side to the length of the adjacent side.



3. Unit Circle:

The unit circle is a circle with a radius of 1 unit, centered at the origin of a coordinate plane. It is a powerful tool in trigonometry as it helps visualize and comprehend the trigonometric functions for any angle. By relating angles to points on the unit circle, we can determine the values of sine, cosine, and tangent for the respective angles.

Applications of Trigonometry

1. Geometry and Measurement:

Trigonometry provides a framework for measuring distances, heights, and angles in various geometric shapes. It enables calculations involving proportions, similarities, and congruence of triangles, helping determine unknown values.

2. Navigation and Astronomy:

Navigation relies heavily on trigonometry, allowing sailors and pilots to determine their position using celestial bodies and compass directions. Trigonometry plays a pivotal role in celestial navigation, satellite positioning, and calculating the height and distance of stars, planets, and other celestial bodies.

3. Engineering and Physics:

Trigonometry helps engineers design structures, such as bridges and buildings, ensuring stability and load-bearing capacities. In physics, trigonometry enables calculations regarding waveforms, oscillations, and harmonic motions, vital in fields like sound engineering and electronics.

Tips for Mastering Trigonometry

1. Practice Regularly:

Trigonometry requires consistent practice to fully comprehend its concepts. Solve a variety of problems, starting from basic to advanced, to reinforce your understanding of different scenarios.

2. Visualize Concepts:

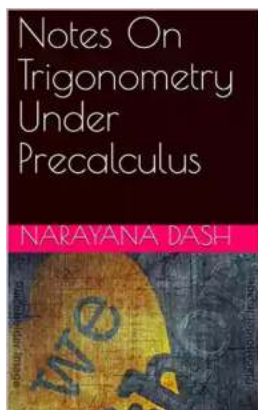
Utilize visual aids like diagrams, unit circles, and interactive online resources to grasp the geometric interpretations of trigonometric functions. Visualizing triangles and angles will help you establish a strong foundation in trigonometry.

3. Seek Resources and Guidance:

Refer to textbooks, online tutorials, and video lectures to supplement your learning. Additionally, seek guidance from teachers, classmates, or online forums to clarify any doubts you may have.

Trigonometry may initially seem daunting, but with dedication and practice, you can master its concepts. By understanding the relationships between angles and sides of triangles, you can unlock the potential to solve problems across various disciplines. Maintain a positive mindset, seek support when needed, and embrace the beauty of trigonometry!

Now that you have comprehensive notes on trigonometry in the context of precalculus, you are well-equipped to excel on your exams or dive deeper into this captivating mathematical field.



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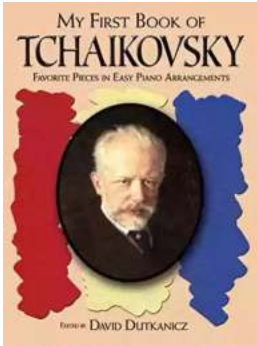


This is a bare all exposition of elementary trigonometry for high school students, sophomores or freshmen who self study . The institutions who train for engineering entrance exams like IIT JEE or NEET in India or elsewhere do not teach fundamentals and expect the student to be pre-tained from else where. This is the book for the purpose.



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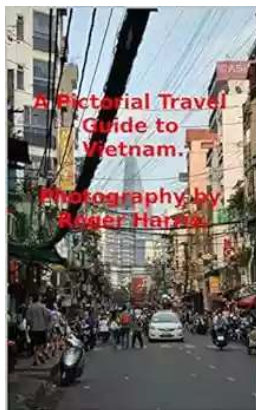
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