

TRIGONOMETRY II - LESSON TWO

PART I MULTIPLICATION & DIVISION IDENTITIES

For each of the following, write an algebraic proof.

1) Prove: $\cot x \tan x = 1$

2) Prove: $\csc x \cos x = \cot x$

3) Prove: $\frac{\sin x}{\tan x} = \cos x$

4) Prove: $\frac{1}{\cot x \cos x \tan x} = \sec x$

Identities will always have the following two properties:

1) If you graph the left and right sides, you will obtain exactly the same graph.

2) If you plug in the same angle for x on both sides, you will obtain exactly the same number.

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PART II ADDITION & SUBTRACTION IDENTITIES

Questions: For each of the following, write an algebraic proof.

1) $\sec x - \sin x = \frac{1 - \sin x \cos x}{\cos x}$

2) $\sin x + \tan x \sin x = \frac{\sin x \cos x + \sin^2 x}{\cos x}$

3) $\sec^2 x + \cot x = \frac{\sin x + \cos^3 x}{\cos^2 x \sin x}$

4) $\csc^2 x - \tan x = \frac{\cos x - \sin^3 x}{\sin^2 x \cos x}$

5) $\csc x - \sec x = \frac{\cos x - \sin x}{\sin x \cos x}$

6) $\sec x - \tan x = \frac{1 - \sin x}{\cos x}$

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PART III THREE SPECIAL IDENTITIES

Questions: Use the special identities to do each of the following proofs.

1) $\sec x - \tan x \sin x = \cos x$

2) $\cos x + \tan x \sin x = \sec x$

3) $\tan x + \cot x = \sec x \csc x$

4) $1 + \tan^2 x = \sec^2 x$

5) $\sec x - \cos x = \tan x \sin x$

6) $\sin x + \cot x \cos x = \csc x$

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PART IV COMPOUND FRACTIONS & SPECIAL IDENTITIES

Questions: Prove each of the following:

1) $\frac{\sec x}{\cot x + \tan x} = \sin x$

2) $\frac{\sin x + \tan x}{\cos x + 1} = \tan x$

3) $\frac{\cos x - \csc x}{\sin x - \sec x} = \cot x$

4) $\frac{\sin x + \cos x}{\sec x + \csc x} = \sin x \cos x$

5) $\frac{\tan x - \sin x}{\tan x \sin x} = \frac{1 - \cos x}{\sin x}$

6) $\frac{1 + \cos x}{\tan x + \sin x} = \cot x$