



Chapter 6 Review (Trig Identities)

Mathematics (Lester B. Pearson High School (Calgary))



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Math 30-1 Chapter 6 Review

Trigonometric Identities

Name _____

Answer the following questions. Remember to show all your work.

1. For the equation $2 \cos^2 x + \sin x - 1 = 0$, find all exact values of x , where $-\pi \leq x \leq \pi$. (T5.3)

2. Find the general solution to the equation $\sin(2\theta) - \cos \theta = 0$. Express the solution in degrees. (T5.5)

3. Three students were given the identity $\frac{\sin^2 \theta - 1}{\cos \theta} = -\cos \theta$, where $\cos \theta \neq 0$. (T5.6)

a) Student A substituted $\theta = \frac{\pi}{3}$ into both sides of the equation and got LS = RS (left side = right side). Student B entered LS into y_1 and RS into y_2 and concluded the graphs are exactly the same. Explain why these methods are not considered a proof of this identity.

b) Student C correctly completed an algebraic process to show LS = RS. Show a process Student C might have used.

c) Which non-permissible values of θ should be stated for this identity?

4. Explain the difference between a trigonometric identity and a trigonometric equation. **(T6.1)**

5. a) Verify that $\sin x \cos x = \tan x - \frac{1}{2}$ for the value $x = \frac{\pi}{4}$. **(T6.2)**

b) Explain why your work in part a) does not verify the identity. **(T6.3)**

6. Graphically determine if $\sec x \tan x = \frac{\cos^2 x - 1}{\sin x}$ is potentially an identity. **(T6.4)**

7. Determine the non-permissible values of the identity $\frac{\sin x + \tan x}{1 + \cos x} = \frac{\sin(2x)}{2 \cos^2 x}$. **(T6.5)**

8. Express $\frac{\cot x + \csc x}{\sec x + 1}$, where $\sec x \neq -1$, as a single trigonometric ratio. **(T6.6)**

9. Prove the identity: $\frac{1 + \tan x}{1 + \cot x} = \tan x$

(T6.6)

10. Prove the identity: $\sin 2x = \frac{2 \tan x}{1 + \tan^2 x}$.

(T6.6)

11. Prove the identity: $\frac{\sec^2 x - \tan^2 x}{2 \sin^2 x + 2 \cos^2 x} = \frac{1}{2}$.

(T6.6)

12. Prove the identity: $\sin\left(\frac{3\pi}{2} + x\right) = -\cos x$.

(T6.6)

13.

Each trigonometric expression below can be simplified to a single numerical value.

1. $\cot^2 \theta - \csc^2 \theta$

2. $\sec^2 \theta - \tan^2 \theta$

3. $\sin \theta - \frac{\tan \theta}{\sec \theta}$

4. $\frac{1}{7} \cos^2 \theta + \frac{1}{7} \sin^2 \theta$

When the numerical values of the expressions are arranged in ascending order, the expression numbers are ____, ____, ____, and _____. Place your answer in the boxes below. **(T6.7)**

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14. Algebraically prove that $\frac{2 \tan x}{1 - \tan^2 x} = \frac{\sin(2x)}{\cos^2 x - \sin^2 x}$, where $x \neq \frac{\pi}{4} + \frac{n\pi}{2}, n \in I$. **(T6.6)**

15. Determine the **exact** value of $\cos 150^\circ$?

(T6.7)

16. Determine the **exact** value of $\tan 75^\circ$?

(T6.7)