

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 $-\pi \le x \le \pi$. (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:
$$\frac{\sec^2 x - \tan^2 x}{2\sin^2 x + 2\cos^2 x} = \frac{1}{2}$$
.

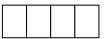
(T6.6)

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)



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

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

(T6.7)

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

(T6.7)