Name: _____   Student #:_____

Date:_____   T.A. #:_____

Mathematics 12 Pre-Calculus
LEARNING GUIDE 10/11 TEST – TRIG IDENTITIES

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When using a calculator, you should provide a decimal answer that is correct **to at least two decimal places** (unless otherwise indicated). Such rounding should occur **only** in the final step of the solution.

1. Determine the non-permissible values of the following expression in radians:

(2 marks)

$$\frac{\tan x}{\sin x}$$

2. Write the expression $\sin 32° \cos 21° - \cos 32° \sin 21°$ as a single trig function. (1 mark)

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3. Given the identity $\dfrac{\sin x}{1 - \cos x} = \dfrac{1 + \cos x}{\sin x}$:

    a) verify the identity for the particular case when x = $\frac{\pi}{3}$. (1 mark)

    b) prove the identity algebraically. (2 marks)

4. Write the expression $\cos^2 \dfrac{\pi}{3} - \sin^2 \dfrac{\pi}{3}$ in terms of a single trig function. (1 mark)

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5. Prove the following identities. (2 marks each)

a) $\sin^2 x \cot^2 x = 1 - \sin^2 x$

b) $\csc x (1 + \sin x) = 1 + \csc x$

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c) $\dfrac{1-\cos 2x}{1+\cos 2x} = \tan^2 x$

d) $\dfrac{\sin\theta}{1+\sin\theta} - \dfrac{\sin\theta}{1-\sin\theta} = -2\tan^2\theta$

6. Prove the following identity. (2 marks)

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

7. Solve the following equation. $0 \le x < 2\pi$ (2 marks)

$\sin 2x - \cos x = 0$

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8. Solve the following equation. Give the general solution expressed in radians. (3 marks)

$3\cos x + 2 = 5\sec x$

9. Solve the following equation. Give the general solution expressed in degrees. (3 marks)

$\cos 2x + 1 = \cos x$

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