Name: _____ Student #:_____

Date:_____ T.A. #:_____

Mathematics 12 Pre-Calculus

LEARNING GUIDE 10/11 TEST – TRIG IDENTITIES

/25

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)

$$\frac{\sec x}{\sin x}$$

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

/3

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

   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 $2sin^2x - 1$ in terms of a single trig function. (1 mark)

/4

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

a) $\sec x \cot x \, sin^2 x = \sin x$

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

/4

c) $\dfrac{1+\cos 2x}{\sin 2x} = \cot x$

d) $\dfrac{\sin x}{\cos x} + \dfrac{\cos x}{\sin x} = \dfrac{1}{\sin x \cos x}$

/4

6. Prove the following identity. (2 marks)

$$\frac{cos^2 x - \cos x - 2}{4\cos x - 8} = \frac{\cos x + 1}{4}$$

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

$\sin x + 1 = 2\csc x$

/4

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

$tan^2x + \sqrt{3}\tan x = 0$

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

$\cos 2x - 2 = 3\sin x$

/6