Name: _____

Student ID: _____

Test 3

This test is graded out of 50 marks. No books, notes, graphing calculators or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1.

    a. *(2 marks)* What angle θ ($0° \leq \theta < 360°$) is co-terminal to $2045°$.

    b. *(2 marks)* What angle θ ($0 \leq \theta < 2\pi$) is co-terminal to $\frac{60\pi}{3}$.

    c. *(2 marks)* Consider an angle θ in standard position. Then find the quadrant that its terminal edge lies in, if $\sec\theta < 0$ and $\cot\theta < 0$.

Question 2. *(4 marks)* Find the values of the other trigonometric functions, if $\csc \theta = -5$ and $\sec < 0$.

Question 3. *(4 marks)* Solve the right triangle ABC ($C = 90°$) given $a = 6$ and $A = 29°$.

Question 4. *(4 marks)* A ladder leaning against a wall makes an angle of 70° with the ground. If the ladder is 10 meters long, how high up the wall does it reach?

Question 5. *(4 marks)* Draw the two "special triangle" which help identify the special angles. Label the angles of the triangles and the lengths of each side.

Question 6. Find the exact value.

    a. *(4 marks)* $\csc 945°$

    b. *(4 marks)* $\tan \frac{5\pi}{3}$

Question 7. *(4 marks)*

    a. *(4 marks)* Sketch the graph of $y = -5\cos(\pi x)$ on the inteval $[-2, 2]$.

    b. *(2 marks)* State the amplitude and period of the above trigonometric function.

Question 8. Prove the following identities.

a. *(4 marks)*

$$\frac{\sin\theta}{\csc\theta} + \frac{\cos\theta}{\sec\theta} = 1$$

b. *(4 marks)*

$$\frac{2\cot\theta}{\csc^2\theta} = \sin 2\theta$$

Question 9.

a. *(4 marks)* Solve for θ, giving the exact solution, $0° \leq \theta < 360°$

$$\sqrt{3}\sec\theta - 2 = 0$$

b. *(4 marks)* Solve for θ, giving the exact solution, $0 \leq \theta < 2\pi$

$$4\sin^2 x\cos x - \cos x = 0$$

Question 10. *(4 marks)* Find the expression of:

$$\tan\left[\arccos\left(\frac{2}{x}\right)\right]$$

Bonus.

    a. *(2 marks)* State the domain and range of $f(x) = \cot x$.

    b. *(2 marks)* Sketch the graph of $f(x) = \cot x$ on the interval $[0, \pi]$.

    c. *(2 marks)* Sketch the graph of $f^{-1}(x)$ if $f(x) = \cot x$ is restricted on $[0, \pi]$.