MCR3U - Unit 3 Test

Question Sheet

Name: _____ **Mark:** _____ **/ 30**

K&U	A	T	C
_____ / 10	_____ / 10	_____ / 6	_____ / 4

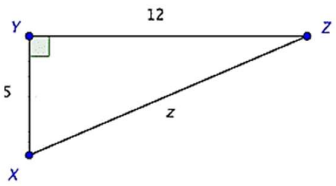
Section I

Part A: Knowledge - Fill in Blanks (6 marks, 1 mark per each)

1. Given the angle of –100°, determine:
   1) In which quadrant does its terminal side lie: _____
   2) Determine its reference angle: _____ (show your work)

2. Evaluate the following trigonometric functions, show your work by drawing special triangles:
   1) cos (45°) = _____ 2) sin (60°) = _____

3. Given the trianlge on the right side, determine:
   1) sin X = _____ (show your work)
   2) tan Z = _____ (show your work)



Part B: Knowledge - Multiple Choices (4 marks, 1 mark per each)

- Identify the choice that **best** answers the question.

4. Evaluate cot (0°).

   A. 0 B. $\frac{\sqrt{3}}{3}$ C. $\sqrt{3}$ D. undefined

5. Evaluate csc (30°).

   A. $\frac{1}{2}$ B. $\frac{\sqrt{3}}{2}$ C. 2 D. $\frac{2\sqrt{3}}{3}$

6. In which quadrants are the sine ratios negative values?

   A. I and II B. III and IV C. II and III D. all quadrants

7. In which quadrant is the $\tan\alpha < 0$ and $\cos\beta > 0$ (show your work)?

   A. I B. II C. III D. IV

Part C: Application (10 marks)

- The question requires mathematical calculations, so please show all of your work.

8. Apply what you've learned about angles to examine whether 380° is a co-terminal angle of 40°. (3 marks)
   1) Given your answer and explain your reasoning by graphing these angles in the coordinate system.
   2) Find a negative co-terminal angle of 380° that is between -360° and -720°.

9. Given the point $(-\sqrt{7}, -\sqrt{2})$ on the terminal side of angle θ, evaluate the sin θ, sec θ, and tan θ. (4 marks)

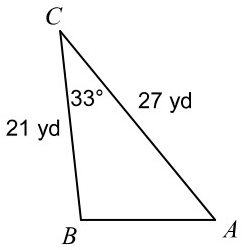
10. Evaluate the value of cos 210° using reference angle(s), special angle(s), and the CAST rule. Draw a diagram to show your work. (3 marks)

Section II

Part D: Thinking (6 marks)

11. A tower casts a shadow that is 60 feet long when the angle of elevation of the sun is 65˚. Analyze the question by drawing a graph and find how tall the tower is.

12. Given the triangle below,



1) Analyze what formula can be used to solve this triangle based on given conditions. (1 mark)

2) Find AB, m∠A, and m∠B. Show your work. (3 marks)

Part E: Communication (4 marks)

13. Use mathematical procedures to justify and prove the following trigonometric identities:

1) $sec\theta - tan\theta sin\theta = \frac{1}{sec\theta}$

2) $\frac{sec\theta}{cos\theta} - \frac{tan\theta}{cot\theta} = 1$

Formula Sheet:

1. Trigonometric Identities:
   1) Reciprocal: $\csc\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$ $\cot\theta = \frac{1}{\tan\theta}$
   2) Quotient: $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$
   3) Pythagorean: $\sin^2\theta + \cos^2\theta = 1$

2. The Sine Law: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

3. The Cosine Law: $a^2 = b^2 + c^2 - 2bc\cos A$

   $b^2 = a^2 + c^2 - 2ac\cos B$

   $c^2 = a^2 + b^2 - 2ab\cos C$