MHF 4U1 Test: Trigonometry

Part A) Knowledge and Understanding

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. The value of $\cos(5\pi/12)$ is:

   a. $\sin(5\pi/13)$
   b. $\cos(7\pi/12)$
   c. $\cos(\pi/2 - 5\pi/12)$
   d. $\sin(\pi/2 - 5\pi/12)$

2. Which of the following compound angles for $11\pi/12$ will not allow the use of special triangles?

   a. $15\pi/12 - 4\pi/12$
   b. $7\pi/12 + 4\pi/12$
   c. $8\pi/12 + 3\pi/12$
   d. $20\pi/12 - 9\pi/12$

3. Determine the exact degree measure for $3\pi/5$.

   a. 108°
   b. 226°
   c. 36°
   d. 145°

4. Determine the approximate degree measure for an angle of 1.32 radians.

   a. 136.4°
   b. 4.2°
   c. 75.6°
   d. 2.4°

5. Determine the exact value of $\cos(\pi/4)$.

   a. $1/\sqrt{2}$
   b. $\sqrt{2}$
   c. $\sqrt{3}/2$
   d. 1/2

6. The point $(-4, 3)$ is on the terminal arm of angle θ in standard position. The value of $\cos\theta$ is:

   a. 3/5
   b. −3/5
   c. −4/3
   d. −4/5

7. Determine the exact value of sec π.

a. 0
c. 1
b. -1
d. undefined

8. Use your calculator to determine the value of cos(1.54), to three decimal places.

a. 0.031
c. 0.034
b. 0.054
d. 0.005

9. Use your calculator to determine the value of cot(4.25), to three decimal places.

a. 2.006
c. 0.074
b. 0.498
d. 13.457

10. 1/8 of a revolution represents how many radians?

a. $\pi/8$
c. $\pi/4$
b. 135
d. 67.5

Short Answer

1. Angle θ lies in the third quadrant such that $\cos\theta = -3/5$. Determine an approximate measure for θ in radians, to the nearest hundredth.

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2. Determine an exact value for each of the following:

/6

(a) $[\cot^2(\pi/4)\csc^2(\pi/3)] / [\cos^2(\pi/3) - \sec^2(2\pi)]$

(b) $\sin(5\pi/4) - \cos(11\pi/6)\cot(\pi/3)$

Part B) Applications

1. Using a co-related angle formula, find the exact value of: /3

$\tan(5\pi/3)$

2. The arc length of the sector of a grandfather clock is 50 cm, and the angle of the sector is 120°. Determine the radius of the clock, expressing your answer in terms of π. /3

3. A skateboard ramp is built with an incline angle of $\pi/3$. If the height of the ramp is 6 m, determine the exact length of the ramp. Include a diagram. /3

4. Evaluate $\sin(2x)$ if $\cos x = -4/5$ and $\pi/2 \leq x \leq \pi$. /3

5. A merry-go-round rotates 180 times per hour. Determine the exact angular velocity in radians per second and in degrees per second. /3

6. Prove the following trigonometric identity: $(\csc x - \cot x)^2 = (1 - \cos x)/(1 + \cos x)$ /4

Part C) Communication

1. If you are given an angle θ, that lies somewhere in the interval $\pi/2 \leq \theta \leq 2\pi$, how would you determine the values of the primary trigonometric ratios for this angle?

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Part D) Thinking, Inquiry and Problem Solving

1. Determine a formula for $\cos 3\theta$, that is only in terms of $\cos \theta$.

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