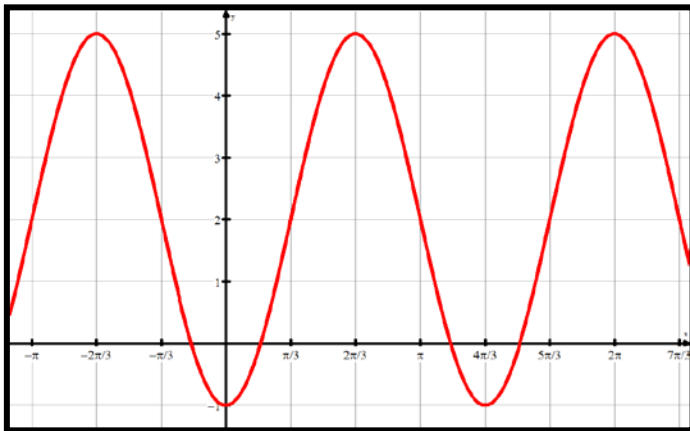


MATH HONORS 2: UNIT 5 QUIZ 1 – Triangle and Circle Trigonometry

SECTION A: Calculator Inactive – 18 minutes

1. An angle θ measures 13 radians. For this angle, is $\sin \theta > \cos \theta$ or is $\cos \theta > \sin \theta$? Explain how you know. (2M)
2. Explain why the values of cosine lie between -1 and 1, but the values for tangent are infinite. (2M)
3. An angle θ is co-terminal to -850° . (2M)
 - a. Given that $0^\circ \leq \theta < 360^\circ$, find θ .
 - b. Convert θ to radians (in terms of π).
4. Evaluate to find the exact values of: (2M)
 - a. $\tan(240^\circ)$
 - b. $\csc\left(\frac{7\pi}{4}\right)$
5. Solve $\cos x = -\frac{1}{2}$ for all solutions of x , given that $-2\pi \leq \theta \leq \pi$. (3M)
6. You are given that $\cot \theta = -\frac{15}{8}$. (3M)
 - a. Determine the possible values of $\sec \theta$.
 - b. Why is there more than one value of $\sec \theta$?
7. Use the graph of the function $f(x) = a \cos(kx) + d$ to find the values of a , k , and d . (3M)



SECTION B: Calculator Active – 17 minutes

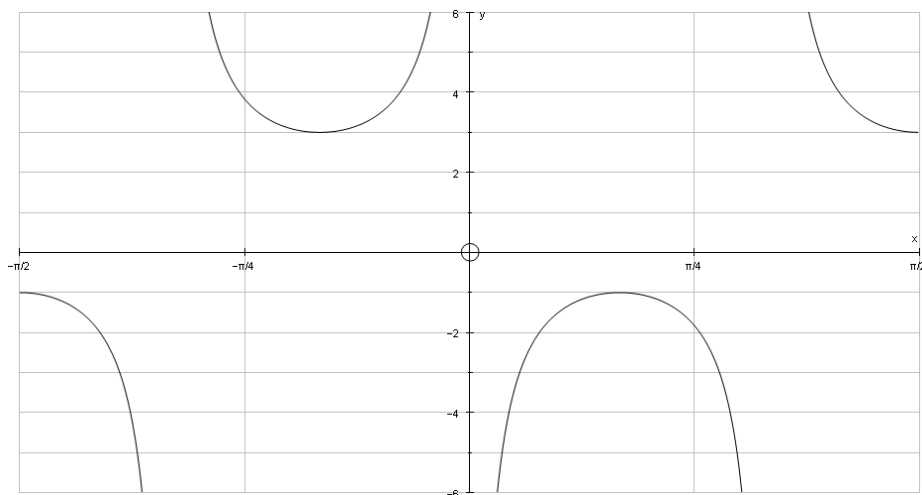
8. Mr. Santowski and Mr. Atkinson are playing golf at Intramuros. It is Mr. A's turn to hit the ball towards flag F. Mr. S is standing 15 meters behind Mr. A such that Mr. S, Mr. A and flag F are all in one line (i.e. points F, A & S are collinear). Since Mr. S and Mr. A are math teachers, they automatically determine the angle of elevation of Mr. A's ball at the moment that it reaches its maximum height in its flight path. Mr. S determines the angle of elevation of Mr. A's golf ball to be 12.2° , while Mr. A determines his ball's angle of elevation to be 14° . (5M)
 - a. Show that the height of the ball can be determined by the equation $h = \frac{15}{\cot 12.2^\circ - \cot 14^\circ}$.
 - b. Hence, or otherwise, determine the maximum height of the ball.

9. Mr. Atkinson and Mr. Santowski are designing a triangular-shaped stage for this year's Battle of the Bands performers. Mr. S proposes that in triangle MAT , angle M measures 21° , side m measures 20 meters, and side t measures 34 meters. (8M)
- Mr. A thinks that an issue may arise in planning to build a stage with the dimensions that Mr. S has proposed. What is this issue, and how do you know if this issue does or doesn't arise?
 - Mr. S and Mr. A must determine the length of side a (which faces the audience), because Mr. Toze has told them that the front of the stage must be between 10 meters and 20 meters in length. Find the measure of side a .
 - Determine the area of the stage.

MATH HONORS 2: UNIT 5 QUIZ 2 – Trigonometric Inverses, Identities & Equations

SECTION A: Calculator Inactive – 30 minutes

10. Explain why $\sin^{-1}\left(\sin\left(\frac{5\pi}{3}\right)\right)$ is not equal to $\frac{5\pi}{3}$. (2M)
11. Evaluate the exact value of $\sin\left(\cos^{-1}\left(-\frac{1}{2}\right) - \cot^{-1}\left(\frac{-5}{12}\right)\right)$. (4M)
12. Sketch the graph of $y = \frac{6}{\pi} \tan^{-1}(x+1)$ on the provided axes, labeling all intercepts and asymptotes. (3M)
13. Use the provided graph of $y = A \csc(Bx) + D$ to determine the values of A , B , and D . (3M)



14. Solve the following trigonometric equations for all solutions in the given domains: (6M)
- $1 - 2\cos^2 \theta = \sin \theta$, $\pi < \theta \leq 3\pi$
 - $\sqrt{2} \cos(4\theta) + 1 = 0$, $-180^\circ < \theta \leq 0^\circ$

15. Prove the following trigonometric identities:

(6M)

a. $\sin 4\theta = \frac{4 \cos \theta}{\csc \theta} - 8 \sin^4 \theta \cot \theta$

b. $\frac{\sec \theta + 1}{\tan \theta} = \frac{\tan \theta}{\sec \theta - 1}$

SECTION B: Calculator Active – 5 minutes

16. On April 5 2011 in The Bay of Fundy in Nova Scotia, Canada, high tide occurs at 8:00 a.m., and the tide marker at the harbor measures high tide to reach a height of 21 meters. Later that day, low tide occurs at 2:00 p.m., and the tide marker at the harbor measures low tide to reach a height of 4 meters.

(6M)

- a. Find a function $h(t)$ that models the height of the tide in The Bay of Fundy on April 5 2011, where $h(t)$ represents the height of the tide t hours after midnight.
- b. Use your function $h(t)$ to predict the times of day on April 5 2011 at which the tide in The Bay of Fundy will have a height of 8 meters.