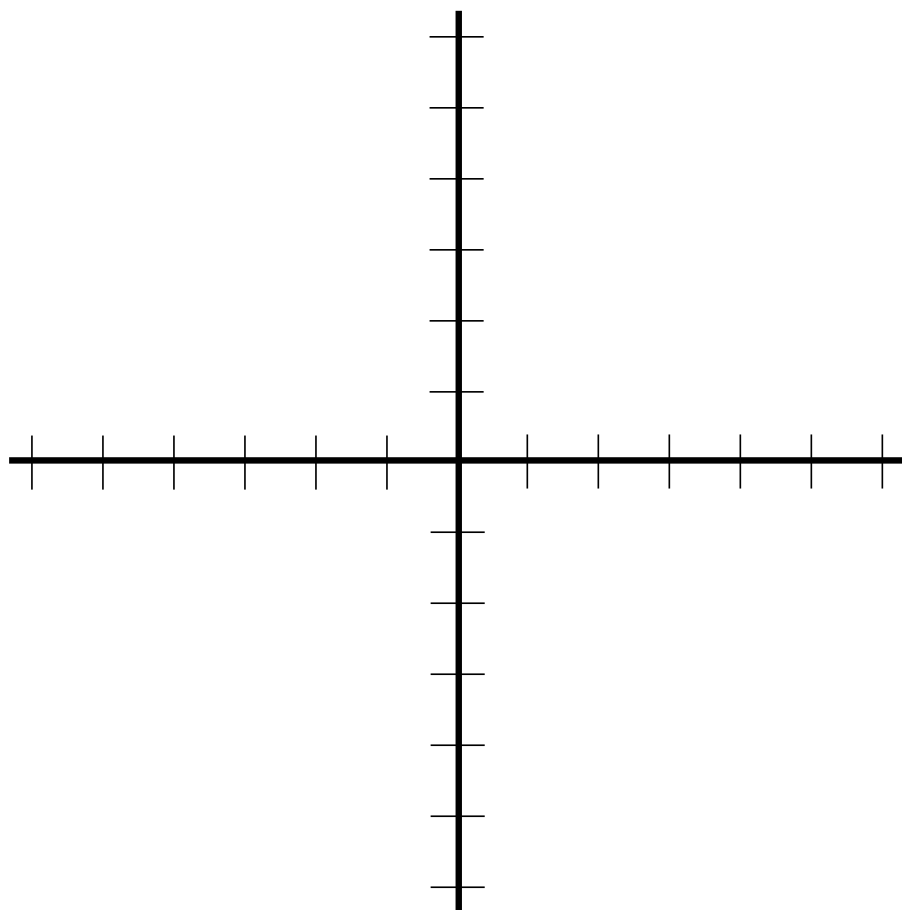


Math 111 - Trigonometry

Practice Exam 2

Warning: This study guide is not all inclusive- there may be material on the test which is covered in the book but not here. This is simply meant to be a supplemental study aid to the homework and class notes

1. Graph two periods of $y = -2 + 4\cos(\pi(x - 2))$. Find the amplitude, period, and average value. Label the axes in a way to reflect the important characteristics of the graph (i.e. when the function reaches its maximum, minimum, and average value).

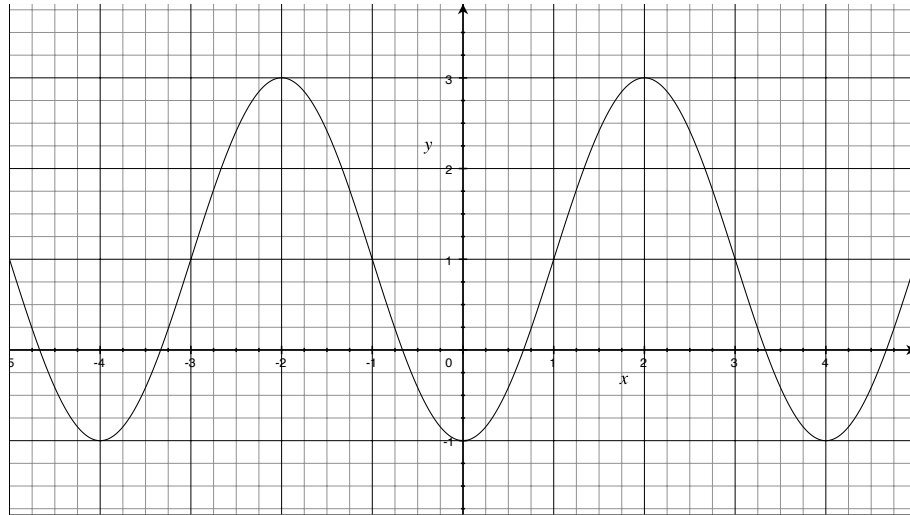


2. Below is a data table for a function involving a trigonometric function.

x	-1	0	1	2	3	4
y	3	7	11	7	3	7

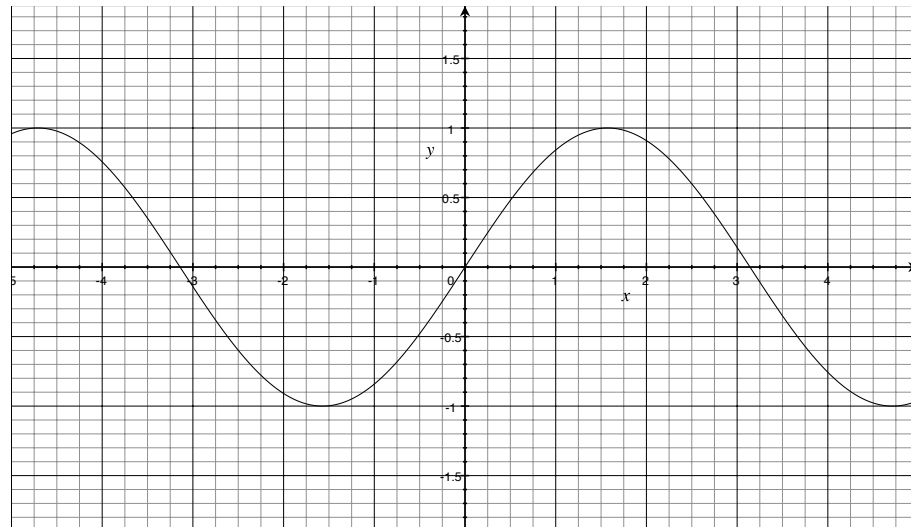
Determine a possible formula for the trigonometric function.

3. Consider a function with the below graph:



- (a) Find a formula for this function involving sine.
 - (b) Find a formula for this function involving cosine.
4. Find the following exact values
- (a) The period of the function $y = \tan(4(x - 3))$
 - (b) The horizontal shift of the function $f(x) = 1 - 2 \sin(3(x - 4))$
 - (c) The average value of the function $g(x) = 2 - 2 \cos(\pi(x + \pi))$
 - (d) $\tan(\cos^{-1}(-\frac{5}{13}))$
 - (e) $\cos(\arctan(\sqrt{3}) + \sin^{-1}(\frac{1}{3}))$ (Hint: Use the Cosine of a Sum identity)
 - (f) $\sin(\tan^{-1}(\frac{3}{2}))$
5. Mark the following true or false.
- (a) $\csc(-x) = -\csc(x)$
 - (b) The amplitude of $y = -3 \sin(5(x + 3))$ is -3 .
 - (c) $\arctan(z + 3) = \arctan(z) + 3$
 - (d) $\tan^{-1} x = \arctan x$
6. For each of the below expressions, determine if the statement is *possible* or *impossible*. For those that are possible, determine the exact value. Represent all angles in radians.
- (a) $\arcsin \pi$
 - (b) $\cos^{-1}(-\frac{\sqrt{3}}{2})$
 - (c) $\sin(-4)$
 - (d) $\sin^{-1}(30^\circ)$

7. Use the below graph of $y = \sin x$ to approximately find $\arcsin 1$, and mark this point on the appropriate axis.



8. Find the domain and range of the following functions.
- $y = \sin^{-1}(z + 1)$
 - $y = 3 \arccos(\frac{w}{2})$
 - $y = \tan^{-1}(z) + 1$
9. Find an expression for $\sin(\tan^{-1}(\frac{w}{z}))$ that does not involve trigonometric functions.
10. Find all solutions to $\cos x = \frac{1}{2}$ (*i.e.* find all x values that make this statement true). Which one is $\cos^{-1} \frac{1}{2}$?
11. Consider the following two statements:
- $x = \sin^{-1} y$ always means $y = \sin x$
 - $y = \sin x$ always means $x = \sin^{-1} y$
- Is statement (a) true or false? Is statement (b) true or false? Explain.
12. Is it true that if $x = \tan 5$, then $5 = \arctan x$?
13. For what values of x will $\sin(\arcsin x) = x$?
- all x
 - $[-1, 1]$
 - $[-\frac{\pi}{2}, \frac{\pi}{2}]$
 - $[0, \pi]$
 - none of the above

MISS LENHART COULDN'T BE HERE TODAY, SO SHE ASKED ME TO SUBSTITUTE.

MATH

MR. MUNROE

I'VE PUT OUT YOUR TESTS. PLEASE GET STARTED.

MR. MUNROE, MISS LENHART NEVER TAUGHT US THIS.

THAT'S BECAUSE MISS LENHART DOESN'T UNDERSTAND HOW IMPORTANT CERTAIN KINDS OF MATH ARE.

BUT THIS JUST LOOKS --

THIS MATERIAL IS MORE VITAL THAN ANYTHING YOU'VE EVER LEARNED

BUT --

NO BUTS.

THIS IS A MATTER OF LIFE AND DEATH.

Name: _____

- The velociraptor spots you 40 meters away and attacks, accelerating at 4 m/s^2 up to its top speed of 25 m/s. When it spots you, you begin to flee, quickly reaching your top speed of 6 m/s. How far can you get before you're caught and devoured?
- You are at the center of a 20m equilateral triangle with a raptor at each corner. The top raptor has a wounded leg and is limited to a top speed of 10 m/s.

(Not to scale)

The raptors will run toward you. At what angle should you run to maximize the time you stay alive?
- Raptors can open doors, but they are slowed by them. Using the floor plan on the next page, plot a route through the building, assuming raptors take 5 minutes to open the first door and halve the time for each subsequent door. Remember, raptors run at 10 m/s and they do not know fear.