

# MATH 119: Midterm 1

Name: \_\_\_\_\_

Directions:

- \* Show your thought process (commonly said as "show your work") when solving each problem for full credit.
- \* If you do not know how to solve a problem, try your best and/or explain in English what you would do.
- \* Good luck!

| Problem | Score | Points    |
|---------|-------|-----------|
| 1       |       | 10        |
| 2       |       | 10        |
| 3       |       | 10        |
| 4       |       | 10        |
| 5       |       | 10        |
| 6       |       | 10        |
|         |       | <b>60</b> |

1. Short answer questions:

(a) Suppose you write

$$(x + y)^2 z^2 = x^2 + y^2 z^2$$

What are the two errors you made?

(b) True or false: We can simplify

$$\frac{(x + 1)(x - 2) + (x - 2)(x + 3)}{x + 1}$$

by crossing out the  $x + 1$ .

(c) Bob has a function  $f(x)$ . It is not one-to-one. However, he goes ahead and finds the inverse  $f^{-1}$ . **What** is the problem with  $f^{-1}$  and **why**?

(d) Suppose  $f(x) = \sin(x)$ . Do

$$g(x) = \sin(x + \pi) \qquad h(x) = \sin(2x + \pi)$$

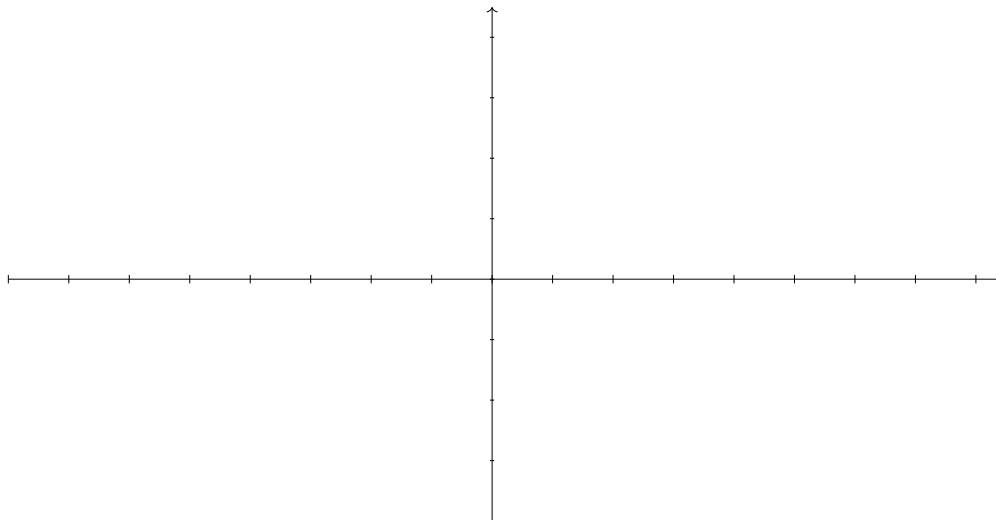
have the same horizontal shift? If not, what are both  $g(x)$  and  $h(x)$ 's horizontal shift?

2. Consider

$$f(x) = -3 \sin(2x + \pi)$$

Do two things:

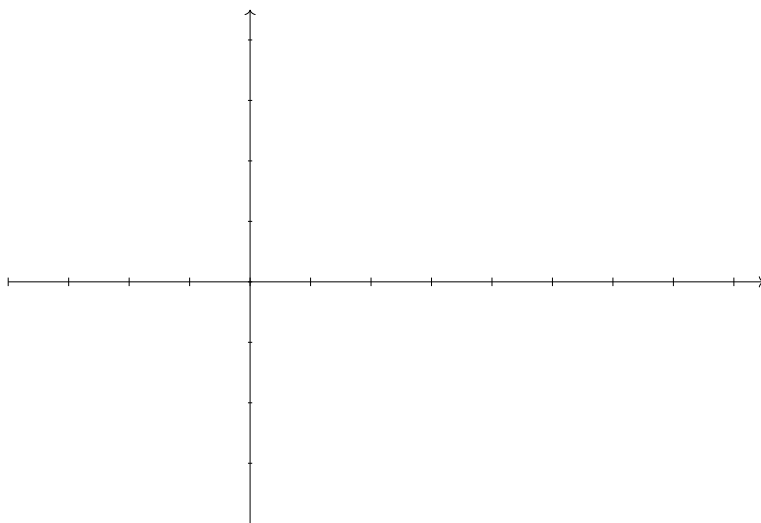
- (a) Graph one period of  $f(x)$  using transformations. Label the  $x$ -axis tick marks you are using.
- (b) Write out the **algebraic list** of transformations **in the order they are performed**.



3. Consider

$$f(x) = 2 \cot \left( 3x - \frac{3\pi}{4} \right)$$

Graph one period of  $f(x)$  using transformations. Label the  $x$ -axis tick marks you are using.



4. Evaluate the following trigonometric functions:

(a)  $\sin\left(\frac{5\pi}{4}\right)$

(b)  $\cos\left(\frac{-7\pi}{6}\right)$

(c)  $\tan\left(\frac{-40\pi}{3}\right)$

(d)  $\csc\left(10000000000000\pi - \frac{4\pi}{3}\right)$

5. Evaluate the following expressions:

(a)  $\tan^{-1}(1)$

(b)  $\tan\left(\sin^{-1}\frac{\sqrt{2}}{2}\right)$

(c)  $\sin^{-1}(2)$

(d)  $\sin^{-1}\left(\cos\left(\frac{\pi}{6}\right)\right)$

6. Let

$$f(t) = \sin(t)$$

$$g(t) = \cos(t)$$

Find the following:

(a)  $f(\pi \cdot g(0))$

(b)  $f\left(\frac{-11\pi}{6}\right)$

(c)  $g\left(\frac{5\pi}{4}\right)$

(d) If  $f(t) = -\frac{4}{5}$  and the terminal point of  $t$  is in Quadrant IV, what is  $g(t)$ ?