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
		50

1. Short answer questions:

   (a) Suppose you write

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

   What are the two errors you made?

   (b) True or false: We can simplify $\dfrac{x^2+x-2}{x-1}$ by crossing out the x's to become $\dfrac{x^2-2}{-1}$. If not, properly simplify the expression.

   (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) If $f(x) = \dfrac{x}{1-x}$, find $f(x^2-1)$.

   (e) Suppose we have a base function $f(x) = x^3$ and we have

   $$g(x) = (x+2)^3 + 4 \qquad\qquad h(x) = \left(\frac{1}{2}x + 2\right)^3 + 4$$

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

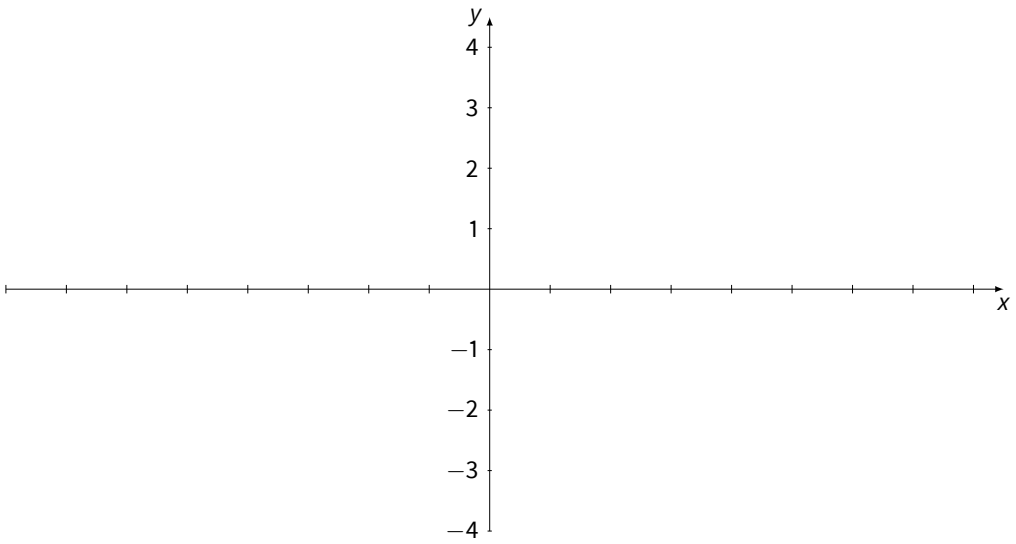
2. Suppose

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

Do two things:

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

(b) Write out the blueprint of transformations starting with $g(x) = \sin x$ to end up at $f(x)$.



3. Let

$$f(x) = 2x^2 - 7x + 3 \qquad\qquad g(x) = \sin(x) - \frac{1}{x-1}$$

(a) Factor $f(x)$.

(b) Find and simplify $f(x) - g(x)$ and it's domain given in interval notation.

(c) Evaluate and simplify $f(x+h) - f(x)$ (you should be able to factor out h at the end).

4. Given $ax - bx(c + d) - ex = gx$, isolate x.

5. Solve for x:

$$\frac{10}{x} - \frac{12}{x-3} + 4 = 0$$

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