

Midterm 2

Instructions: This exam has 7 pages and is out of a total of 100 points. No calculators, books or notes allowed. Be sure to show all work for all problems. No credit will be given for answers without work shown. If you do not have enough room in the space provided you may use additional paper. Be sure to clearly label each problem and attach them to the exam. You have 50 MINUTES.

Academic Honesty Certification

I certify that I have taken this exam with out the aid of unauthorized people or objects.

Signature: _____ Date: _____

Name: _____

Some identities:

$$\cos(\alpha + \beta) = \cos(\alpha) \cos(\beta) - \sin(\alpha) \sin(\beta)$$

$$\cos(\alpha - \beta) = \cos(\alpha) \cos(\beta) + \sin(\alpha) \sin(\beta)$$

$$\sin(\alpha + \beta) = \sin(\alpha) \cos(\beta) + \cos(\alpha) \sin(\beta)$$

$$\sin(\alpha - \beta) = \sin(\alpha) \cos(\beta) - \cos(\alpha) \sin(\beta)$$

$$\cos(2x) = 1 - 2 \sin^2(x) = \cos^2 x - \sin^2 x$$

$$\sin(2x) = 2 \sin x \cos x$$

1. (25 total points) Evaluate the following functions. Put your answer in the simplest terms possible.

(a) $3^{\log_2(\frac{1}{2})}$

(b) $\log_3(24) - \log_3(8)$

(c) $\cos(7\pi/4)$

(d) $\sin(255^\circ)$ (*Hint: $255=210+45$*)

(e) $\operatorname{arcsec}(-\frac{2}{\sqrt{2}})$

2. (20 points) Find *all* solutions to the following trigonometric equations.

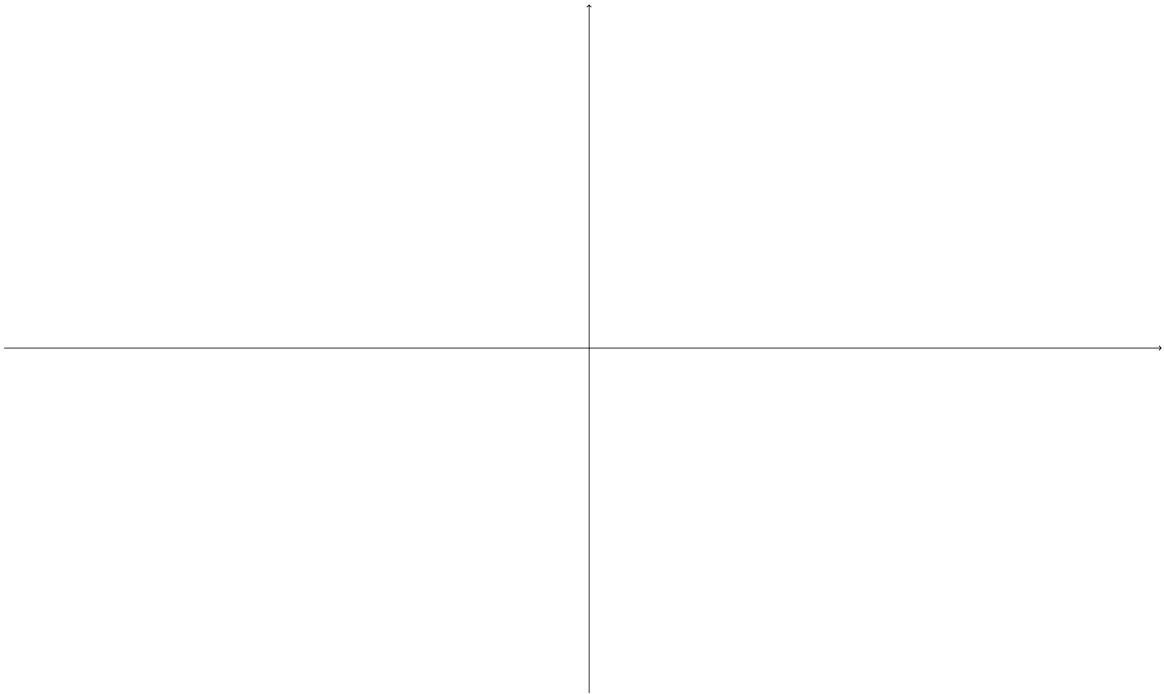
(a) $\sin(x) = \frac{1}{2}$

(b) $\tan(x) = \sqrt{3}$

3. (20 points) Graph at least three cycles of the following trig function. Be sure to label the axes and clearly indicate all vertical asymptotes and x -intercepts.

$$f(x) = \tan(2x)$$

(Hint: Recall that $\tan(2x) = \sin(2x)/\cos(2x)$. Start by finding the zeros of the numerator and denominator.)



4. (20 points) Consider a SSA triangle with $\alpha = 30^\circ$, $a = 5$, and $c = 4$. First, determine how many such triangles there are by finding h . Then solve all possible triangles. You may use the fact that $\arcsin(2/5) \approx 24^\circ$ and $\sin(126^\circ) \approx 0.8$.

5. (15 points) Verify the following identity. Be sure to show all work and clearly justify each step (for example, if you use a Pythagorean identity, say so).

$$\cos(2x) - 2\cos^2 x + 1 = 0$$

Extra paper!