MATH 150: Plane Trigonometry **(Due: 07/31)**

Final Exam

Instructor: Joshua Miller

Topics to Study:

Problem 1 Solve $\sin\left(\arcsin\frac{1}{\sqrt{2}} - \arccos\frac{\sqrt{3}}{2}\right)$ use exact values.

Problem 2 Find all all solutions to $\cos\left(5x + \frac{3\pi}{4}\right) = 1$

Problem 3 Find all solutions to $6\tan^2 x - 20\tan x + 6 = 0$

Problem 4 Calculate and find the modulus of $(3 - \sqrt{2}i)^7$

Problem 5 Solve the triangle ΔABC based on $a = 6$, $b = 4$ and $A = 37°$.

Problem 6 Find sine, cosine, and tangent of $\theta/2$ given $\tan\theta = \frac{24}{7}$ and $\pi < \theta < 2\pi$.

Problem 7 Find all solutions using exact values

$$\cos 3x + \cos 5x = 0$$

and

$$\sec 2x - \sec 6x = 0.$$

Problem 8 Find all 5^{th} roots of -243i.

Problem 9 Find all solutions of the given equation

$$x^6 - 6x^3 + 3 = 0$$

Problem 10 Given the equation

$$2x^2 + 3x + 5y^2 + 10y = 7,$$

Find the standard form of the ellipses and give all of the relevant data: Horizontal/Vertical Major axis, length of major and minor axis, coordinates of the minor points, vertices, center, and foci, and the eccentricity of the ellipse.

Problem Bonus Find the 6th roots of -144.