DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING
ROY G. PERRY COLLEGE OF ENGINEERING
PRAIRIE VIEW A&M UNIVERSITY
ENGINEERING MATHEMATICS – SPRING 2021
PRELIMINARY EXAMINATION
THURSDAY, JANUARY 14, 2021

READ THIS CAREFULLY AND SIGN BELOW

I declare truthfully that the work I am presenting here is my own, and that I have not conducted myself in any manner unethical. I have not copied from anyone nor have I let anyone copy from me. I am aware of the ethical requirements of my profession and I firmly believe in practicing and implementing them.

Name: _____

**Signature: _____**

Note: This examination will be conducted in two parts:

1. Online synchronous – you can work out the questions at your own location and send your workout by e-mail to Dr. Rick Wilkins: rtwilkins@pvamu.edu.
2. Video Chat: On Wednesday, January 20, 2021, you will be asked to participate in a Zoom session with a professor. You will be asked to explain how you solved the problems on the examination. This session may last upto thirty minutes.

Your grade on the examination will be determined based on these two parts.

All the best.

1. The figure shows a lamp located three units to the right of the y-axis and a shadow created by the elliptical region $x^2 + 4y^2 \leq 5$. If the point (-5, 0) is on the edge of the shadow, how far above the x-axis is the lamp located?
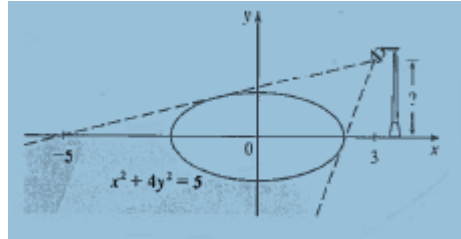
2. Solve the inequality $|x - 3| + |x + 2| < 11$

3. Find the area of the largest rectangle that can be inscribed in a semicircle of radius r.

4. Evaluate $\int_{-1}^{3} x^{-2} dx$.

5. Consider the following system of equations:

$$3x + 3y + 4z = 1$$

$$3x + 5y + 9z = 2$$

$$5x + 9y + 17z = 4$$

Solve for x, y, z by employing the matrix approach (Cramer's Rule).

6. Solve the following differential equation by employing the separation of variables method.

$$x \sin^2 y \frac{dy}{dx} = (x + 1)^2 .$$