

Math 1220 Section 1 - Fall 2007
Exam III

Answer the questions in the spaces provided on the question sheets. Show all work to receive credit. Calculators are not permitted. Each question is worth 10 points.

Name: _____

1. Find the focus and directrix of the parabola given by $x^2 = 8y$. Find the equation of the line tangent to this parabola at $(4, 2)$.

2. Find the foci of the ellipse given by

$$\frac{x^2}{4} + y^2 = 1.$$

3. Write the equation

$$x^2 - 4y^2 - 2x + 16y - 19 = 0$$

in standard form, i.e.

$$\frac{(x - x_0)^2}{a^2} - \frac{(y - y_0)^2}{b^2} = 1.$$

4. Find $\frac{dy}{dx}$ for the parametric curve given by

$$x = \cos t, \quad y = \sin t$$

without eliminating the parameter.

5. Convert the equation

$$3x - 2y + 1 = 0$$

to polar coordinates.

6. Find the slope of the line tangent to $r = 2 \cos \theta$ at $\theta = \pi/3$.

7. Find the area inside the curve given by $r = 2 \sin \theta$ for $0 \leq \theta \leq \pi$.

8. Find the auxillary equation for $y'' + y' - 2y = 0$. Write down the general solution to this differential equation. Write down a particular solution to the equation satisfying the initial conditions $y(0) = 0$ and $y'(0) = 1$.