

Math 102. Fall 2006. Practice 3rd Midterm

1 For the parabola defined by the equation $x^2 - 4x = 8y - 28$, determine the vertex, focus, and directrix and sketch the graph.

2 Write an equation for the parabola whose focus is $(3, -1)$ and whose directrix is the line $x = 1$.

3 For the ellipse defined by the following equations, determine their centers, major axes, vertices, and foci and sketch their graphs.

(a) $x^2 + 9y^2 - 3 = 0$

(b) $x^2 + 3y^2 - 12y + 9 = 0$

4 Find an equation for the ellipse with foci $(0, \pm 4)$, center at the origin, and minor axis with length of 6.

5 For the hyperbolas defined by the following equations determine their centers, vertices, transverse axes, asymptotes and sketch their graphs.

(a) $5y^2 - 7x^2 = 70$,

(b) $y^2 - x^2 + 4x - 4y - 1 = 0$

6 Find an equation for the hyperbola with foci $(0, \pm 7)$ and vertices $(0, \pm 5)$

7 Find an equation for the hyperbola with foci $(0, \pm 7)$ and asymptotes $y = \pm 2\sqrt{2}x$.

8 Solve the system
$$\begin{cases} .5x + .3y = 2.7 \\ .7x - .2y = 1.3 \end{cases}$$

9 Use row operation to transform the following augmented matrix to reduced row echelon form:

$$\left[\begin{array}{ccc|c} 2 & 1 & 8 & -1 \\ 1 & -1 & 1 & -2 \\ 3 & -2 & -2 & 2 \end{array} \right]$$

10 Solve the following system of equations by transforming its augmented matrix to reduced row echelon form.

$$\begin{cases} x - y + 2z = -1 \\ 3x + 2y - 6z = 1 \\ 2x + 3y + 4z = 8 \end{cases}$$

11 The amount of money awarded in medical malpractice suits has been rising in the past decade, as shown in the following table:

Year	1997	2001	2005
\$ (thousands)	253	287	431

It can be modeled with a quadratic function $y = at^2 + bt + c$, where t is the time in years since 1995 and y is the amount of dollars (in thousands). Find a , b , and c .

12 Solve the system

$$\begin{cases} y - 3x + 5 = 0 \\ x^2 + y^2 - 5 = 0 \end{cases}$$

13 Solve the system

$$\begin{cases} \ln x = 5 \ln y \\ \log_2 x = 3 + 2 \log_2 y \end{cases}$$

14 Graph the system of inequalities

$$\begin{cases} y \leq x + 2 \\ y \geq |x| \\ y - 3 < 0 \end{cases}$$

15 Graph the system of inequalities

$$\begin{cases} x^2 + 3y^2 < 9 \\ y \leq -x^2 - 1 \end{cases}$$