# Parametrics and Polar Test

## Parametric Equations

1. Eliminate the parameter and find a rectangular equation for the following parametric equations. Show all work.
   1. [3pts] and
   2. [3pts] and
2. Graph the curve whose parametric equations are given, indicating the orientation of the curve with arrows.
   1. [4pts] and where
   2. [4pts] and

## Polar Coordinates

1. Which of the following is not a possible coordinate for the indicated point.
2. Convert to polar coordinates with
3. Convert to rectangular coordinates
4. Which of the following points is furthest from the origin?
5. Which points are between and ?
6. Convert to polar:
7. Convert to rectangular:
8. Which of the following is the graph of ?
9. Which of the following is the graph of ?
10. What are the -intercepts of
11. What conic section is represented by ?

## True/False

1. It is possible for a single point in the plane to have the same coordinates in both rectangular and polar representations.
2. A function cannot intersect itself
3. The graph of a parametric system cannot intersect itself.
4. Every polar graph fails the vertical line test.
5. Every point in the plane has infinitely many polar coordinate representations.

## Free Response

A baseball pitcher throws a baseball with an initial speed of 138 feet per second at an angle of 20° to the horizontal. The ball leaves the pitcher’s hand at a height of 4 feet above the ground.

1. [1pt] Find parametric equations that describe the motion of the ball as a function of time. (Assume the ground has a y-coordinate of 0).
2. [1pt] How long is the ball in the air?
3. [1pt] At what time does the ball reach its maximum height?
4. [1pt] What is the maximum height of the ball?
5. [1pt] Determine the distance the ball travels.