Problem Set 3

1. Find the vertex, focus, and directrix of the parabola with the equation $2y^2 = 5x$ and sketch the curve.

2. Find the vertices and foci of the ellipse with an equation $x^2 + 9y^2 = 9$ and sketch the curve.

3. Find the vertices, foci, and asymptotes of the hyperbola with an equation $x^2 - y^2 = 100$ and sketch the curve.

4. For the equation $x^2 = 4y - 2y^2$, identify the type of conic section and find the vertices and foci.

5. For a parabola with a focus at (3,6) and a vertex at (3,2), find the equation of the curve.

6. For an ellipse with foci at (0,2) and (0,6) and with vertices at (0,0) and (0,8), find the equation of the curve.

7. Write the polar equation of a hyperbola with the focus at the origin, an eccentricity of 3, and a directrix of x = 3.

8. For the polar equation $r = \frac{4}{5-4sin\theta}$, (a) find the eccentricity, (b) identify the conic section, (c) give an equation of the directrix, and (d) sketch the curve.

9. For the polar equation $r = \frac{3}{2+2cos\theta}$, (a) find the eccentricity, (b) identify the conic section, (c) give an equation of the directrix, and (d) sketch the curve.

10. The orbit of Mars around the sun is an ellipse with an eccentricity of 0.093 and a semimajor axis of 1.56×10^6km. Find a polar equation for the orbit.