Assignment Problems

1. Show that, the equation $3x^2 - y + 5x - 2 = 0$ represents a parabola. Find it's vertex, focus, tangent at the vertex, directrix, latus rectum, length of the latus rectum. Also sketch the above parabola.

2. Determine the equation of the parabola whose focus is at the point $(1,2)$ and tangent at the vertex is the line $x - 5 = 0$.

3. Identify the conic given by the following equation

$$x^2 + 2y^2 + 2x + 4y - 3 = 0$$

Then reduce this conic to its standard form.

4. Find the eccentricity and length of the minor axis of an ellipse whose foci are (0, 0), (6, 0) and length of the major axis is 8.

5. Find the equation of the hyperbola whose asymptotes are the straight lines $x = 0$ and $y = 0$ and which passes through the point $\left(am, \frac{a}{m}\right)$.

6. Find the equation of the conic whose focus is the point $(2, 1)$, directrix is the line $x - 2y + 3 = 0$, and eccentricity is 2.

7. Find the distance of $A\ (1, -2, 3)$ from the line PQ through $P(2, -3, 5)$, which makes equal angles with the axes.