Questions from old Exams

1 Section 8.1

1. Find the equation of the parabola in standard form with focus at \((2, -3)\), and directrix \(x = 10\).

2. Write the equation in standard form of the parabola that has vertex \((-4, 1)\), axis of symmetry parallel to the \(y\)-axis and passing through the point \((-2, 2)\).

3. Find the vertex, focus, and directrix of the parabola given by the equation \(6y - 3x^2 - 12x + 4 = 0\).

4. Find the equation in standard form of the parabola with directrix \(x = 4\) and focus \((0, -3)\).

5. The graph of the parabola \(x = -y^2 + 6y - 5\):
   
   (a) has vertex at \((4, 3)\) and opens to the left.
   (b) has vertex at \((31, 6)\) and opens to the left.
   (c) has vertex at \((3, 4)\) and opens to the left.
   (d) has vertex at \((31, 6)\) and opens to the right.
   (e) has vertex at \((4, 3)\) and opens downward.

6. If the distance between the center of the circle \(x^2 + y^2 - 2y = 5\) and the vertex of the parabola \(x = -5y^2 + m\) is \(\sqrt{10}\), then find the value of \(m\).

2 section 8.2

1. Find the center, vertices, and foci of the ellipse \(8x^2 + 25y^2 - 48x + 50y + 47 = 0\). Sketch the graph.

2. Find the vertices of an ellipse with center at \((2, 0)\) and major axis of length 6 on the \(x\)-axis.

3. Consider the ellipse given by the equation \(9x^2 + y^2 + 18x - 6y + 9 = 0\).
   
   (a) Find its vertices and foci.
   (b) Sketch the graph of the ellipse.

4. Find the standard form of the equation of the ellipse that has foci at \((-3, 0)\) and \((-3, 6)\) and vertices at \((-3, -2)\) and \((-3, 8)\).

5. Find the equation in standard form of the ellipse with eccentricity \(\frac{2}{5}\) and foci \((-1, 3)\) and \((3, 3)\).

6. Graph the equation \(x = \sqrt{\frac{25 - 16y^2}{2}}\).

7. Find the equation of the ellipse with center \((3, 1)\), minor axis of length 6 units, and a horizontal major axis of length 9 units.

8. Find the lengths of the major and minor axes and the eccentricity of the ellipse \(4(x - 1)^2 + 9(y + 1)^2 = 36\).
9. Find the lengths of the major and minor axes of the ellipse \(4x^2 + 9y^2 - 36 = 0\).

10. The equation of \(x^2 - 6x + 4y^2 - 40y + 45 = 0\) is
   (a) an ellipse with center at \((-3, 5)\).
   (b) an ellipse with major axis of length 64.
   (c) a circle with center \((3, -5)\).
   (d) a hyperbola with center \((3, -5)\).
   (e) an ellipse with major axis of length 8.

11. The graph of \(x = -\sqrt{16 - 9y^2}\) is
    (a) half a hyperbola.
    (b) a parabola.
    (c) half an ellipse.
    (d) two intersecting lines.
    (e) a circle.

### 3 Section 8.3

1. Find the coordinates of the foci of the hyperbola \(9(y - 1)^2 - 16(x + 1)^2 = 144\).

2. Find the equations of the asymptotes of the hyperbola \(4x^2 - y^2 - 8x - 2y - 13 = 0\).

3. Find the vertices and the equations of the asymptotes of the hyperbola \(4x^2 - 9y^2 = 36\).

4. The graph of the equation \(12x^2 + 72x + 72 = 9y^2 + 72y\) represents:
   (a) an ellipse with center \((3, 4)\).
   (b) an ellipse with center \((-3, -4)\).
   (c) a hyperbola with center \((-3, -4)\).
   (d) a hyperbola with center \((3, 4)\).
   (e) a parabola with vertex \((3, 4)\).

5. Find the center and the vertices of the hyperbola \(25(y + 2)^2 - 9(x + 3)^2 = 225\).

6. Find the asymptotes of the hyperbola \(4x^2 - 8x - 9y^2 + 36y - 68 = 0\).

7. Find the slopes of the asymptotes of the hyperbola with center \((1, -2)\), one focus at \((6, -2)\) and eccentricity \(\frac{5}{3}\).

8. Find the foci of the hyperbola \(\frac{9(x - 1)^2}{64} - \frac{9(y - 2)^2}{80} = 1\).