

Math 110 – Chapter 7 – Worksheet 1 – Version A

The Parabola; The Ellipse; The Hyperbola

7.2 The Parabola

- Graph the parabola and specify the vertex, focus and directrix.
 - $x^2 = 12y$
 - $y^2 = -6x$
- Find the vertex, focus, directrix and the focal diameter (latus rectum) of the parabola $y^2 = -8x$
- Find the standard equation of the parabola with vertex $(0, 0)$, focus at $(0, 2)$, the axis of symmetry is the x - axis and that passes through the point $(1, 2)$.
- Find the equation of each parabola that satisfies the given conditions. Also, find the focal diameter of each.
 - Focus $(0, 2)$; directrix $y = -10$
 - Vertex $(1, 2)$; directrix $x = 5$
 - Vertex $(1, 7)$ and focus $(2, 7)$
- Find the vertex, focus and directrix of the parabola: $2x^2 - 8x - y + 7 = 0$

7.3 The Ellipse

- Find the standard form of the equation of the ellipse that has vertex $(0, 10)$ and foci $(0, 8)$ and $(0, -8)$
- Graph the ellipse whose equation is given by $4x^2 + y^2 = 16$. Identify its vertices, foci and co-vertices. Find the length of its major axis. Find the length of its minor axis.
- Find the equation of the ellipse that has
 - Foci at $(2, -3)$ and $(2, 5)$ and has a major axis of length 10.
 - Vertices at $(0, 0)$ and $(0, 10)$ and a focus at $(0, 8)$.
- Find the center, vertices and foci of the ellipse with equation: $x^2 + 4y^2 - 6x + 8y - 29 = 0$

7.4 The Hyperbola

- Find the vertices and foci of the hyperbola: $x^2 - 4y^2 = 8$
- Find the standard form of the equation of the hyperbola with
 - Vertices at $(0, \pm 3)$ and foci at $(0, \pm 6)$
 - Center at $(0, 0)$, vertex at $(5, 0)$ and focus at $(7, 0)$.
 - Foci at $(0, \pm 6)$ and the length of the transverse axis is 10.
- Find the equations of the asymptotes of the hyperbola $\frac{y^2}{4} - \frac{x^2}{9} = 1$.
- Find the equation of the hyperbola with center at $(0, 0)$ satisfying the given conditions
 - Foci $(\pm 2\sqrt{2}, 0)$ and asymptotes $y = \pm x$
 - Vertices $(0, \pm 1)$ and asymptotes $y = \pm \frac{1}{3}x$
- Sketch the graph of each equation.
 - $25x^2 - 4y^2 = 100$
 - $9y^2 - x^2 = 1$