Week in Review # 13

MATH 150

9.1 through 9.3 Drost-Fall 2002

Parabolas

1. Find the focus and vertex of the parabola

$$x^2 - 4x + 6y - 8 = 0$$

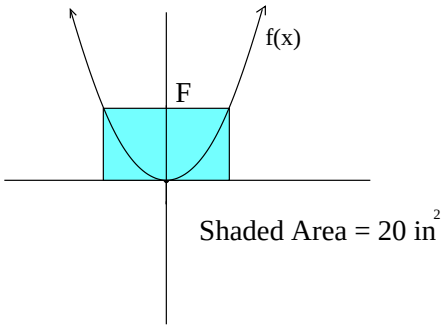
2. Find the equation of the parabola with focus (2,3) and directrix $y = -1$.

3. Given $y^2 - 10y + 8x - 7 = 0$

Find the vertex, focus, and directrix.

4. Write the equation of the parabola with focus (-2,3) and vertex (-2,1)

5. Find an equation of the parabola in the figure below:



Ellipses

6. Find the vertices and the foci of the ellipse:

$$\frac{x^2}{20} + \frac{y^2}{2} = 1$$

7. Graph $\frac{x^2}{4} + \frac{y^2}{81} = 1$

8. Write the equation of the ellipse with foci at $(0, \pm 3)$ and vertices at $(0, \pm 5)$

9. Graph: $16x^2 + 9y^2 - 32x + 54y - 47 = 0$

10. Write the equation of the ellipse whose foci are $(1, 4)$ and $(5, 4)$ and with vertices at $(0, 4)$ and $(6, 4)$.

11. Find the equation of the ellipse whose eccentricity is $\frac{1}{9}$ and with foci are at $(0, \pm 2)$.

Hyperbolas

12. Find the vertices, foci and asymptotes of the hyperbola: $25y^2 - 9x^2 = 225$.

13. Find the equation of the hyperbola whose vertices are $(0, \pm 4)$ which passes through the point $(3, -5)$.

14. Find the equation of the hyperbola whose foci are $(0, \pm 8)$ and has asymptotes $y = \pm \frac{1}{2}x$.

15. Show that the asymptotes of $x^2 - y^2 = 5$ are perpendicular to each other.

Circles

16. Find the center and radius of the circle:

$$x^2 + y^2 - 14x + 31 = 0$$

17. Sketch the solution:

$$(x - 4)^2 + (y + 1)^2 \leq 4$$

18. Find the equation of the circle whose center is at (-3,5) and is tangent to the y-axis.

19. Find the equation of the circle whose diameter is AB where A = $(6, -3)$ and B = $(1, 9)$

ANSWERS:

1. focus = $(2, \frac{1}{2})$, vertex $(2, 2)$

2. $x^2 - 4x - 8y + 12 = 0$

3. vertex $\Rightarrow (4, 5)$, focus $\Rightarrow (2, 5)$, directrix $\Rightarrow x = 6$

4. $x^2 + 4x - 8y + 12 = 0$

5. $x^2 = 4\sqrt{5}y$

6. vertices $(\pm 2\sqrt{5}, 0)$, foci $(\pm 3\sqrt{2}, 0)$

7.

8. $\frac{x^2}{16} + \frac{y^2}{25} = 1$

9.

10. $\frac{(x-3)^2}{9} + \frac{(y-4)^2}{5} = 1$

11. $\frac{x^2}{320} + \frac{y^2}{324} = 1$

12. vertices $(0, \pm 3)$, foci $(0, \pm\sqrt{34})$, asymptotes $y = \pm\frac{3}{5}x$

13. $\frac{y^2}{16} - \frac{x^2}{16} = 1$

14. $\frac{5y^2}{64} - \frac{5x^2}{256} = 1$

15. $m_1 \cdot m_2 = -1$

16. center $(7, 0)$, radius $= 3\sqrt{2}$

17.

18. $(x + 3)^2 + (y - 5)^2 = 9$

19. $(x - 3.5)^2 + (y - 3)^2 = 6.5^2$