

You may need to use additional paper.

1. Write the definition of each of the following:

circle

ellipse

parabola

hyperbola

2. Find the center and radius for the following:

$$x^2 + y^2 = 25$$

$C(0,0)$
 $r=5$

$$3x^2 + 3y^2 = 60$$

$$x^2 + y^2 = 20$$

$C(0,0)$ $r=2\sqrt{5}$

$$-5x^2 - 5y^2 = -100$$

$$x^2 + y^2 = 20$$

$C(0,0)$ $r=2\sqrt{5}$

3. Find the focus and directrix for the following:

$$x^2 = 12y$$

$4p = 12$
 $p = 3$

$f(0,3)$
dir $y = -3$

$$2y^2 = 32x$$

$p = 4$

$y^2 = 16x$

$f(4,0)$
dir $x = -4$

$$\frac{1}{3}x^2 + 5y = 0$$

$x^2 = -15y$

$f(0, -\frac{15}{4})$
dir $y = \frac{15}{4}$

4. Find the vertices, co-vertices, and foci for the following:

$$\frac{x^2}{144} + \frac{y^2}{49} = 1$$

$V(12,0)(-12,0)$
 $C-V(0,7)(0,-7)$
 $f(\sqrt{95},0)(-\sqrt{95},0)$

$$25x^2 + 49y^2 = 1225$$

$$\frac{x^2}{49} + \frac{y^2}{25} = 1$$

$V(7,0)(-7,0)$ $C-V(0,5)(0,-5)$

$$\frac{25x^2}{4} + \frac{25y^2}{9} = 1$$

$$\frac{x^2}{\frac{4}{25}} + \frac{y^2}{\frac{9}{25}} = 1$$

$f(2\sqrt{4},0)(-2\sqrt{4},0)$
 $V(0,\frac{3}{5})(0,-\frac{3}{5})$
 $C-V(\frac{2}{5},0)(-\frac{2}{5},0)$ $f(0,\frac{\sqrt{5}}{5})(0,-\frac{\sqrt{5}}{5})$

5. Find the vertices, foci, and asymptotes for the following:

$$\frac{x^2}{64} - \frac{y^2}{121} = 1$$

$V(8,0)(-8,0)$
 $f(\sqrt{165},0)(-\sqrt{165},0)$

$y = \frac{11}{8}x$
 $y = -\frac{11}{8}x$

$$\frac{x^2}{1} - \frac{y^2}{81} = -1$$

$$-\frac{x^2}{1} + \frac{y^2}{81} = 1$$

$V(0,9)(0,-9)$ $f(0,\sqrt{82})(0,-\sqrt{82})$ $y = \pm 9x$

$-2x^2 + 8y^2 = 32$
 $V(0,2)(0,-2)$
 $f(0,2\sqrt{5})(0,-2\sqrt{5})$ $y = \pm \frac{1}{2}x$

6. Write the equation of the circle with center at the origin with a radius of 7.

$$x^2 + y^2 = 49$$

7. Write the equation of the parabola with the origin as its' vertex and with directrix $y = -3$.

$$x^2 = 12y$$

8. Write the equation of the circle with center at the origin at passes through the point (4, -2).

$$x^2 + y^2 = 20$$

9. Write the equation of the ellipse with center at the origin and a vertex at (0,4) and a co-vertex at (-3,0)

$$\frac{x^2}{9} + \frac{y^2}{16} = 1$$

10. Write the equation of the circle with center at the origin with radius of $3\sqrt{5}$.

$$x^2 + y^2 = 45$$

11. Write the equation of a parabola that opens up with vertex at the origin and passes through the point (5,10).

$$x^2 = 4py \quad p = \frac{5}{8}$$

$$25 = 4p(10)$$

$$25 = 40p$$

$$x^2 = \frac{5}{2}y$$

12. Write the equation of the ellipse with center at the origin and has a vertex at (-8,0) and a focus at (5,0).

$$25 = 64 - b^2$$

$$-39 = -b^2$$

$$39 = b^2$$

$$\frac{x^2}{64} + \frac{y^2}{39} = 1$$

13. Write the equation of the hyperbola with center at the origin and vertex at (0,5) and focus at (0, -13).

$$169 = 25 + b^2$$

$$144 = b^2$$

$$\frac{y^2}{25} - \frac{x^2}{144} = 1$$

14. What is the area of the following.

$$x^2 + y^2 = 9 \quad r = 3, \quad r^2 = 9$$

$$A = 9\pi \text{ sq units}$$

$$5x^2 + 5y^2 = 30$$

$$x^2 + y^2 = 6$$

$$A = 6\pi$$

$$r^2 = 6$$

$$\frac{x^2}{169} + \frac{y^2}{196} = 1$$

$$a = 13$$

$$b = 14$$

$$A = 182\pi$$