Honors Algebra 2/Trig
9.2 Day 2 Worksheet

Name: Key

Determine the conic from the equation.

1. $x^2+y^2-10x-8y+16=0$ circle

$x^2+5y^2-10x-8y+16=0$ ellipse

$x^2-y^2-10x-8y+16=0$ hyperbola

$x^2-10x-8y+16=0$ parabola

Write the equation of the conic described. Write the final answer in standard form.

2. For each point, its distance from the fixed point (4,3) is 3 times its distance from the fixed point (-1,2).

(x,y)

$$\left(\sqrt{(x-4)^2+(y-3)^2}\right)^2=\left(3\sqrt{(x+1)^2+(y-2)^2}\right)^2$$

$$(x-4)^2+(y-3)^2=9\left[(x+1)^2+(y-2)^2\right]$$

$$x^2-8x+16+y^2-6y+9=9(x^2+2x+1+y^2-4y+4)$$

$$x^2-8x+y^2-6y+25=9x^2+18x+9y^2-36y+45$$

$$\boxed{0=8x^2+26x+8y^2-30y+20}$$ or

$$0=4x^2+13x+4y^2-15y+10$$

3. Each point is three times as far from the line y=5 as it is from the line x=1.

(x,y)

$$\sqrt{(x-x)^2+(y-5)^2}=3\sqrt{(x-1)^2+(y-y)^2}$$

$$(y-5)^2=9\left[(x-1)^2+(y-y)^2\right]$$

$$y^2-10y+25=9(x^2-2x+1)$$

$$y^2-10y+25=9x^2-18x+9$$

$$\boxed{0=9x^2-y^2-18x+10y-16}$$

4. For each point, its distance from the point (-3,1) is half its distance from the line y=4.

(x,y)

$$\sqrt{(x+3)^2+(y-1)^2} = \frac{1}{2}\sqrt{(y-4)^2}$$

$$\left(2\sqrt{(x+3)^2+(y-1)^2}\right)^2 = \left(\sqrt{(y-4)^2}\right)^2$$

$$4[(x^2+6x+9+y^2-2y+1)] = y^2-8y+16$$

$$4x^2+24x+4y^2-8y+40 = y^2-8y+16$$

$$\boxed{4x^2+24x+3y^2+24=0}$$

☆ Rather than dealing with fractions, we can multiply both sides by 2.

5. For each point, its distance from the point (4,0) is twice its distance from the line x=-4.

(x,y)

$$\left(\sqrt{(x-4)^2+(y-0)^2}\right)^2 = \left(2\sqrt{(x+4)^2}\right)^2$$

$$(x-4)^2+y^2 = 4(x+4)^2$$

$$x^2-8x+16+y^2 = 4(x^2+8x+16)$$

$$x^2-8x+16+y^2 = 4x^2+32x+64$$

$$\boxed{0 = 3x^2+40x-y^2+48}$$

6. Each point is equidistant from the point (3,-4) and the line y=2.

(x,y)

$$\sqrt{(x-3)^2+(y+4)^2} = \sqrt{(y-2)^2}$$

$$(x-3)^2+(y+4)^2 = (y-2)^2$$

$$x^2-6x+9+y^2+8y+16 = y^2-4y+4$$

$$\boxed{x^2-6x+12y+21=0}$$