Honors Algebra II Conic Worksheet 2 Name Key

Show all work for full credit. It might help to make a quick sketch of the conic.

1. Identify the type of conic and then find the relevant things for each type of conic (center, focus, directrix, vertex, co-vertex, asymptotes, etc.)

a) $(x-5)^2+(y+1)^2=25$ circle

$c(5,-1)$ $r=5$ units

b) $\dfrac{\left(y-\frac{3}{2}\right)^2}{\frac{49}{4}}+\dfrac{(x+2)^2}{16}=1$ Ellipse

$c\left(-2,\frac{3}{2}\right)$

$v\left(2,\frac{3}{2}\right)\left(-6,\frac{3}{2}\right)$

$c\text{-}v(-2,5)(-2,-2)$ $f\left(-2\pm\frac{\sqrt{15}}{2},\frac{3}{2}\right)$

c) $-\dfrac{9(x-7)^2}{8}+\dfrac{25(y+2)^2}{32}=2$ Hyperbola

$c(7,-2)$

$v\left(7,-\frac{2}{5}\right)\left(7,-\frac{18}{5}\right)$

$f\left(7,-2\pm\frac{4\sqrt{61}}{15}\right)$

$y=\frac{6}{5}x-\frac{52}{5}$

$y=-\frac{6}{5}x+\frac{32}{5}$

d) $2(y-3)^2=16(x+2)$ Parabola

$V(-2,3)$ $f(0,3)$

dir $x=-4$

2. Put the following in standard form, identify the type of conic and then find the relevant things for each type of conic (center, focus, directrix, vertex, co-vertex, asymptotes, etc.)

a) $x^2-8x+10y+y^2-8=0$ Circle

$x^2-8x+16+y^2+10y+25=8+16+25$

$(x-4)^2+(y+5)^2=49$

$c(4,-5)$ $r=7$ units

b) $y^2+4x-2y=11$ Parabola

$y^2-2y+1=-4x+11+1$

$(y-1)^2=-4x+12$

$(y-1)^2=-4(x-3)$

$v(3,1)$

$f(2,1)$

dir $x=4$

c) $2x^2+18y+20x+3y^2+5=0$ Ellipse

$\dfrac{(x+5)^2}{36}+\dfrac{(y+3)^2}{24}=1$ $c(-5,-3)$

$v(1,-3)(-11,-3)$ $c\text{-}v(-5,-3\pm2\sqrt{6})$

$f(-5\pm2\sqrt{3},-3)$

d) $-16x^2-36y-128x+9y^2-364=0$ Hyperbola

$-\dfrac{(x+4)^2}{9}+\dfrac{(y-2)^2}{16}=1$ $c(-4,2)$

$v(-4,6)(-4,-2)$ $f(-4,7)(-4,-3)$

$y=\frac{4}{3}x+\frac{22}{3}$ $y=-\frac{4}{3}x-\frac{10}{3}$

e) $y^2-8x-4y+18=-22$ Parabola

$(y-2)^2=8\left(x-\frac{9}{2}\right)$

$v\left(\frac{9}{2},2\right)$ $f\left(\frac{13}{2},2\right)$

dir $x=\frac{5}{2}$

f) $9x^2+4y^2+18x-16y=0$ Ellipse

$\dfrac{(x+1)^2}{\frac{25}{9}}+\dfrac{(y-2)^2}{\frac{25}{4}}=1$ $c(-1,2)$

$v\left(-1,\frac{9}{2}\right)\left(-1,-\frac{1}{2}\right)$ $f\left(-1,2\pm\frac{5\sqrt{5}}{6}\right)$

$c\text{-}v\left(\frac{2}{3},2\right)\left(-\frac{8}{3},2\right)$

g) $x^2+2x-2y^2+4y=17$ Hyperbola

$\dfrac{(x+1)^2}{16}-\dfrac{(y-1)^2}{8}=1$ $c(-1,1)$

$v(-5,1)(3,1)$ $f(-1\pm2\sqrt{6},1)$ $y=\frac{\sqrt{2}}{2}x+1+\frac{\sqrt{2}}{2}$

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

h) $3x^2-36y+24x+3y^2=-135$ Circle

$(x+4)^2+(y-6)^2=7$

$c(-4,6)$

$r=\sqrt{7}$ units

3. Find the equation, in standard form, of the circle that contains the point (-3,5) and has its center at (-2,1).

$$(x+2)^2+(y-1)^2=17$$

4. Write the equation, in standard form, of the parabola with a focus at (-2,3) and a directrix at $x=6$.

$$(y-3)^2=-16(x-2)$$

5. Write the equation, in standard form, for the hyperbola that has a vertices at (-2,2) and (8,2) a focus at (10,2).

$$\frac{(x-3)^2}{25}-\frac{(y-2)^2}{24}=1$$

6. Write the equation, in standard form, of the ellipse with vertices at (-1,7) and (-1,-13) and a co-vertex at (4,-3).

$$\frac{(x+1)^2}{25}+\frac{(y+3)^2}{100}=1$$

7. Write the equation, in standard form, of the conic with co-vertices at (1,9) and (1,3) and a focus at (-6,6).

$$\frac{(x-1)^2}{58}+\frac{(y-6)^2}{9}=1$$

8. Write the equation of the hyperbola that has a horizontal transverse axis and asymptotes of $y=2x+8$ and $y=-2x-4$.

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

9. Find the point(s) of intersection, if any, of the graphs in the system.

a) $x^2+y^2=20$
$x-y=-2$

(2, 4)
(-4, -2)

b) $4x^2+y^2=16$
$y=x-2$

(2, 0)
$\left(-\frac{6}{5}, -\frac{16}{5}\right)$

c) $9x^2+y^2-90x=-216$
$x^2-y^2-16=0$

(4, 0)
(5, 3)
(5, -3)