Honors Alg 2

Classify each equation as that of a circle, an ellipse, a parabola or a hyperbola.

(1) $x^2+y^2-2x+6y-3=0$

$(x^2-2x+1)+(y^2+6y+9)=3+1+9$

$(x-1)^2+(y+3)^2=13$

circle of $r=\sqrt{13}$, $C(1,-3)$

(2) $x^2-y^2+6x+10y-17=0$

$(x^2+6x+9)-(y^2-10y+25)=17+9-25$

$(x+3)^2-(y-5)^2=1$

hyp $C(-3,5)$

(3) $9x^2+16y^2+18x=64y+71$

$9x^2+18x+16y^2-64y=71$

$9(x^2+2x+1)+16(y^2-4y+4)=71+9+64$

$\frac{9(x+1)^2}{144}+\frac{16(y-2)^2}{144}=\frac{144}{144}$

ellipse w/ $C(-1,2)$

(4) $y^2-6y-x+4=0$

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

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

parab. $V(-5,3)$

(5) $y^2+2y-x-1=0$

$\frac{1}{4p}=\frac{-2}{1}$

$8p=-1$

$p=-\frac{1}{8}$

$\frac{1}{4p}=\frac{1}{1}$

$4p=1$

$p=\frac{1}{4}$

$y^2+2y+1=x+1+1$

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

parab. $V(-2,-1)$

(6) $2x^2+8x+y^2+4=0$

ellipse $C(-2,0)$

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

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

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

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

(7) $x^2+y^2+8x-12y-7=0$

$(x^2+8x)+(y^2-12y)=7$

$(x^2+8x+16)+(y^2-12y+36)=59$

$(x+4)^2+(y-6)^2=59$

circle $r=\sqrt{59}$ $C(-4,6)$

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

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

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

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

hyp $C(3,2)$

(9) $4x^2+2y^2=8$

$\frac{4x^2}{8}+\frac{2y^2}{8}=\frac{8}{8}$

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

ellipse $C(0,0)$

(10) $3y^2+24y-x^2-2x=-41$

$(3y^2+24y)-(x^2+2x)=-41$

$3(y^2+8y+16)-(x^2+2x+1)=-41+48-1$

$\frac{3(y+4)^2}{6}-\frac{(x+1)^2}{6}=\frac{6}{6}$

hyp $C(-1,-4)$

Can you make a generalization so you can determine the conics if the equation is not in standard form? (over)

e(11) $4x^2+3y^2+8x-24y+51=0$

$4x^2+8x \quad +3y^2-24y \quad = -51$

$4(x^2+2x+1)+3(y^2-8y+16) = -51+4+48$

$= 1$

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

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

P 12) $y^2-4y-4x+16=0$

$y^2-4y = 4x-16$

$y^2-4y+4 = 4x-12$

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

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

C13) $x^2+y^2-6x+4y+9=0$

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

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

H 14) $x^2-4y^2+6x+16y-11=0$

$(x^2+6x+9)-(4y^2-16y\quad) = 11+9-16$

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

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

P15) $y=2x^2-4x+3$

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

$+2$

$y-1 = 2(x-1)^2$ parab

H1.6) $9x^2-4y^2-24y=72$

$9x^2-(4y^2+24y\quad)=72$

$9x^2-4(y^2+6y+9)=36$

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

E17) $x^2+4y^2-2x-15=0$

$(x^2-2x+1)+4y^2 = 15+1$

$\frac{(x-1)^2}{16}+\frac{y^2}{4}=1$ ellipse

C18) $x^2+y^2+8x-16y+12=0$

$(x^2+8x+16)+(y^2-16y+64) = -12+16+64$

$(x+4)^2+(y-8)^2=68$ circle

P19) $x^2-4x-2y+13=0$

$(x^2-4x+4) = 2y-13+4$

$(x-2)^2 = 2y-9$

$(x-2)^2 = 2(y-9/2)$ parab

$\frac{1}{2}(x-2)^2 = y-9/2$