Identifying Conic Sections

Identify the conic section that each equation represents.

**** Remember that there are 4 types of conic sections.**

$$x+4=\frac{(y-2)^2}{10}$$ → parabola since only one variable is squared

$$\frac{(x-1)^2}{9}-\frac{(y-2)^2}{16}=1$$ → hyperbola since both variables are squared and the terms are separated with subtraction

$$(x-1)^2+(y-2)^2=\frac{81}{16}$$ → circle since both squared terms have the same coefficient

★ Ellipse would have two squared terms added together w/ different coefficients.

Example #1:

Given $x^2+y^2+4x-6y-3=0$.

Write the equation in standard form and identify the conic section. ★ complete the square

★ $\boxed{\text{circle}}$

$x^2+4x+\underline{4}+y^2-6y+\underline{9}=3+\underline{4}+\underline{9}$

$$\boxed{(x+2)^2+(y-3)^2=16}$$

Example #2: ★ $\boxed{\text{Hyperbola}}$

Find the standard form of $4x^2-y^2+8x+8y-16=0$ by completing the square. Then identify the conic.

$4x^2+8x+\underline{4}-y^2+8y+\underline{-16}=+16+\underline{4}+\underline{-16}$

$4(x^2+2x+\underline{1})-(y^2-8y+\underline{16})=4$

$4(x+1)^2-(y-4)^2=4$ ★ Make equation equal 1 by dividing by 4

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

You try:

Write the equation for the conic section in standard form and classify the type.

1) $16x^2+9y^2-128x+108y+436=0$

★ ellipse

$$\frac{(x-4)^2}{9}+\frac{(y+6)^2}{16}=1$$

2) $6x^2+24x-y-6=0$

★ parabola

$$y+30=6(x+2)^2$$