Ellipses

LT: I will identify characteristics of an ellipse through inspection of standard form.

Characteristics
- vertices
- center
- co-vertices
- foci (2 focuses)

Standard form:

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

How do I know if it's vertical or horizontal??

if $a > b \rightarrow$ horizontal
if $b > a \rightarrow$ vertical

Ex 1

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

3^2 ← $\rightarrow 4^2$

center: (0,0)
$b > a$, → vertical
: change in y

vertices: $(0, 0 \pm 4)$
$= (0,4) : (0,-4)$

co-vertices: change in h
$= (0 \pm 3, 0)$
$= (3,0) : (-3,0)$

Example 2: find center, vertices, co-vertices and foci

$\frac{(x-5)^2}{36} + \frac{(y+3)^2}{121} = 1$

center: $(5, -3)$

vertical → change in k

vertices: $(5, -3 \pm 11)$

$= (5, 8) : (5, -14)$

co-vertices: $(5 \pm 6, -3)$

$= (11, -3) : (-1, -3)$

To find foci (2 points equal distance from the center)

apply Pythagorean Theorem:

$a^2 - b^2 = c^2$ ~~for~~ c = foci

$121 - 36 = c^2$

$85 = c^2$

$c = \sqrt{85}$

Since its vertical, the foci also affect k.

foci $= (5, -3 \pm \sqrt{85})$

HW: #1-6 (on blog)