Ellipse: Tips and tactics, in addition to prior notes

1.) Convert into standard form. May need to "complete the square." 2.) Find the Center (h, k). 3.) Identify a^2 and b^2 and determine vertical or horizontal orientation. 4.) Find a, b, and c. 5.) Find the total major and minor axis lengths, 2a and 2b. 6.) Find the coordinates of the foci. 7.) Graph the ellipse—including the center, foci, and major/minor axes.

$$\frac{16x^2}{144}+\frac{9y^2}{144}=\frac{144}{144}$$

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

$b^2 \to 9$ Big $16 \leftarrow a^2$

vertical

Center: (h, K)
(0, 0)

$a^2=16 \to a=4$ major Axis: 8

$b^2=9 \to b=3$ Minor Axis: 6

$b^2=a^2-c^2$

$9=16-c^2$

$-16 \quad -16$

$\sqrt{+7}=+\sqrt{c^2}$

$c=\sqrt{7}$

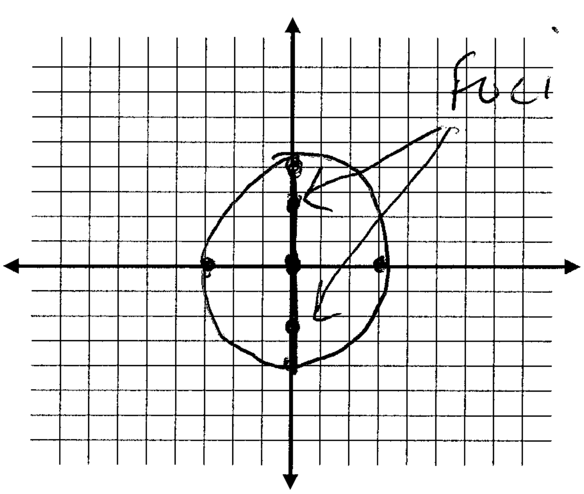
Foci $(h, k+c)$

$(0, \sqrt{7})$

$h, k-c$

$(0, -\sqrt{7})$

2.6



$$7x^2+3y^2-28x-12y+19=0$$

$7x^2-28x+\square+3y^2-12y+\square=-19$

$7(x^2-4x+\boxed{4})+3(y^2-4y+\boxed{4})=-19$
$+28$
$+12$

$$\frac{7(x-2)^2}{21}+\frac{3(y-2)^2}{21}=\frac{21}{21}$$

$$\frac{(x-2)^2}{3}+\frac{(y-2)^2}{7}=1$$

$b^2 \to 3$ $7 \leftarrow a^2$

Center (2, 2) h K

Vertical

$a^2=7, a=\sqrt{7}$

$b^2=3, b=\sqrt{3}$

Foci: $(h, k+c)$ & $(h, k-c)$

$(2,4)$ & $(2,0)$

$b^2=a^2-c^2$

$3=7-c^2$

$-7 \quad -7$

$\sqrt{+4}=\sqrt{+c^2}$

$2=c$

Foci dist. from center

Major: $2\sqrt{7}$

Minor: $2\sqrt{3}$