Answer on Question #45106 – Math – Analytical Geometry

Find the center, vertices, and foci of the ellipse with equation x squared divided by one hundred plus y squared divided by thirty six=1

Solution:
$$\frac{x^2}{100} + \frac{y^2}{36} = 1$$
Since $x^2 = (x-0)^2$ and $y^2 = (y-0)^2$, the equation above is really:
$$\frac{(x-0)^2}{100} + \frac{(y-0)^2}{36} = 1$$
Then the center is at $(h, k) = (0, 0)$. I know that the a^2 is always the larger denominator (and b^2 is the smaller denominator), and this larger denominator is under the variable that parallels the longer direction of the ellipse. Since 100 is larger than 36, then $a^2 = 100$, $a = \pm\sqrt{100} = \pm 10$, and this ellipse is wider (paralleling the x-axis) than it is tall. The value of a also tells me that the vertices are $\sqrt{100} = 10$ units to either side of the center, at (–10, 0) and (10, 0).
Let's find co-vertices of the ellipse:
$$b^2 = 36$$
$b = \pm\sqrt{36} = \pm 6$.
Co-vertices are (–6, 0) and (6, 0).

To find the foci, we need to find the value of c. From the equation, I already have a^2 and b^2, so:
$$a^2 - c^2 = b^2$$
$$100 - c^2 = 36$$
$$c^2 = 64$$
$$c = 8$$
Then the value of c is 8, and the foci are eight units to either side of the center, at (–8, 0) and (8, 0)

Answer: center $(0,0)$,
Vertices a (–10, 0) and (10, 0), (–6, 0) and (6, 0).
foci $(-8,0)$ and $(8,0)$