Writing Equations of Ellipses

Things to remember

- **The value of a = the length from the _____ to the _____.**
- **The value of b = the length from the _____ to the _____.**
- **The value of c = the length from the _____ to the _____.**
- **The vertices fall on the _____ axis whereas, the covertices fall on the _____ axis.**

What am I given?	EXAMPLE:	EXAMPLE:
Vertices and Covertices Step 1 Find the center using the midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ Step 2: Find the length of a. a = center to vertex Determine a^2 Step 3: Find the length of b. b = center to covertex Determine b^2 Step 4: Substitute the values of a^2, b^2, and (h,k) into the formula $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ or $\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$	Vertices: (-5,1) and (1,1) Covertices: (-2,0) and (-2,2)	Vertices: (-8,10) and (-8,-2) Covertices: (-4,4) and (-12,4)
Vertices and Foci Step 1 Find the center using the midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ Step 2: Find the length of c. c= center to foci Determine c^2 Step 3: Find the length of a. a= center to vertex Determine a^2 Step 4: Use the formula $c^2 = a^2 - b^2$ to find the value of b^2 by substituting the values of a^2 and c^2 into the formula. Solve for b^2. Step 5: Substitute the values of a^2, b^2, and (h,k) into the formula $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ or $\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$	Vertices: (3,-5) and (-7,-5) Foci: (1,-5) and (-5,-5)	Vertices: (-8,14) and (-8,-12) Foci: (-8,13) and (-8,-11)

What am I given?	EXAMPLE:	EXAMPLE:
Center, Vertex, Covertex Step 1: Find the length of a. a= center to vertex Determine a^2 Step 2: Find the length of b. b = center to covertex Determine b^2 Step 3: Substitute the values of a^2, b^2, and (h,k) into the formula $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ or $\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$	Center: (-2,-8) Vertex: (6,-8) Covertex: (-2,-15)	Center: (-1,-9) Vertex: (-1,-18) Covertex: (5,-9)
Co-Vertices and Foci Step 1: Find the center using the midpoint $\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$ Step 2: Find the length of c. c= center to foci Determine c^2 Step 3: Find the length of b. b= center to covertex Determine b^2 Step 4: Use the formula $c^2 = a^2 - b^2$ to find the value of a^2 by substituting the values of b^2 and c^2 into the formula. Solve for a^2. Step 5: Substitute the values of a^2, b^2, and (h,k) into the formula $\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ or $\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$	Co-vertices: (6,3), (6,-7) Foci: (18,-2), (-6,-2)	Co-vertices: (4,-5), (-6,-5) Foci: (-1,7), (-1,-17)