Tutorial: Writing the Equation of an Ellipse

Slide 1:

In this tutorial you will be writing the equation of an ellipse given various pieces of information.

Slide 2:

When you are asked to write the equation of an ellipse, you will be given various pieces of information. Based on those pieces of information, you will need to generate the rest of what you need to write the equation.

The first thing you need to know is whether the ellipse is horizontal or vertical. This will tell you which form of the equation you will use. Remember that if the ellipse is horizontal, the vertices and the foci lie on a straight line horizontally and if the ellipse is vertical, the vertices and the foci lie on a straight line vertically.

The next thing you need to know is where the center point is. For these problems, the center will be at the origin.

The next thing you will need to know is the value of 'a'. This is the distance the vertices are away from the center.

The last thing you will need to know is the value of 'b'. This is the distance the co-vertices are away from the center.

Keep in mind that some of this information will be given to you in the problem and some of this information will need to be generated using the equation a squared minus b squared equals c squared.

Slide 3:

The best way to learn about writing an equation of an ellipse is to look at an example. Various pieces of information might be given to you in the problem so it is important that you pay attention to what is given and what you need to find.

Write the equation of an ellipse with foci at zero, negative four and zero, four and a minor axis of six.

From the information of the foci we see that c is equal to four.

We know that the minor axis is equal to two times b which is equal to 6.
B is equal to three.

Our next step is to find a.
A squared minus b squared is equal to c squared.
A squared minus three squared is equal to four squared.
A squared minus nine is equal to sixteen.
A squared is equal to twenty five.
A is equal to five.

Looking at the location of the foci, we see that this graph has a vertical major axis.
We will use the general equation x squared over b squared plus y squared over a squared is equal to one.

Plugging in our information we have a final equation of x squared over nine plus y squared over twenty five is equal to one.

Slide 4:

Now you try.
Answer the following question and then click on Solution to check your work.

Find the equation of an ellipse with a center at (0, 0), focus at (-3, 0) and a co-vertex at (0, 4).

Solution

X squared divided by 25 plus y squared divided by 16 equals 1.

Slide 5:

Remember

Read each problem carefully. Write down the information that is given and solve for the missing a or b values.

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