



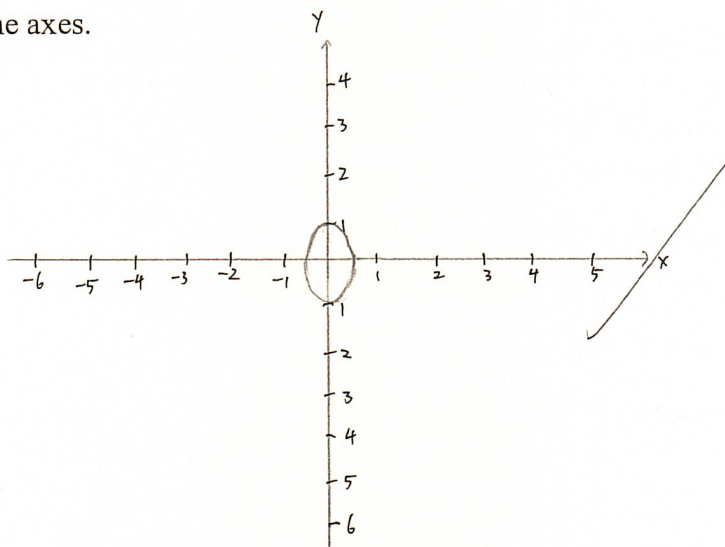
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Class: 3E1

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MA303.1.X1 – Ellipses

S1. By plotting, sketch the graph of $2x^2 + y^2 = 1$. Label the coordinates of the points of intersection with the axes.



S2. The general form of the equation of an ellipse is $\frac{(x-a)^2}{h} + \frac{(y-b)^2}{k} = 1$. Explore and explain the significance of a , b , h and k .

$\pm \sqrt{h}$ represents the displacement on the x -axis.

$\pm \sqrt{k}$ represents the displacement on the y -axis.

When $h=k$, it forms a circle.

a and b are the center of the ellipse.

S3. Under what condition on the values of h and k would an ellipse become a circle?

When $h = k$, the displacements of both axis is the same, forming a circle.

S4. Draw the ellipse whose equation is given by $9x^2 + 4y^2 - 36x + 24y + 36 = 0$.

$$9x^2 + 4y^2 - 36x + 24y + 36 = 0$$

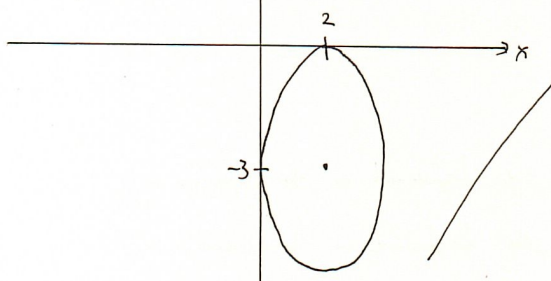
$$9x^2 - 36x + 4y^2 + 24y + 36 = 0$$

$$9(x^2 - 4x) + 4(y^2 + 6y) + 36 = 0$$

$$9(x - 2)^2 + 4(y + 3)^2 - 36 - 36 + 36 = 0$$

$$9(x - 2)^2 + 4(y + 3)^2 = 36$$

$$\frac{(x - 2)^2}{4} + \frac{(y + 3)^2}{9} = 1$$



$$\text{When } y + 3 = 0, (x - 2)^2 = 4$$

$$x = 2 \pm 2$$

$$\text{when } x - 2 = 0, (y + 3)^2 = 9$$

$$y = -3 \pm 3$$