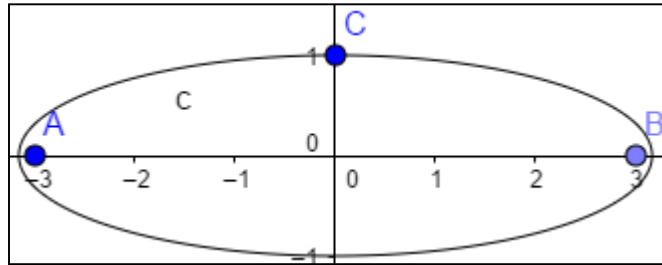
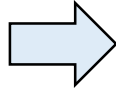
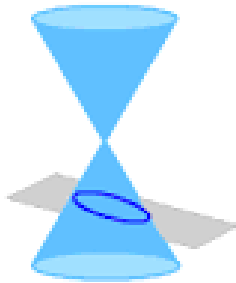


## Ellipses and Circles Guided Notes

An **Ellipse** is a curve formed by the intersection of a plane and a double cone such that the plane cuts the cone at an angle.



**Ellipse**

### Equations Representing Ellipses

The equations representing the ellipses are given below:

- **Ellipse with Horizontal Axis ( $a > b$ )**

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

- **Ellipse with Vertical Axis ( $b > a$ )**

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

### Foci of Ellipse

**Foci** are two fixed points such that the sum of distances between any point on Ellipse and these two points is a constant.

For **vertical ellipse**, foci are given as:

$$(h, k \pm c)$$

For **horizontal ellipse**, foci are given as:

$$(h \pm c, k)$$

where,

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

# Ellipses and Circles Guided Notes

## Major Axis and Minor Axis

**Vertices** are the points on the ellipse where the line passing through the foci and called **Major Axis** intersects the ellipse.

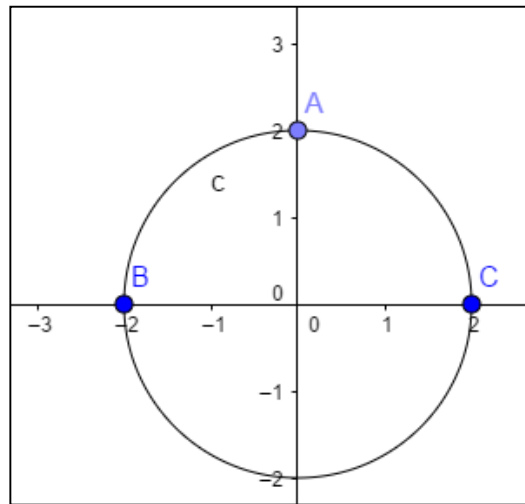
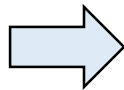
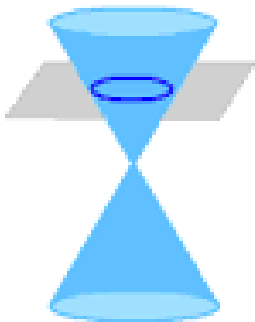
**Minor Axis** is the line perpendicular to major axis and intersects the ellipse at points called **Co-vertices**.

| Ellipse    | Vertices       | Co-Vertices    |
|------------|----------------|----------------|
| Vertical   | $(h, k \pm a)$ | $(h \pm b, k)$ |
| Horizontal | $(h \pm a, k)$ | $(h, k \pm b)$ |

**Problem 1:** Graph  $4x^2 + 25y^2 = 100$ . Identify the center, vertices, co-vertices and foci of the ellipse.

## Ellipses and Circles Guided Notes

A **Circle** is a curve formed by the intersection of a plane and a double cone such that the plane is perpendicular to the axis of cone.

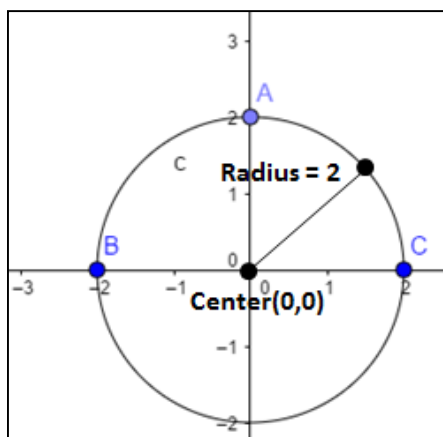


**Circle**

The equation of a circle is given as:

$$(x - h)^2 + (y - k)^2 = r^2$$

- $(h, k)$  is the **center** of the circle and is the point that is equidistant from all the points on the circle.
- $r$  is the radius of the circle and is the distance between the center and any point on the circle.



$$x^2 + y^2 = 4$$

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Ellipses and Circles Guided Notes

**Problem 2: Graph  $(x - 2)^2 + (y + 1)^2 = 16$ . Identify the center and radius of the circle.**