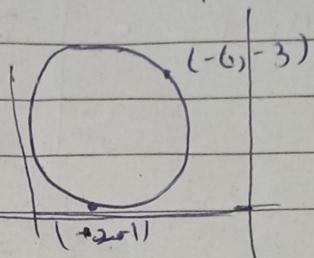


## Question No: 05

## part (a)

If  $P = (-2, -1)$  and  $Q = (-6, -3)$

are the end point of diameter of a circle, find the equation of the circle.



Mid point

$$\left( \frac{-2-6}{2} \right) \left( \frac{-1-3}{2} \right)$$

$$\frac{-8}{2}, \frac{-4}{2}$$

$$(-4, -2)$$

$$\text{equation of circle} = (x-h)^2 + (y-k)^2 = r^2 \quad \textcircled{1}$$

$$(x+4)^2 + (y+2)^2 = r^2$$

$$x \cdot (x, y) = (-2, -1)$$

$$(-2+4)^2 + (-1+2)^2 = r^2$$

$$(2)^2 + (1)^2 = r^2$$

$$4+1 = r^2$$

$$5 = r^2$$

$$r^2 = 5$$

put the values

$$(x+4)^2 + (y+2)^2 = 5$$

$\therefore$   $\therefore$

## part (b)

If the circle pass through  $(4, 0)$  and  $(0, 2)$  and center at  $y$ -axis  
then find the radius of the circle.

so/

equation of circle

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

$$\text{let } x=0, \therefore y=b$$

DATE: \_\_\_/\_\_\_/\_\_\_

at point (4, 0)

$$(4)^2 + (-b)^2 = r^2$$

$$16 + b^2 = r^2 \quad \text{--- (1)}$$

at point (0, 2)

$$(0)^2 + (2-b)^2 = r^2$$

$$(2-b)^2 = r^2 \quad \text{--- (2)}$$

compare eq (1) and eq (2)

$$16 + b^2 = (2-b)^2$$

$$16 + b^2 = 4 - 4b + b^2$$

$$16 + b^2 - b^2 - 4 + 4b = 0$$

$$12 + 4b = 0$$

$$4b = -12$$

$$\boxed{b = -3}$$

Put the values in eq (1)

$$\text{So, } r^2 = (4)^2 + (-3)^2$$

$$r^2 = 16 + 9$$

$$r = \pm 5$$

~~real~~ neglect -ve

$$\boxed{r = 5}$$

### part C :-

Find the equation of directrix of parabola  $y^2 = 100x$

$$y^2 = 100x$$

compare with

$$y^2 = 4ax$$

$$4a = 100$$

$$\boxed{a = 25}$$

equation of directrix =  $x = -a$

$$x = -25$$

**Part (d)**

Find the equation of the axis of the parabola  $x^2 = 24y$

$$x^2 = 24y$$

compare with

$$x^2 = 4ay$$

$$4a = 24$$

$$a = 8$$

so, focus is  $F(a, 0) = F(8, 0)$

and equation of directrix is

$$x = -a$$

$$\boxed{x = -8}$$

**Part e:-**

What is the major axis length for

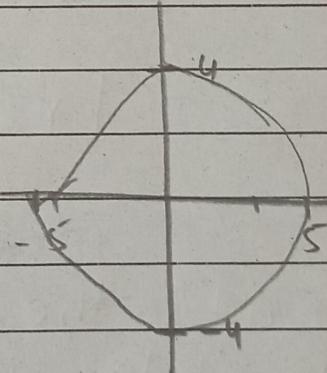
$$\text{ellipse } \frac{(x)^2}{25} + \frac{(y)^2}{16} = 1$$

compare with

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{x^2}{5^2} + \frac{y^2}{4^2}$$

$$a = 5$$

$$b = 4$$



$$= 1 - \frac{1}{5^2}$$

$$c = \sqrt{a^2 - b^2} = \sqrt{25 - 16} = \pm 3$$

$$F_1 = (3, 0)$$

$$F_2 = (-3, 0)$$

$$\begin{aligned} \text{length of major axis} &= 2a \\ &= 2(5) = 10 \end{aligned}$$

DATE: \_\_\_ / \_\_\_ / \_\_\_

### Part (F)

If length of major axis is 10 and minor is 8 and major axis is along x-axis then find the equation of ellipse.

$$\text{major axis} = 10$$

$$\text{minor axis} = 8$$

$$2a = 10$$

$$a = 5$$

$$2b = 8$$

$$b = 4$$

Equation of ellipse along x-axis.

$$\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 = 1$$

$$\left(\frac{x}{5}\right)^2 + \left(\frac{y}{4}\right)^2 = 1$$