North South University

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Quiz 1

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Ans. to the ques. no. 01

We need to find an equation which is perpendicular to the line : $y = \frac{1}{2}x + 4$ ... ①

and containing the point $(1, -2)$

From the equation no ① we find that,

$$\text{slope, } m_1 = \frac{1}{2}.$$

As the equation of is perpendicular with equation ①,

Hence, $m_1 \times m = -1$

$$\Rightarrow \frac{1}{2} \times m = -1$$

$$\Rightarrow m = -1 \times \frac{2}{1}$$

$$\therefore m = -2 \checkmark$$

So, slope of the equation is -2 and the containing point is $(1, -2)$.

By using point-slope form of an equation,

$$y + 2 = -2(x-1)$$

$$y + 2 = -2x + 2$$

$$\therefore 2x + y = 0$$

Thus the equation is $2x + y = 0$ $\checkmark$

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Ans. to the ques. no. 02

Given that,

the equation is $x^2 = -4y^2 + 4$

And the points are $(0,1)$; $(2,0)$; $(\frac{1}{2}, 2)$;

For point $(0,1)$,

Let us substitut the point on the given equation,

$$0^2 = -4 \cdot 1^2 + 4$$

$$\Rightarrow 0 = -4 + 4$$

$$\therefore 0 = 0 \quad ; \text{ which is true.}$$

Thus the point is on the graph of the given equation.

For point $(2,0)$,

Let us substitute the point on the given equation.

$$2^2 = -4 \cdot 0^2 + 4$$

$$\Rightarrow 4 = 0 + 4$$

$$\therefore 4 = 4 \quad ; \text{ which is true.}$$

Thus the point is on the graph of the given equation.

For point $\left(\frac{1}{2}, 2\right)$,

Let us substitut the point on the given equation

$$\left(\frac{1}{2}\right)^2 = -4 \cdot 2^2 + 4$$

$$\frac{1}{4} = -16 + 4$$

$$\frac{1}{4} = -12 \quad ; \text{ which is not true.}$$

Thus the point is not on the graph of the given equation.

Ans. to the ques. no. 03

Given that,

The equation of a circle is.

$$3(x+1)^2 + 3(y-1)^2 = 6$$

$$\Rightarrow 3\left\{(x+1)^2 + (y-1)^2\right\} = 6$$

$$\Rightarrow (x+1)^2 + (y-1)^2 = 2 \quad \cdots \cdots \, \bigoplus$$

$$\therefore \left\{x - (-1)\right\}^2 + \left\{y - (1)\right\}^2 = (\sqrt{2})^2 \quad \cdots \cdots \, \bigodot$$

The general form of a circle is,

$$(x-h)^2 + (y-k)^2 = r^2 \quad \cdots \text{(ii)}$$

Here, center $= (h, k)$

and radius $= r$

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By considering the ~~t~~equation ① and ⑪ we get that.

$$h = -1$$

$$k = 1$$

and $r = \sqrt{2}$

Thus the center is $(-1, 1)$ Ans

and radius is $\sqrt{2}$.

Ans

~~to~~ In order to find the x-intercept we let us pat $y=0$

in the given equation and solve it for x.

$$3(x+1)^2 + 3(0-1)^2 = 6$$

$$3(x+1)^2 + 3 = 6$$

$$(x+1)^2 = \frac{6-3}{3} = 1$$

$$\therefore x+1 = \sqrt{1} = \pm 1$$

$\therefore n+1 = +1$ and $n+1 = -1$

$\therefore n = 0$ $\therefore n = -2$

Thus the n intercepts are $0, -2.$ (0,0) (-2,0)

In order to find the y-intercept let us put $n=0$ in the

given equation and solve it for y.

$$3(0+1)^2 + 3(y-1)^2 = 6$$

$$3 + 3(y-1)^2 = 6$$

$$3(y-1)^2 = 3$$

$$(y-1)^2 = 1$$

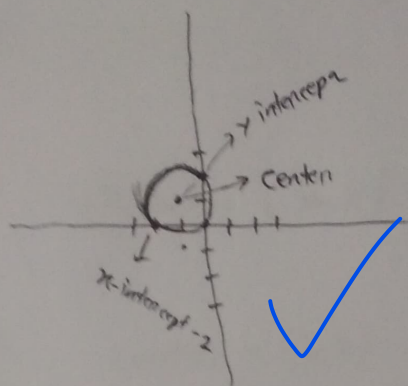$$y-1 = \sqrt{1} = \pm 1$$

$\therefore y-1 = 1$ and $y-1 = -1$

$y = 2$ $\therefore y = 0$

Thus the y intercepts are $2, 0.$ (0,0) (0,2)

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Ans to the que) no. 04
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Given that

End point of a diameter at $(1,4)$ and $(-3,2)$

Using mid point formula,

$$\bullet \text{ midpoint} = \text{center} = (h,k) = \left(\frac{1-3}{2}, \frac{4+2}{2}\right)$$

$$= (-1, 3)$$

By using distance formula,

$$\text{radius}, r = d \left(\text{enpoint } (1,4) \text{ and center } (-1,3)\right)$$

$$= \sqrt{(-1-1)^2 + (3-4)^2}$$

$$= \sqrt{4+1} \qquad = \sqrt{5}$$

We know that general equation of a circle is

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

Here, center $= (h, k)$

radius, $= r$

Thus the equation is,

$$(x+1)^2 + (y-3)^2 = 5 \quad \checkmark$$

In border to find x- intercept let us put $y = 0$ again in the given equation and solve it for x,

$$(x+1)^2 + (0-3)^2 = 5$$

$$(x+1)^2 + 9 = 5$$

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

$$x+1 = \sqrt{-4} \; ; \; \text{undefinde}$$

~~Thus x-intercept is 5.~~

Thus there is no x-intercept or x-intercept is undefined. $\checkmark$

In order to find y-intercept let us put $x=0$ in the given equation and solve it for y.

$$(0+1)^2 + (y-3)^2 = 5$$

$$1 + (y-3)^2 = 5$$

$$(y-3)^2 = 4$$

$$y-3 = \pm 2$$

$$y = \pm 2 + 3$$

$$\therefore y = 5 \text{ and } 1$$

Thus y intercepts are 5 and 1 $(0,1)(0,5)$

Ans. to the ques. no. 5