Discussion Assignment

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Introduction

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

- **Does the equation determine a relation between x and y**
  Yes the above equation clearly depicts a relationship between x and y, with (x, y) being points on a circle of radius 1 and center $(0, 2)$.

- **Can the variable x be seen as a function of y**
  Yes it can
  This can be achieved by making x the subject of the equation given above. we can express x as a function of y like $x = g(y)$

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

  Subtracting $(y-2)^2$ from both sides

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

  Next, we take the Square root of both the LHS and RHS

  $$x = \pm\sqrt{(1 - (y-2)^2)}$$

  Once this has been done we are left with an expression of $x = g(y)$ and this expresses x as a function of y, because for any value of y placed into the equation

  $$x = \pm\sqrt{(1 - (y-2)^2)}$$

  there would be an equivalent value of x gotten from it.

- **Can the variable y be seen as a function of x**
  Yes it can
  Just like with the variable x, y can also be seen as a function of x we can achieve this by making y the subject of the equation

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

and we start by subtracting x^2 from both sides of the equation

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

Next we open the brackets on the LHS by taking the square root of both the LHS and the RHS

$$y - 2 = \sqrt{1 - x^2}$$

We then add 2 to both sides, so that we are left with expression

$$y = 2 \pm \sqrt{1 - x^2}$$

And this equation satisfies the expression of $y = h(x)$ and proves that the variable y can be seen as a function of x

- **What will be the domain for these two functions? For the First function that expresses x as a function of y,**
  The domain would be

$$1 - (y-2)^2 \geq 0$$
$$(y-2)^2 \leq 1$$
$$y - 2 \leq \pm\sqrt{1}$$
$$-1 < y - 2 < 1$$

  Therefore the domain for this equation is

$$1 < y < 3$$

  For the Second function that expresses y as a function of x,
  The domain would be

$$1 - x^2 \geq 0$$
$$x^2 \leq 1$$
$$x \leq \pm\sqrt{1}$$
$$-1 \leq x \leq 1$$

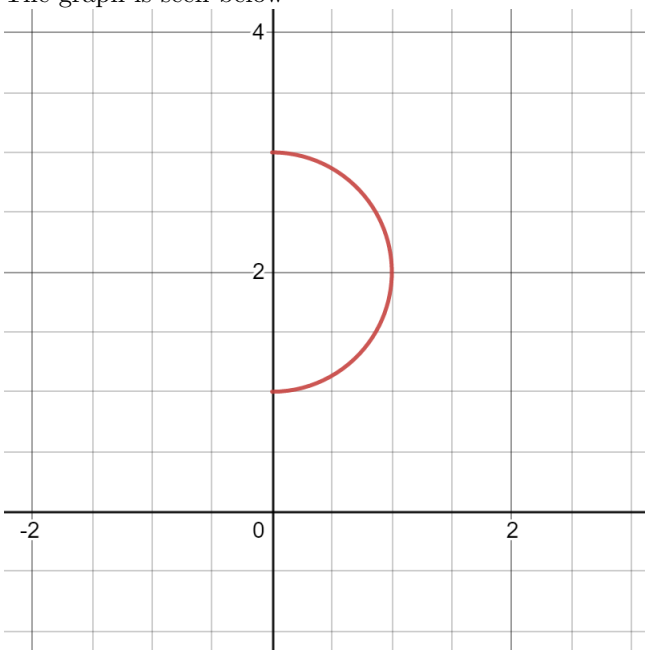
  Therefore the domain for this function is

$$-1 \leq x \leq 1$$

- **What are the graphs of these two functions?**
  For the function that expresses x as a function of y i.e

$$x = g(y)$$

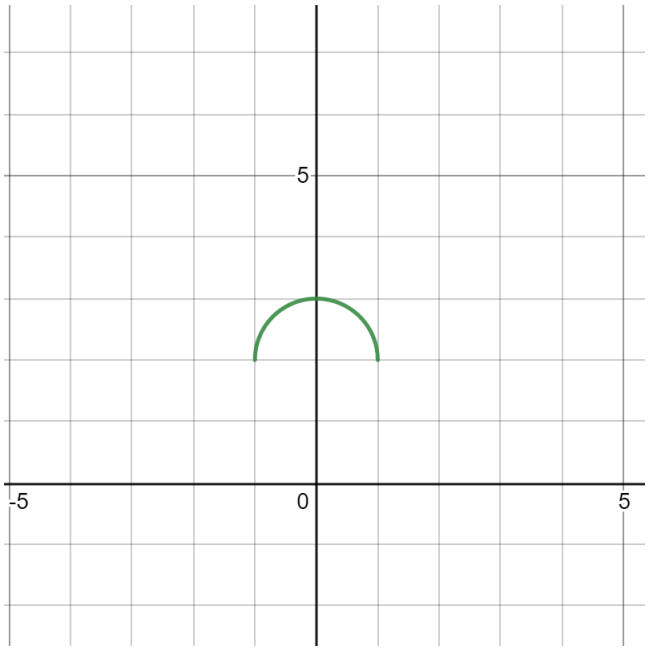
The graph is seen below



For the function that expresses y as a function of x i.e

$$y = h(x)$$

The graph is seen below



- **Are there points of the coordinate axes that relate to** $(0, 2)$ **by means of R**

  Yes all points on the circle has a distance of 1 to the center of the circle at $(0, 2)$