Assignment No. 2 **MTH201 (Fall 2022)**

Total Marks: 10

Due Date: 31th December, 2022

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DON'T MISS THESE: Important instructions before attempting the solution of this assignment:

- To solve this assignment, you should have good command over 15-22 lectures.
- Upload assignments properly through the LMS, No Assignment will be accepted

- **Also remember that you are supposed to submit your assignment in Word format, any other format like scanned images, etc. will not be accepted and be awarded zero marks**

Question 1: Find the area of the region R bounded by $y = x$ and $y = x^3$ in the first quadrant.

SOLUTION:

First, we find the coordinates of the point P

$y = x$ ... ... (1)

And

$y = x^3$ ... ... (2)

Comparing equation 1 and 2

$\Rightarrow x^3 = x$

$\Rightarrow x^3 - x = 0$

$\Rightarrow x(x^2 - 1) = 0$

$\Rightarrow x = 0,1,-1$

For the value of $x = 0$ *corresponding t*0 0(0,0)

For 1 *and* -1

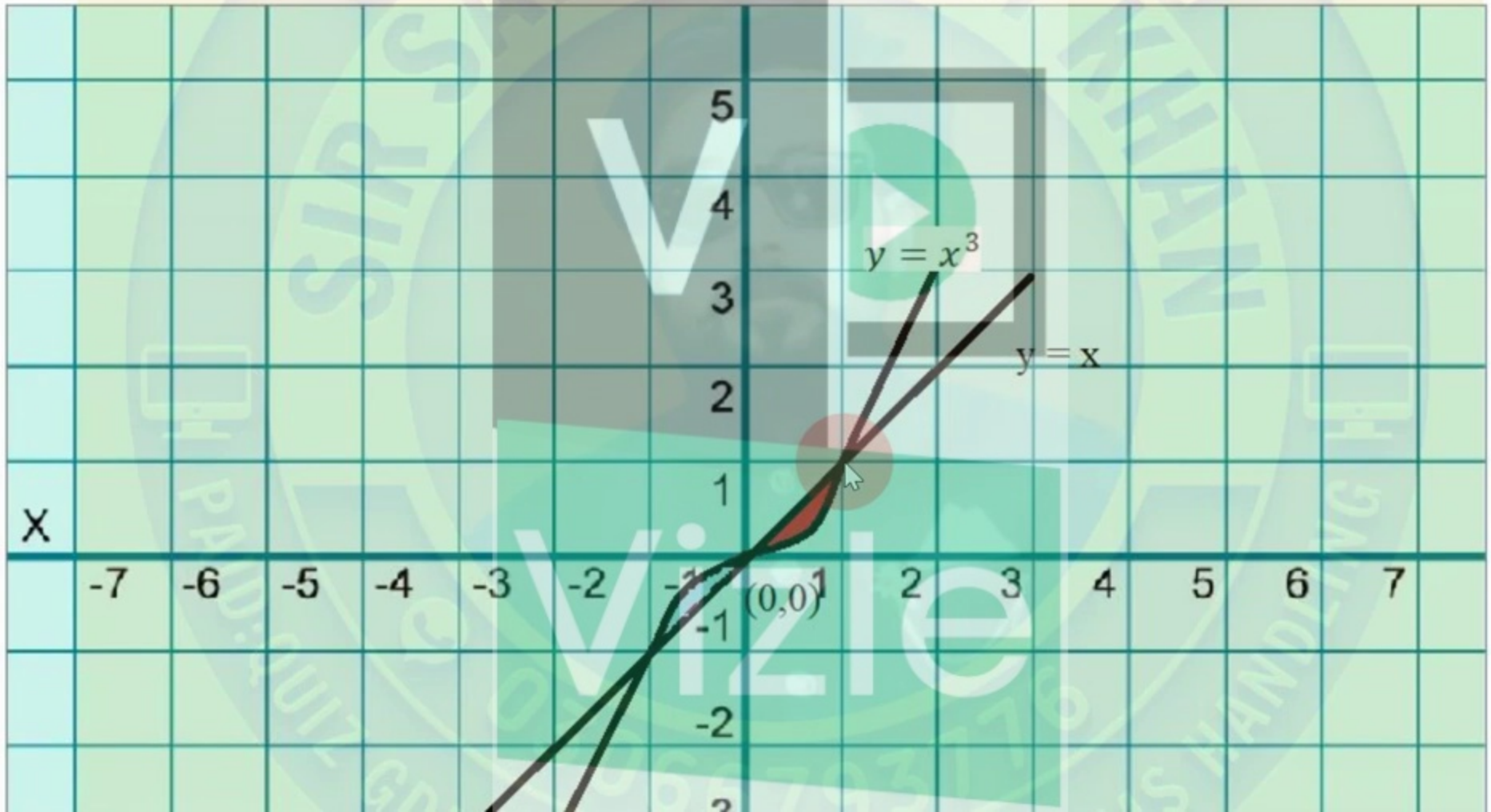
$y = x$ ..... (1)

And

$y = x^3$ ..... (2)

Comparing equation 1 and 2

$\Rightarrow x^3 = x$


5
4
3
2
1
X
-7
-6
-5
-4
-3
-2
-1
(0,0)
1
2
3
4
5
6
7
-1
-2
$y = x^3$
y = x

For the value of $x = 0$ *corresponding* $t0$ 0(0,0)

For 1 *and* -1

(1, 1) and (-1, -1)

Required Area in the first quadrant

$$A = \int_0^1 (x - x^3)dx$$

$$A = \left[\frac{x^2}{2} - \frac{x^4}{4}\right]_0^1$$

$$A = \left(\frac{1}{2} - \frac{1}{4}\right) - (0 - 0)$$

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$$A = \left(\frac{1}{2} - \frac{1}{4}\right) - (0 - 0)$$

$$A = \left(\frac{2-1}{4}\right)$$

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