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Course : CSE330

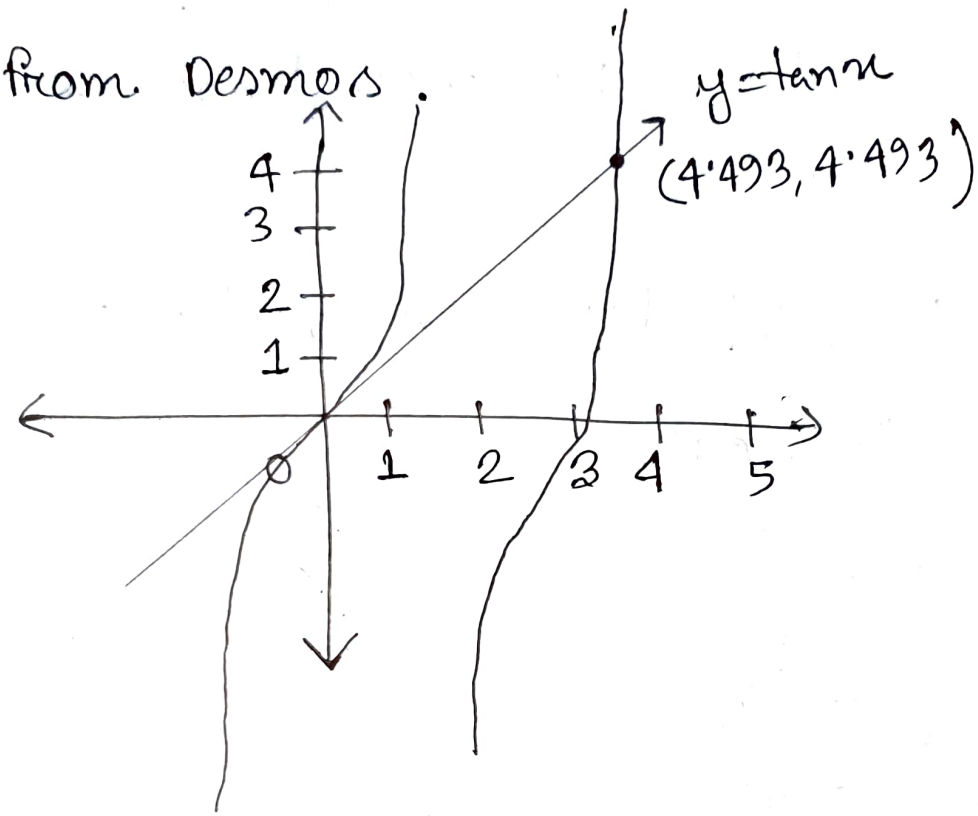
Section : 10

Assignment no: 06

Ans: to the que no: A

1

sketch from Desmos.



From the values of the graph, the first positive value of intersection point is (4·493, 4·

The positive value of x is in between [4, 5

for the graph $y = x$, $y = \tan x$.

2

Given interval is $[4,5]$. and the root for $f(x) = x - \tan x$ is in this interval.

Now, Using Bisection method:

Iteration 01:

$$c = \frac{a+b}{2}$$

$$= \frac{4+5}{2}$$

$$= 4.5$$

$$f(4.5) = -0.1373 < 0$$

New interval $[4, 4.5]$

Iteration 2:

$$c = \frac{4+4.5}{2}$$

$$= 4.25$$

$$f(4.25) = 2.2437 > 0$$

$\therefore$ $[4.25, 4.5]$

Iteration 03:

$$c = \frac{4.25 + 4.5}{2}$$

$$= 4.375$$

$$f(4.375) = 1.5244 > 0$$

New, interval = $[4.375, 4.5]$

Iteration 4:

$$c = \frac{4.375 + 4.5}{2}$$

$$= 4.4375$$

$$f(4.4375) = 0.8918 > 0$$

New interval = $[4.4375, 4.5]$

Iteration 5:

$$c = \frac{4.4375 + 4.5}{2} = 4.46875$$

$$f(4.46875) = 0.4459 > 0$$

New interval = $[4.46875, 4.5]$

Iteration 07:

$$c = \frac{4.46875 + 4.5}{2} = 4.484375$$

$$f(4.484375) = 0.1749 > 0$$

Interval = $[4.484375, 4.5]$

Iteration 07:

$$c = \frac{4.484375 + 4.5}{2}$$

$$= 4.4921875$$

$$f(4.4921875) = 0.024570$$

Interval now = $[4.4921875, 4.5]$

Iteration 08:

$$c = \frac{4.4921875 + 4.5}{2}$$

$$= 4.49609375$$

$$f(4.49609375) = -0.0549 < 0$$

$\therefore$ Interval = $[4.4921875, 4.49609375]$

Iteration: 9

$$c = 4.494140625$$

$$f(4.494140625) = -0.0148 < 0$$

$\therefore$ Interval $= [4.4921875, 4.494140625]$

Iteration 10

$$c = \frac{a+b}{2}$$

$$= 4.493164063$$

$\therefore$ Approximate first positive value $= 4.493164063$

Ans: to the que no: B

(1)

$$f(x) = x - \tan x$$

$$x \in I = [4, 5]$$

$$f(x) = 0$$

$$\therefore f\, x - \tan x = 0$$

Now

$$g(x) = \tan(x)$$

$$\Rightarrow g(x) = \tan^{-1}(x)$$

$$g(x) = \sin^{-1}(x.\cos(x))$$

Putting values 4, 5, 4.5 the solution can not reach to the solution. Ans $\notin I$.

$$\therefore g(x) = \pi + \tan^{-1}(x), \text{ over } [4, 5]$$

$$\therefore g(x) = \pi + \tan^{-1}(x)$$

2

Letting, $x_0 = 4.5$

$x_1 = g(4.5)$

$= 4.09372$

$x_2 = g(4.49372) = 4.49342$

$x_3 = g(4.49342) = 4.4937$.