MTH-101AA, Quiz II, 29-01-2021
Question 1, 5:10-5:20 PM

(1) Discuss the convergence or divergence of the improper integral

$$\int_0^2 \frac{x(1+sin^2x)}{2-x}\,dx.$$

[4]

MTH-101AA, Quiz II, 29-01-2021
Question 2, 5:20-5:32 PM

(2) Let $f : [0, 1] \to \mathbb{R}$ be a differentiable function such that $\int_0^1 f(t)dt = 1$ and $f(0) = 0$. Show that there exists $c \in (0, 1)$ such that $f'(c) = 2$. [5]

MTH-101AA, Quiz II, 29-01-2021
Question 3, 5:32-5:45PM

(3) Let R be the region bounded by the y-axis, the line $y = 2x$ and the curve $y = 3-x^2$. Let S_1 be the solid obtained by revolving R about the x-axis and S_2 be the solid obtained by revolving R about the line $y = -1$. Find the volume of S_1 by the Washer Method and the volume of S_2 by the Shell Method. [6]