

MATH 102-Take Home Quiz 4

Write clear solution of each solution in order and Submit it on Monday (Dec 6) in the Class

Q1.

Integrate showing complete work:

i. $\int_0^1 \frac{\sqrt[4]{x}}{1+\sqrt{x}} dx$

ii. $\int \tan^{-1}\left(\frac{1}{x}\right) dx$

iii. $\int \frac{6x^2 - 5x + 5}{(x+1)(x-1)^2} dx$

iv. $\int_{-2}^2 \frac{3-2x}{x^2+4x+20} dx$

v. $\int \frac{\sqrt{\tan x}}{\cos^4 x} dx.$

vi. $\int \cos^5 x \csc x dx.$

vii. $\int \frac{3x^2+13x+12}{(x+1)(x^2+4x+5)} dx.$

viii. $\int x^5 e^{-4x^3} dx.$

ix. $\int \sqrt{1+\sqrt{x}} dx.$

Q2. Does the improper integral converge? If so, find its value.

i. $\int_0^1 \frac{x}{x^2-1} dx$

ii. $\int_0^2 \frac{x}{x^2-1} dx$

iii. $\int_0^{\infty} \frac{1}{e^x + e^{-x}} dx$

Q.3 Decompose into partial fractions.

i. $\frac{3x^3 - x^2 + 7x - 1}{x^4 + 4x^2 + 3}.$

ii. $\frac{x^2 + 1}{x^3 + 2x^2 + x}.$

Q4. Find the average value of the function $f(t) = te^{-t^2}$ on interval $[0,5]$. Also, find the value of c that satisfies the Mean Value Theorem of Integrals.