

Q: Find homomorphism $\phi: \frac{\mathbb{Z}^*}{\langle 7 \rangle} \rightarrow \frac{\mathbb{Z}^*}{\langle 11 \rangle}$.

where $\frac{\mathbb{Z}^*}{\langle 7 \rangle}$ & $\frac{\mathbb{Z}^*}{\langle 11 \rangle}$ are group under multiplication

Also find $\text{Ker } \phi$ & $\text{Im } \phi$.

Q: Find the tangent of curve $r(t) = (\cos t, \sin t, t/2)$ at $t = 2\pi$. Also find its intersection with xy -plane.

Q: $\int_0^1 \int_0^2 e^{x^2} dx dy$.

Q: Find the orthogonal projection P' of $(-1, 1, 1)$ where $\mathbb{R}^3 \rightarrow V$ (Euclidean plane) the plane is given by $3x - y + 2z = 0$. Also find the distance b/w P and P' .

Q: $f = xy^2 - yx^2$ on the boundary of rectangle $0 \leq x \leq 1$ & $0 \leq y \leq 1$. Why its extremum exists? Find its maximum value.

Q: The ideal $\langle x^2 + 2 \rangle$ is prime but not maximal in

$$\mathbb{R}[x], \quad \mathbb{Z}_5[x], \quad \mathbb{Z}_4[x], \quad \mathbb{Z}[x]$$

Q: If eigen value of vector A is 3 and corresponding vector is $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and second eigen value is (-2) & corresp. eigen vector is $\begin{bmatrix} \quad \\ \quad \end{bmatrix}$.

Find $A \begin{bmatrix} 3 \\ 2 \end{bmatrix}$

$$\begin{bmatrix} -1 \\ 1 \end{bmatrix}, \quad \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \quad \begin{bmatrix} 0 \\ 0 \end{bmatrix},$$

Q: $\sum \frac{(e)^{n^2}}{n!} x^n$ is convergent in the interval

Q: $\phi(x) = \int_{\sqrt[3]{x}}^{x^2} t \, dt$ Find $\phi'(0)$

Q: Find the perpendicular to the tangent (was given 2 parametric eqns)

Q: Given was $x(t) = 4t^3 - 3t^2$ $y(t) = t - 1/t$. find the eqn of tangent line at $(8, 80)$.

Q: If $f: \mathbb{R}/\{-1, 1\} \rightarrow \{-2, 0, 2\}$ is cont and surjective then max. value of $f(-10) + f(-2) + f(4)$

a) 0, b) 1, c) 4, d) 2.