Question 1

Correct

Mark 5.00 out of 5.00

Evaluate $\iiint x^2\,dx\,dy\,dz$ throughout the volume of the tetrahedron $x \geq 0,\ y \geq 0,\ z \geq 0$, and $\frac{x}{a}+\frac{y}{b}+\frac{z}{c} \leq 1$.

a) $\frac{a^3}{60}$ b) $\frac{a^3b^2}{20}$ c) $\frac{a^3bc}{60}$ d) $\frac{a^3c^2}{60}$

Select one:

- c ✔
- b
- d
- a

Question 2

Correct

Mark 5.00 out of 5.00

Evaluate $I(a)=\int_0^\infty \frac{e^{-x}\sin ax}{x}dx$ using DUIS rule

Step1: Differentiate with respect to parameter

(a) $\frac{dI}{da}=\int_0^\infty e^{-x}\cos x\,dx$ (b) $\frac{dI}{da}=\int_0^\infty e^{-x}\sin ax\,dx$

(c) $\frac{dI}{da}=\int_0^\infty e^{-x}\sin x\,dx$ (d) $\frac{dI}{da}=\int_0^\infty e^{-x}\cos ax\,dx$

Step2: Integrate with respect to parameter

(a) $I(a)=\tan^{-1}a+c$ (b) $I(a)=\frac{1}{a}\tan^{-1}a+c$

(c) $I(a)=\cot^{-1}a+c$ (d) $I(a)=\frac{1}{a}\cot^{-1}a+c$

Step3: substitution for parameter

(a) $a=0$ (b) $a=\pi$

(c) $a=\infty$ (d) $a=-x$

Step4: Value of Integral

(a) $I(a)=\tan^{-1}a$ (b) $I(a)=\tan^{-1}a+\pi/2$

(c) $I(a)=\frac{1}{a}\cot^{-1}a+\pi/2$ (d) $I(a)=\cot^{-1}a+\pi/2$

Answer for [step 1] is

Answer for [step 1] is

(d) ✔ (c) (a) (b)

Answer for [step2] is

(c) (a) ✔ (b) (d)

Answer for [step3] is

(d) (a) ✔ (b) (c)

Answer for [step 4] is

(d) (b) (a) ✔ (c)

Question 3

Correct

Mark 5.00 out of 5.00

Find Eigen Value and Eigen Vector of Matrix A

$$\begin{bmatrix} -2 & 5 & 4 \\ 5 & 7 & 5 \\ 4 & 5 & -2 \end{bmatrix}$$

Characteristics equation is $\lambda^3 + a\lambda^2 + b\lambda + c = 0$

Then a = -3 ✔

b = -90 ✔

c = -216 ✔

The largest eigen value λ_1 is 12 ✔

The Second largest eigen value λ_2 is -3 ✔

The largest eigen value λ_1 is 12 ✔

The Second largest eigen value λ_2 is -3 ✔

The Smallest eigen value λ_3 is -6 ✔

Eigen vector for λ_1 is $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ if x =1 then y = 2 ✔ and z = 1 ✔

Eigen vector for λ_2 is $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ if z = 1 then y = -1 ✔ and x = 1 ✔

Eigen vector for λ_3 is $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ if y = 0 then x = 1 ✔ and z = -1 ✔

Question 4

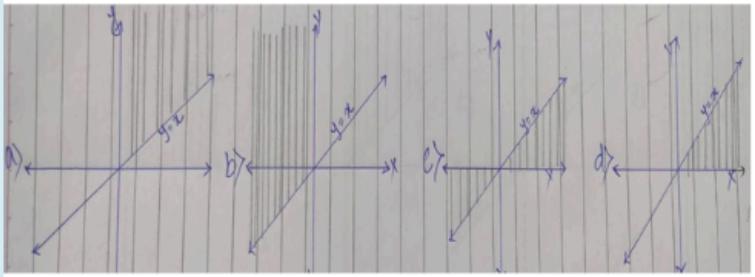
Correct

Mark 5.00 out of 5.00

Change the order of integration and evaluate

$\int_0^a \int_y^a \frac{x}{x^2+y^2}\, dxdy$.

[1] The region of the integration is



[2] The integral after changing the order is

a) $\int_0^a \int_0^a \frac{x}{x^2+y^2}\, dydx$

b) $\int_0^a \int_x^a \frac{x}{x^2+y^2}\, dxdy$

c) $\int_0^a \int_y^a \frac{x}{x^2+y^2}\, dxdy$

d) $\int_{-a}^a \int_y^a \frac{x}{x^2+y^2}\, dydx$

[3] The value of integral is

a) $\frac{a}{4}$ b) $\frac{\pi a}{4}$ c) $\frac{\pi}{4}$ d) $\frac{\pi a}{2}$

Answer for [1] is

(d) ✔ (a) (c) (b)

Answer for [2] is

(a) ✔ (c) (a) (b)

Answer for [3] is

(b) ✔ (c) (d) (a)

Question 5

Correct

Mark 5.00 out of 5.00

If matrix $A = \begin{bmatrix} 4 & 4 \\ -3 & 3 \end{bmatrix}$ and SVD of matrix A is $A = UDV^T$, choose the correct options for the following questions

1. Matrix for A^TA is
   (a)- $\begin{bmatrix} 25 & -7 \\ 7 & 25 \end{bmatrix}$ (b)- $\begin{bmatrix} 25 & 7 \\ 7 & 25 \end{bmatrix}$ (c)- $\begin{bmatrix} -25 & 7 \\ 7 & 25 \end{bmatrix}$ (d)- $\begin{bmatrix} 25 & 7 \\ 7 & -25 \end{bmatrix}$
2. Eigen Values for A^TA are (a)-(32,18) (b)-(16,9) (c)-(32,9) (d)-(16,18)
3. matrix D is
   (a)- $\begin{bmatrix} \sqrt{32} & 0 \\ 0 & \sqrt{18} \end{bmatrix}$ (b)- $\begin{bmatrix} 0 & \sqrt{16} \\ \sqrt{9} & 0 \end{bmatrix}$ (c)- $\begin{bmatrix} 0 & \sqrt{32} \\ \sqrt{9} & 0 \end{bmatrix}$ (d)- $\begin{bmatrix} \sqrt{16} & 0 \\ 0 & \sqrt{18} \end{bmatrix}$
4. matrix V is
   (a)- $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$ (b)- $\begin{bmatrix} 1/\sqrt{2} & 1 \\ 1/\sqrt{2} & -1 \end{bmatrix}$ (c)- $\begin{bmatrix} 1/\sqrt{2} & 1/\sqrt{2} \\ 1 & -1 \end{bmatrix}$ (d)- $\begin{bmatrix} 1/\sqrt{2} & 1/\sqrt{2} \\ 1/\sqrt{2} & -1/\sqrt{2} \end{bmatrix}$
5. matrix U is
   (a)- $\begin{bmatrix} 1/\sqrt{2} & 0 \\ 0 & -1/\sqrt{2} \end{bmatrix}$ (b)- $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ (c)- $\begin{bmatrix} 1/\sqrt{2} & 0 \\ -1/\sqrt{2} & 0 \end{bmatrix}$ (d)- $\begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix}$

Answer for [1] is

(c) (d) (b) ✔ (a)

Answer for [2] is

(d) (b) (c) (a) ✔

Answer for [3] is

(b) (c) (a) ✔ (d)

Answer for [4] is

(d) ✔ (c) (b) (a)

Answer for [5] is

(b) ✔ (d) (a) (c)

Finish review

◀ Tutorial 9-(All divisions)

Jump to...