Abdul Aziz 13741 CMC

Q:1:

Sol:

$$\int_1^4 \int_1^{x^2} (2x + 6xy)\, dy\, dx$$

$$\int \left(2xy + \frac{6xy^2}{2} \right)\Bigg|_1^4 dx$$

$$\int \Big((8x + 48x^2) - (2x + 3x^2) \Big)\, dx$$

$$\int (6x + 45x^2)\, dx$$

$$\frac{6x^2}{2} + \frac{45x^3}{3}$$

$$= 3x^2 + 15x^3$$

Q 4:-

We want to determine the angle b/w planes

$4x + 2y - 6z = 10$ and xz plane.

Direction ratios of plane α are 4, 2, -6 and

Direction ratios of plane β 0, 0, 1

if angle b/w two planes having direction ratios a_1, b_1, c_1 and a_2, b_2, c_2 is Q, then,

$$\cos Q = \left| \frac{a_1 a_2 + b_1 b_2 + c_1 c_2}{\sqrt{a_1^2 + b_1^2 + c_1^2}\sqrt{a_2^2 + b_2^2 + c_2^2}} \right|$$

Therefore if the angle b/w planes α and β is Q then

$$\cos Q = \left| \frac{4 \times 0 + 2 \times 0 - 6 \times 1}{(4^2 + (-2) + 2^2)\sqrt{0^2 + 0^2 + 1^2}} \right|$$

$$= \left| \frac{6}{\sqrt{18}} \right| = \frac{1}{3}$$

The angle b/w them

$\frac{1}{3}$

Q2: $(5, -2, 4)$

$$3x + y - 6z + 8 = 0$$

$$\Rightarrow \quad 3x + y - 6z = -8$$

Find normal vector of the plane by taking co-efficients of the equation for the plane.

Normal Vector $= (3, 1, -6)$.

Because normal vector is perpindicular to the plane, we can use it as the direction vector for the line. Using the given point and normal vector. We can find the equation for the line.

$$l : (5, -2, 4) + t(3, 1, -6).$$

in parametric form:

$$x = 5 + 3t$$

$$y = -2 + t$$

$$z = 4 - 6t$$

Q:

$x = \sin^{-1}\sqrt{5}$

$\sin x = \sqrt{5}$

$\sin x = 2.2360$

$x = \sin(2.23)$

$x = 0.790$

$\sin x = \sin(2.2360)$

$x = 2.2360$

Range

$\sin^{-1}\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ Q, −Q