NAME ADNAN

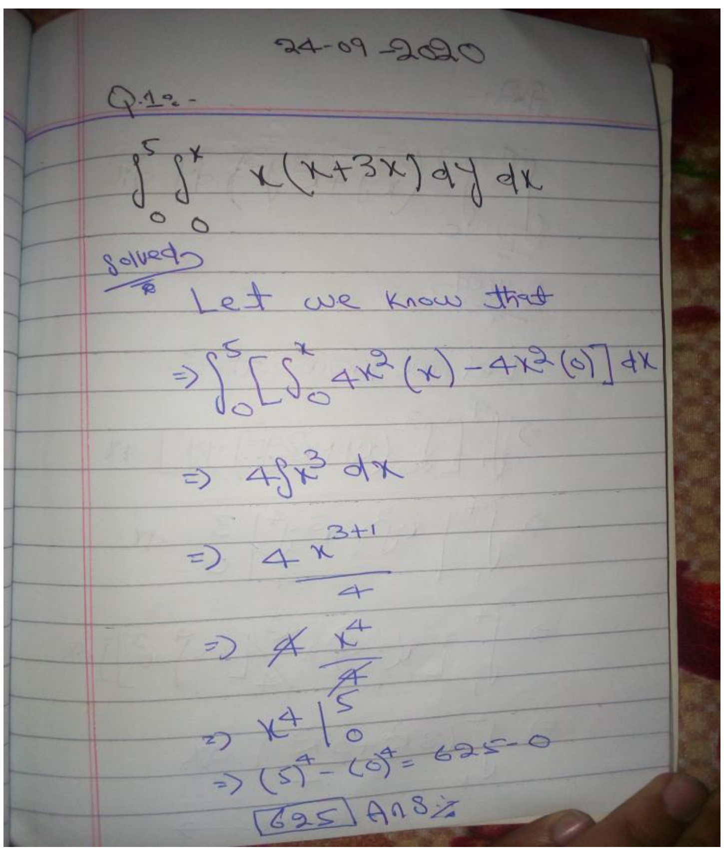
ID 13507

SUBJECT MULTIVARIATE CALCULUS…

Q1.

Solved.

$$\int_0^5 \int_0^x x\ (x + 3x)dydx$$



24-09-2020

Q.1:-

$$\int_0^5 \int_0^x x(x+3x)\,dy\,dx$$

Solved:

Let we know that

$$\Rightarrow \int_0^5 \left[\int_0^x 4x^2(x) - 4x^2(0)\right] dx$$

$$\Rightarrow 4\int x^3\,dx$$

$$\Rightarrow 4\,\frac{x^{3+1}}{4}$$

$$\Rightarrow \cancel{4}\,\frac{x^4}{\cancel{4}}$$

$$\Rightarrow x^4 \Big|_0^5$$

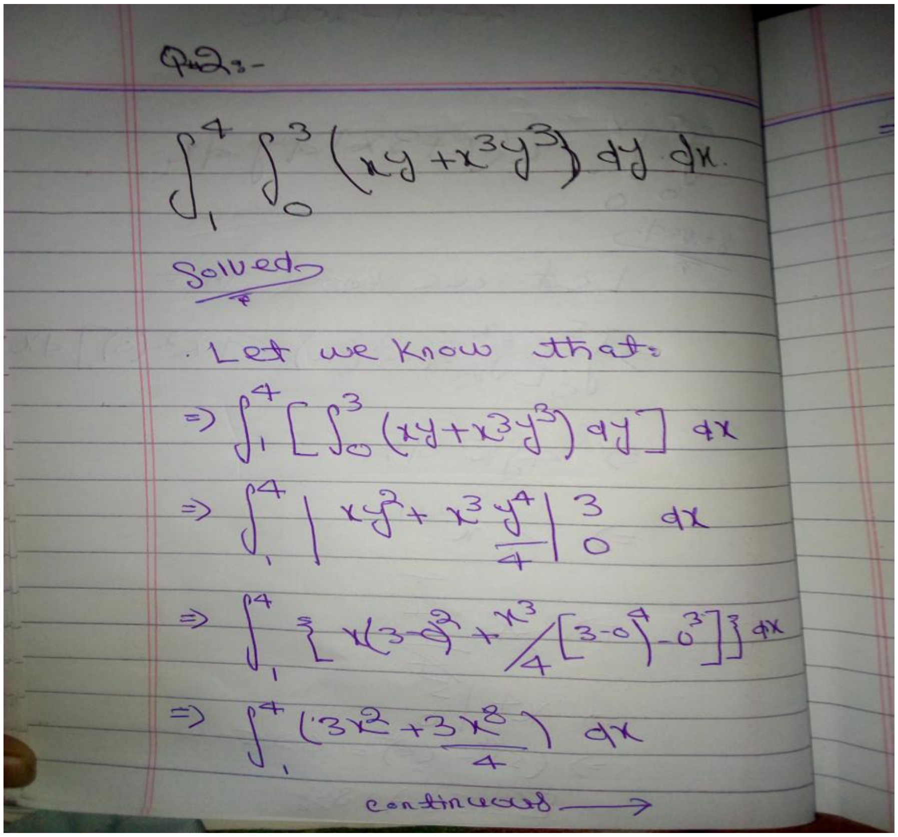
$$\Rightarrow (5)^4 - (0)^4 = 625 - 0$$

$\boxed{625}$ Ans:/.

Q2.

Solved.

$\int_1^4 \int_0^3 (xy + x^3y^3)dydx$



Q#2:-

$$\int_1^4 \int_0^3 (xy + x^3y^3)\, dy\, dx.$$

Solved:

Let we know that:

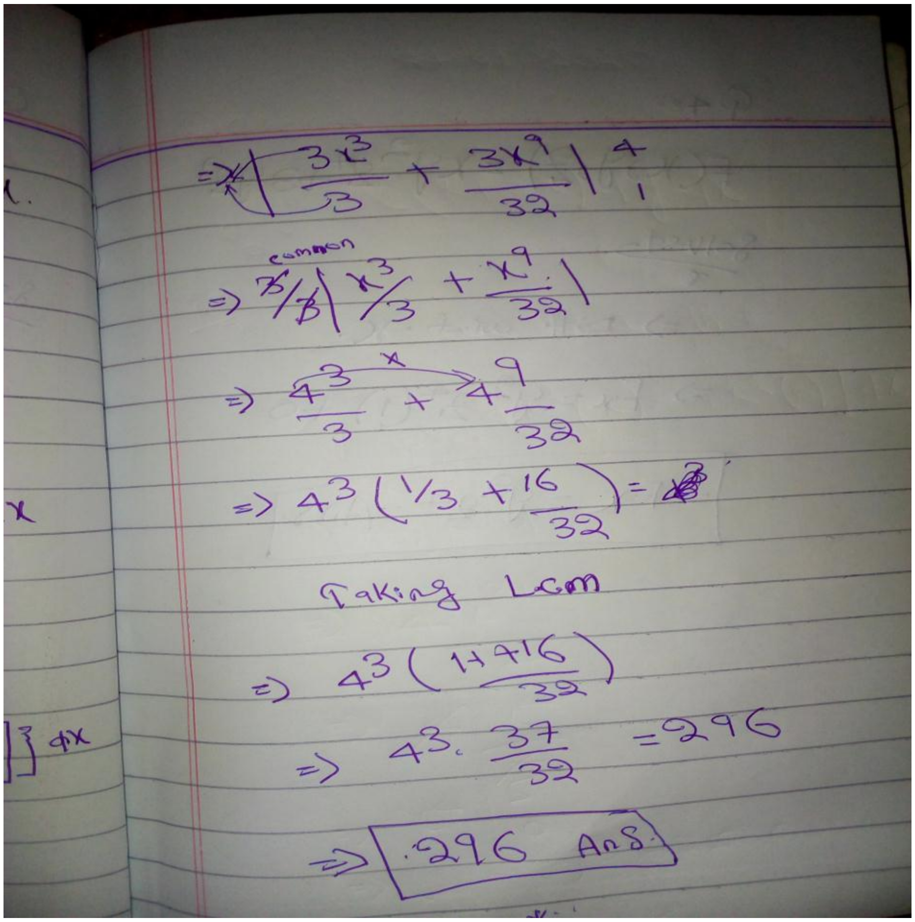
$$\Rightarrow \int_1^4 \left[\int_0^3 (xy + x^3y^3)\, dy \right] dx$$

$$\Rightarrow \int_1^4 \left| xy^2 + x^3 \frac{y^4}{4} \right|_0^3 dx$$

$$\Rightarrow \int_1^4 \left\{ x(3-0)^2 + \frac{x^3}{4}\left[(3-0)^4 - 0^3\right] \right\} dx$$

$$\Rightarrow \int_1^4 \left(3x^2 + \frac{3x^8}{4} \right) dx$$

continuous →



$$\Rightarrow \cancel{x}\left| \frac{3x^3}{3} + \frac{3x^9}{32} \right|_1^4$$

common

$$\Rightarrow \cancel{3}/\cancel{3} \left| x^3/3 + \frac{x^9}{32} \right|$$

$$\Rightarrow \frac{4^3}{3} + \frac{4^9}{32}$$

$$\Rightarrow 4^3\left(1/3 + \frac{16}{32}\right) =$$

Taking LCM

$$\Rightarrow 4^3\left(\frac{1+16}{32}\right)$$

$$\Rightarrow 4^3 \cdot \frac{37}{32} = 296$$

$$\Rightarrow \boxed{296 \text{ Ans.}}$$

Q3.

Solved.

fr (r,s) = r.ln(r^3 +s^2)

Find partial derivatives, fr(r,s) and fs (r,s)
f (r,s) = d/dr[rln(r ^{3}.+ s ^{3}.)]

Using product rule…

$fr(r,s) = r\,d/dr[\ln(r^3.+ s^3.)] + \ln(r^3.+ s^3.)\,d/dr[r]$

$fr(r,s) = r(3r/ r^3.+ s^3) + \ln(r^3.+ s^3.)\,(1)$

simplify

$fr(r,s) = 3r^3/ r^3.+ s^3. + \ln(r^3.+ s^3.)$

And

$fs(r,s) = d/ds[r\ln(r^3.+ s^3.)]$

Pull out the constant

$fs(r,s) = r\,d/ds[\ln(r^3.+ s^3.)]$

$fs(r,s) = r(3s/ r^3.+ s^3)$

simplify

$fs(r,s) = 3rs/ r^3.+ s^3$

$fr(r,s) = 3r^3/ r^3.+ s^3 + \ln(r^3.+ s^3)$: $fs(r,s) = 3r^3/ r^3.+ s^3$

ANS.

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Q4.

Solved.

Finding partial derivatives w.r.t “x”

$F(x,y,z) = xy^2z^4 + 3yz^2$

We know that…

Q 48-

$$F(x,y,z) = xy^2z^4 + 3yz^2$$

Solved

$\Rightarrow$ Diff w.r.t. x.

$$\Rightarrow F_x = y^2z^4(1) + 0$$

$$\boxed{= F_x = y^2z^4 \quad \text{Ans.}}$$

Q5.

Solved.

Find the value of x and y

$8x - y = -1, \quad 7x - y = -2$

$8x - y = -1$ (equation 1)

$7x - y = -2$ (equation 2)

Equation 1 subtract from equation 2…

$8x - y = -1$

$+ \quad 7x - y = -2$

$-$ ------------------

$X = 1$

Put x =1 in equation 1.

$8(1) - y = -1$

$8 - y = -1$

$8 + 1 = y$

$Y = 9$

So x= 1 and y= 9. ANS…

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