$= \int_0^1 y^3 \times 2y\,dy + (y^2+y)\,dy$

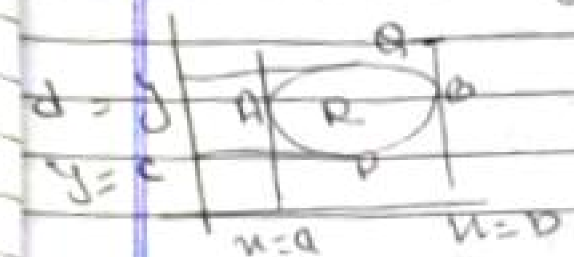
$= \left[\frac{2y^5}{5} + \frac{y^3}{3} + \frac{y^2}{2}\right]_0^1 = \left[2/5 + 1/3 + 1/2\right] = \frac{37}{30}$

(*) Green's theorem :
proof and statement

Statement : If $f_1(x,y)$ and $f_2(x,y)$, $\frac{\partial f_1}{\partial y}$ and $\frac{\partial f_2}{\partial x}$ be continuous functions defined in a region R of the xy plane bounded by a simple closed curve C,

then $\oint_C \vec{F}\cdot d\vec{r} = \iint_R \left(\frac{\partial f_2}{\partial x} - \frac{\partial f_1}{\partial y}\right) dx\,dy$

$= \int_C (f_1\,dx + f_2\,dy)$



Proof :
consider such a region R of the xy-plane bounded by any simple closed curve (path) C which is cut by a ~~plane~~ line parallel to the co-ordinate axes & that the curve C is broken into two curves.
Let the region R be bounded by the line $y = c$, $y = d$
$x = g_1(y)$, $x = g_2(y)$ the curves A, B, P, Q.
(BQA)

Case - I : $P = Q$ (D)

$= \int_0^1 y^3 \times 2y\,dy + (y^2+y)\,dy$

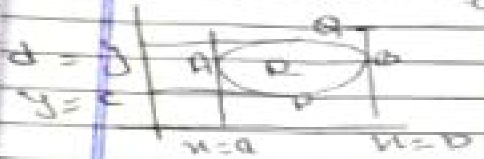
$= \left[\frac{2y^5}{5} + \frac{y^3}{3} + \frac{y^2}{2}\right]_0^1 = \left[2/5 + 1/3 + 1/2\right] = \frac{37}{30}$

(x) Green's theorem :
proof and statement

Statement : If $f_1(x,y)$ and $f_2(x,y)$ $\frac{\delta f_1}{\delta y}$ and $\frac{\delta f_2}{\delta x}$ be a continuous functions defined in a region R of the xy plane bounded by a closed curve C,

then $\oint_C \vec{F}\cdot d\vec{R} = \iint_R \left(\frac{\delta f_2}{\delta x} - \frac{\delta f_1}{\delta y}\right) dx\,dy$

$= \int_C (f_1\,dx + f_2\,dy)$



Proof :

consider such a region R of the xy-plane bounded by any simple closed curve(path) C which is cut by a ~~plane~~ line parallel to the co-ordinate axes & that the curve C is broken into two curves.

Let the region R be bounded by the line y = c, y = d

$x = g_1(y)$, $x = g_2(y)$ the curves A, B, P, Q.

case - I : P = Q

$= \int_0^1 y^3 \times 2y\,dy + (y^2+y)\,dy$

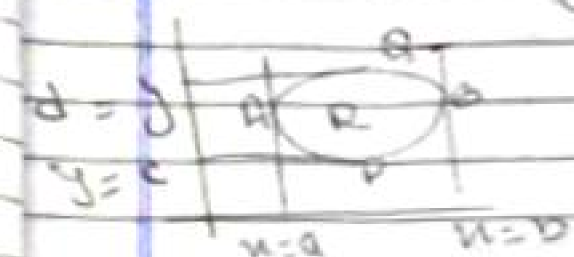
$= \left[\frac{2y^5}{5} + \frac{y^3}{3} + \frac{y^2}{2}\right]_0^1 = \left[2/5 + 1/3 + 1/2\right] = \frac{37}{30}$

(x) Green's theorem :
proof and statement

Statement : If $f_1(x,y)$ and $f_2(x,y)$ $\frac{\delta f_1}{\delta y}$ and $\frac{\delta f_2}{\delta x}$ be a continuous functions defined in a region R of the xy plane bounded by a simple closed curve C,

then $\oint_C \vec{F}\cdot d\vec{R} = \iint_R \left(\frac{\delta f_2}{\delta x} - \frac{\delta f_1}{\delta y}\right) dx\,dy$

$= \int_C (f_1\,dx + f_2\,dy)$



Proof :
consider such a region R of the xy-plane bounded by any simple closed curve (path) C which ~~so~~ is cut by a ~~plane~~ line parallel to the co-ordinate axes & that the arc C is broken into two curves.
Let the region R be bounded by the line $y=c$, $y=d$
$x = g_1(y)$, $x = g_2(y)$ the curves A, B, P, S.

Case-I : $P = Q$ (zero)

$= \int_0^1 y^3 \times 2y\,dy + (y^2+y)\,dy$

$= \left[\frac{2y^5}{5} + \frac{y^3}{3} + \frac{y^2}{2}\right]_0^1 = \left[2/5 + 1/3 + 1/2\right] = \frac{37}{30}$

(x) Green's theorem :
proof and statement

Statement : If $f_1(x,y)$ and $f_2(x,y)$, $\frac{\partial f_1}{\partial y}$ and $\frac{\partial f_2}{\partial x}$ be continuous functions defined in a region R of the xy plane bounded by a simple closed curve C,

then $\oint_C \vec{F}\cdot d\vec{r} = \iint_R \left(\frac{\partial f_2}{\partial x} - \frac{\partial f_1}{\partial y}\right) dx\,dy$

$= \int_C (f_1\,dx + f_2\,dy)$

Proof :

consider such a region R of the xy-plane bounded by any simple closed curve (path) C which is cut by a ~~plane~~ line parallel to the co-ordinate axes & that the curve C is broken into two curves.

Let the region R be bounded by the line $y=c$, $y=d$ $x = g_1(y)$, $x = g_2(y)$ the curves A, B, P, Q.

Case - I : P = Q

$= \int_0^1 y^3 x 2y\,dy + (y^2 + y)\,dy$

$= \left[\frac{2y^5}{5} + \frac{y^3}{3} + \frac{y^2}{2}\right]_0^1 = \left[2/5 + 1/3 + 1/2\right] = \frac{37}{30}$

(x) Green's theorem :
proof and statement

Statement : If $f_1(x, y)$ and $f_2(x, y)$, $\frac{\partial f_1}{\partial y}$ and $\frac{\partial f_2}{\partial x}$ be continuous functions defined in a region R of the xy plane bounded by a closed curve C,

then $\oint_C \vec{F} \cdot d\vec{r} = \iint_R \left(\frac{\partial f_2}{\partial x} - \frac{\partial f_1}{\partial y}\right) dx\,dy$

$= \int_C (f_1\,dx + f_2\,dy)$

Proof :

consider with a region R of the xy-plane bounded by any simple closed curve (path) C which is cut by a ~~plane~~ line parallel to the co-ordinate axes & that the curve C is broken into two curves.
Let the region R be bounded by the line $y = c$, $y = d$, $x = f_1(y)$, $x = f_2(y)$ the curves A, B, P, Q.

Case - I : $P = Q$ (…)

Date ____________
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