GROUP NAME: ¿Derive

Logo:

Date: 5/6/13 Pract

Topics: Test #3

Student Names (First and Last)

Speaker/Presenter: Michael M.

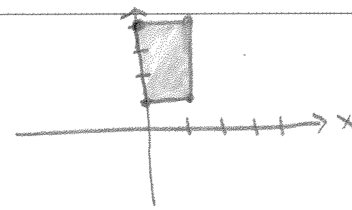
Writer/Prep: Joanna P

QC/Leader: Kate M.

Instructions: Set up a triple integral to find the volume under the function $f(x,y) = xy + 2x + 100$ and above the rectangular region b/w pts (0,1)(1,1)(0,3)(1,3)

#1

$$V = \int_0^1 \int_1^3 \int_0^{xy+2x+100} 1 \, dz\,dy\,dx$$



Regions

$0 \leq x \leq 1$

$1 \leq y \leq 3$

$0 \leq z \leq xy + 2x + 100$

Answer $\longrightarrow$ $V = \int_0^1 \int_1^3 \int_0^{xy+2x+100} dz\,dy\,dx$

#2 Set up an integral to find the surface area of the function $f(x,y) = xy + 2x + 100$ above the rectangular region b/w pts (0,1)(1,1)(0,3)(1,3)

$z = xy + 2x + 100$

$$\int_A = \iint_D \sqrt{1 + \left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2} \, dA$$

$\frac{\partial z}{\partial x} = y + 2$

$\frac{\partial z}{\partial y} = x$

$$\int_A = \int_0^1 \int_1^3 \sqrt{1 + (y+2)^2 + x^2} \, dy\,dx$$ ← ANSWER

Connect #3

$\iint_S xz\,dS$, S is portion of $z = 8x + 5y$ above $1 \leq x \leq 8$, $1 \leq y \leq 5$

$0 = 8x + 5y - z \Rightarrow \vec{n} = \langle 8, 5, -1 \rangle \Rightarrow \|\vec{n}\| = \sqrt{90} = 3\sqrt{10}$

$3\sqrt{10} \int_1^8 \int_1^5 8x^2 + 5xy \, dy\,dx = 3\sqrt{10} \int_1^8 \left[8x^2 y + \frac{5}{2} x y^2 \Big|_1^5 \right] dx = 3\sqrt{10} \int_1^8 32x^2 + 60x \, dx$

$= 3\sqrt{10} \left[\frac{32}{3} x^3 + 30x^2 \Big|_1^8 \right] = 3\sqrt{10} \left[(512 + 1920) - \left(\frac{32}{3} + 30\right) \right] = 7238\sqrt{10}$

GROUP NAME: The Doughmakers

Logo:

Student Names (First and Last)

Speaker/Presenter: Patricia

Writer/Prep: Alana

QC/Leader: Bogels

Date:

Topics:

Instructions: #3 & #4 Practice Test #3

#3

$$M = \int_1^3 \int_0^1 \int_0^{xy+2x+100} xy+4 \; dz\,dx\,dy$$

#4

$$(\bar{x}, \bar{y}, \bar{z})$$

$$\bar{x} = \frac{\int_1^3 \int_0^1 \int_0^{xy+2x+100} x(xy+y)\,dV}{m}$$

$$\bar{y} = \frac{\int_{\phi}^3 \int_0^1 \int_0^{xy+2x+3} y(xy+y)\,dV}{m}$$

$$\bar{z} = \frac{\int_1^3 \int_0^1 \int_0^{xy+2x+3} z(xy+y)\,dV}{m}$$

GROUP NAME:

Logo:

Date:__________

Topics:

Student Names (First and Last)

Speaker/Presenter: William E. Carter

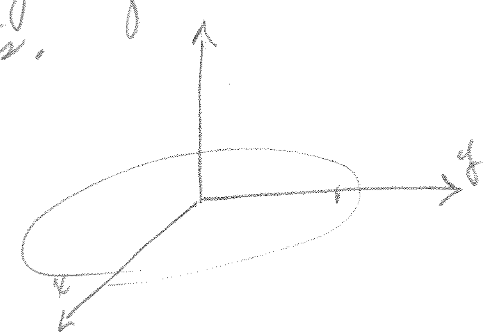
Writer/Prep:__________

QC/Leader:__________

Instructions: 5. & 6.

5. Set up the integral to find the volume for the region under the function $f(x,y) = xy + 2x + 100$ & above the circular region of radius 4 & centered @ the origin using rectangular coordinates.

$$V = \iint_R f(x,y)\, dA \Rightarrow \int_{-4}^{4} \int_{-\sqrt{16-x^2}}^{\sqrt{16-x^2}} (xy + 2x + 100)\, dx\, dy$$



$$x^2 + y^2 = 16$$
$$y = \pm \sqrt{16 - x^2}$$

$$z = xy + 2x + 100$$
$$0 = xy + 2x + 100$$

6. See back

$$\int_{\theta=0}^{2\pi} \int_{r=0}^{4} (r\cos\theta\, r\sin\theta + 2r\cos\theta + 100)\, r\, dr\, d\theta$$

GROUP NAME: Engineers

Logo:

Date:____________

Topics:

Student Names (First and Last)

Speaker/Presenter: ____________________

Writer/Prep: ____________________

QC/Leader: ____________________

Instructions:

7. change of variables

$$\iint 3x-2y \qquad x=u+2v \qquad y=3u-2v \qquad (0,0)(3,1)(2,-2)(1,3)$$

$$\int_0\int 3(u+2v)-2(3u-2v)(-8)$$

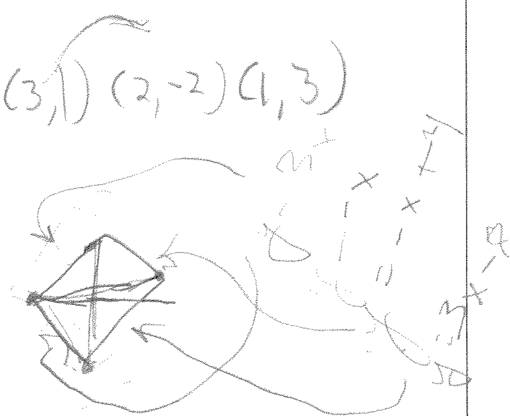
$\frac{\partial x}{\partial u}=1 \quad \frac{\partial y}{\partial u}=3$

$\frac{\partial x}{\partial v}=2 \quad \frac{\partial y}{\partial v}=-2$

$$\begin{vmatrix} \frac{\partial x}{\partial u} & \frac{\partial y}{\partial u} \\ \frac{\partial x}{\partial v} & \frac{\partial y}{\partial v} \end{vmatrix}$$

$-2-6=-8$

$\frac{\partial x}{\partial u}\frac{\partial y}{\partial v}-\frac{\partial y}{\partial u}\frac{\partial x}{\partial v}$



$y-y_0=m(x-x_0)$

8

$$\int_{-3}^{3}\int_{0}^{\sqrt{9-x^2}}\int_{0}^{\sqrt{9-x^2-y^2}} x^2+y^2+z^2 \, dV$$

$x^2+y^2+z^2=9=\rho$

$$\int_0^{\frac{\pi}{2}}\int_0^{\pi}\int_0^{3} \rho^2 \sin\phi \, d\rho \, d\theta \, d\phi$$

$\cancel{x^2+y^2}+z^2=\sqrt{9-x^2-y^2}$

GROUP NAME: Engees	Student Names (First and Last)
Logo:	Speaker/Presenter:
Date: 5/6/13	Writer/Prep: Brendan
Topics:	QC/Leader: Felipe

Instructions: practice test 3.
#9 + #10

9.) $\int_0^1 \int_0^x \int_0^y \int_0^z w \, dw \, dz \, dy \, dx$

$= \int_0^1 \int_0^x \int_0^y \frac{1}{2} z^2 \, dz \, dy \, dx$

$= \int_0^1 \int_0^x \frac{1}{6} y^3 \, dy \, dx$

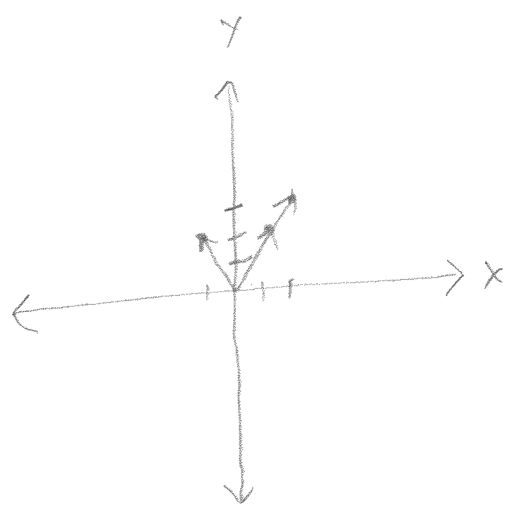
10.) $\overline{F} = \nabla f$

$\nabla f = \langle y, x+1 \rangle$

$\nabla f(1,1) = \langle 1, 2 \rangle$

$\nabla f(2,2) = \langle 2, 3 \rangle$

$\nabla f(-1,1) = \langle -1, 2 \rangle$



GROUP NAME: Mechanical Engineers	Student Names (First and Last)
Logo:	Speaker/Presenter: Suraj Porangada
Date: 05/06/2013	Writer/Prep: Mick Chiovari
Topics:	QC/Leader: Renzo Changanqui

Instructions:

Find the line integral under the function $f(x,y) = 2x-3y$ and over the semi circle from $(-1,0)$ to $(1,0)$

$L(C) =$

$f(x) = 2x-3y$ form $(-1,0)$ to $(1,0)$

$x = \cos t$, $y = \sin t$ for t in $[0,\pi)$

$\Rightarrow dx = -\sin t \cdot dt$ and $dy = \cos t \cdot dt$

so, $\int_{C_1} (\sin x \cdot dx + \cos y \cdot dy)$

$= \int_0^{\pi} [\sin(\cos t) \cdot (-\sin t \cdot t) + \cos(\sin t) \cdot \cos t] \, dt$

$=$

GROUP NAME: CompSci	Student Names (First and Last)
Logo:	Speaker/Presenter: Eric Zhuang
Date: 5/6/13	Writer/Prep:
Topics:	QC/Leader:

Instructions: line integral $\int_C \overset{M}{(x+3y)}dx + \overset{N}{(2x-y)}dy$ over square curve C from (-1,0) to (1,0) to (1,2) to (-1,2) and back to (-1,0) with Green's.

$$\int_C (x+3y)\,dx + (2x-y)\,dy$$

$$= \iint_R \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}\right) dA$$

$$= \int\int_{-1}^{1} (2-3)\,dA$$

(-1,0) to (1,0) to (1,2) to (-1,2)

(-1,0)

$\frac{\partial N}{\partial x} = 2$; $\frac{\partial M}{\partial y} = 3$