

GROUP NAME: <u>i Derive</u>	Student Names (First and Last)
Logo:	Speaker/Presenter: <u>Michael M.</u>
Date: <u>5/6/13</u>	Writer/Prep: <u>Joanna P</u>
Topics: <u>Test #3</u>	QC/Leader: <u>Kate M.</u>

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

#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 $(0,1)(1,1)(0,3)(1,3)$

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

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

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

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

$$S_A = \int_0^1 \int_1^3 \sqrt{1 + (y+2)^2 + x^2} \, dy \, dx \quad \leftarrow \text{ANSWER}$$

3 Connect H3

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

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

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

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

<p>GROUP NAME: <u>The Doughnuts</u></p> <p>Logo: _____</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>Patricia</u></p>
<p>Date: _____</p> <p>Topics: _____</p>	<p>Writer/Prep: <u>Alana</u></p> <p>QC/Leader: <u>Bagels</u></p>

Instructions: #3 & #4 Practice Test #3

#3

$$M = \int_1^3 \int_0^1 \int_0^{xy+2x+100} (xy+y) dz dx dy$$

#4

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

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

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

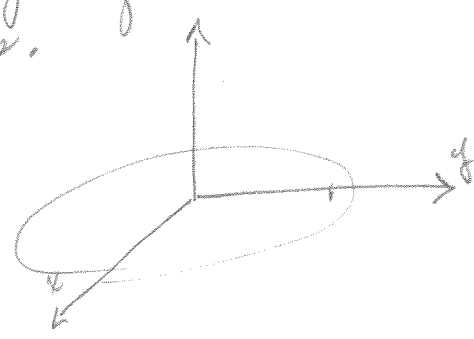
$$\bar{z} = \frac{\int_1^3 \int_0^1 \int_0^{xy+2x+3} z(xy+y) dV}{m}$$

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter: <u>William E. Carter</u>
Date: _____	Writer/Prep: _____
Topics:	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.

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



$$x^2 + y^2 = 16$$

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

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

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

6. See back

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



<p>GROUP NAME: Engineers</p> <p>Logo:</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: _____</p>
<p>Date: _____</p> <p>Topics:</p>	<p>Writer/Prep: _____</p> <p>QC/Leader: _____</p>

Instructions:

7. change of variables

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

$\iint_D 3x - 2y$

$\int_0^3 \int_0^{3-u} 3(u+2v) - 2(3u-2v) dv du$

$\frac{\partial x}{\partial u} = 1$ $\frac{\partial x}{\partial v} = 2$ $\frac{\partial y}{\partial u} = 3$ $\frac{\partial y}{\partial v} = -2$

$\begin{vmatrix} \frac{\partial x}{\partial u} & \frac{\partial x}{\partial v} \\ \frac{\partial y}{\partial u} & \frac{\partial y}{\partial v} \end{vmatrix} = \begin{vmatrix} 1 & 2 \\ 3 & -2 \end{vmatrix} = -2 - 6 = -8$

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

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

6

$\int_{-3}^3 \int_0^{\sqrt{9-x^2}} \int_0^{\sqrt{9-x^2-y^2}} x + y + z^2 dv dy dx$

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

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

$x^2 + y^2 + z^2 = 9 - x^2 - y^2$

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

Instructions: practice test 3.
#9 + #10

$$\begin{aligned}
 9.) & \int_0^1 \int_0^x \int_0^y \int_0^z w \, dw \, dz \, dy \, dx \\
 &= \int_0^1 \int_0^x \int_0^y \frac{1}{2} z^2 \, dz \, dy \, dx \\
 &= \int_0^1 \int_0^x \frac{1}{6} y^3 \, dy \, dx
 \end{aligned}$$

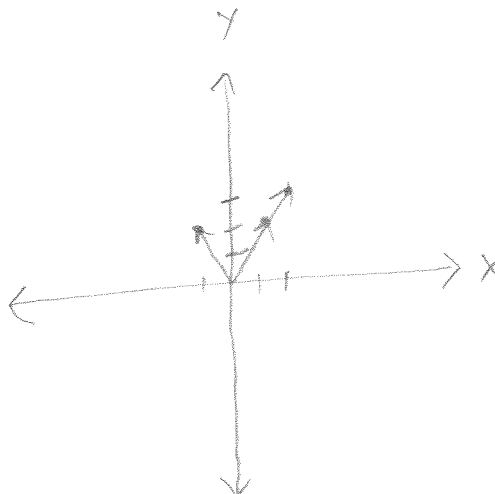
$$10.) \vec{F} = \nabla f$$


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

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

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

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



<p>GROUP NAME: <i>Mechanical Engineers</i></p> <p>Logo: </p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u><i>Suraj Perangada</i></u></p>
<p>Date: <u><i>05/06/2013</i></u></p> <p>Topics:</p>	<p>Writer/Prep: <u><i>Mik Chiovani</i></u></p> <p>QC/Leader: <u><i>Renzo Changanqui</i></u></p>

Instructions:

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

$C(t) =$

$f(x) = 2x - 3y$ from $(-1,0)$ 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, $\int_C (\sin x \cdot dx + \cos y \cdot dy)$

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

<p>GROUP NAME: <u>Comp Sci</u></p> <p>Logo:</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>Eric Zhuang</u></p>
<p>Date: <u>5/6/13</u></p> <p>Topics:</p>	<p>Writer/Prep: _____</p> <p>QC/Leader: _____</p>

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

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

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

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

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

$(-1,0)$

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