GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter:
Date:	Writer/Prep: Shawnee
Topics:	QC/Leader:

Instructions: #1) Do Paths cross.. Do Ships hit?
Angle between the two paths

$\vec{A} = \langle 9-0; 0-12 \rangle = \langle 9, -12 \rangle$

$\vec{B} = \langle 2-14, 1-10 \rangle = \langle -12; -9 \rangle$

$\langle 0, 12 \rangle + t\langle 9, -12 \rangle$

$\langle 14, 10 \rangle + s\langle -12, -9 \rangle$

$x = 9t \quad y = 12 - 12t$

$x = 14 - 12s \quad y = 10 - 9s$

$\|\vec{A}\| = \sqrt{9^2 + (-12)^2} = \sqrt{225}$

$\|\vec{B}\| = \sqrt{(9)^2 + (-12)^2} = \sqrt{225}$

$\cos^{-1} \frac{\langle 9, -12 \rangle \cdot \langle -12, -9 \rangle}{\sqrt{225}^2}$

$= \cos^{-1} \frac{(9)(-12) + (-12)(-9)}{225}$

$= \cos^{-1} \frac{-108 + 108}{225}$

$= \cos^{-1} 0 = 90° \text{ or } \frac{\pi}{2}$

$(9t = 14 - 12s)4$

$(12 - 12t = 10 - 9s)3$

$36t = 56 - 48s$

$36 - 36t = 30 - 27s$

$36 = 86 - 75s$

$-75s = -50$

$s = \frac{2}{3}$

$9t = 14 - 12(\frac{2}{3})$

$9t = 6$

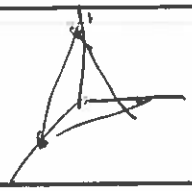
$t = \frac{2}{3}$

So $s = t$ they cross and hit

$|\vec{A}| = |\vec{B}| = \sqrt{9^2 + 12^2}$

GROUP NAME: Midterm	Student Names (First and Last)
Logo: #2 parts A & B	Speaker/Presenter: Piyush
Date:	Writer/Prep: Puri
Topics:	QC/Leader:

Instructions: • Eq plane $(1,0,0)_A$ $(0,4,0)_B$ $(0,0,2)_C$ origin from the plane!



$\vec{AB} = \langle 0-1, 4-0, 0-0 \rangle = \langle -1, 4, 0 \rangle$

$\vec{BC} = \langle 0-0, 0-4, 2-0 \rangle = \langle 0, -4, 2 \rangle$

$$\vec{AB} \times \vec{BC} = \begin{vmatrix} i & j & k \\ -1 & 4 & 0 \\ 0 & -4 & 2 \end{vmatrix} = \langle i(8-0), j(0+2), k(+4-0) \rangle$$

$$= \langle 8, 2, 4 \rangle$$

pt A. $(1,0,0)$

$$8(x-1) + 2(y-0) + 4(z-0) = 0$$

$$8x - 8 + 2y + 4z = 0$$

$$\boxed{8x + 2y + 4z = 8} \rightarrow \boxed{4x + y + 2z = 4}$$

$$d = \frac{|8(0) + 2(0) + 4(0) - 8|}{\sqrt{8^2 + 2^2 + 4^2}} = \frac{8}{\sqrt{84}} = .8728\ldots$$

$$64 + 4 + 16$$

$$= \frac{4}{\sqrt{21}}$$

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter: Kyle H.
Date:	Writer/Prep:
Topics: MIDTERM FALL 2013 #3	QC/Leader:

Instructions: #3

The position of a car traveling up a spiral driveway is given by: $r(t) = 7\cos t\,i + 7\sin t\,j + 49t\,k$

Find the distance travelled, the position, and the direction being faced after 30 seconds.

Arc Length ⇒ distance travelled

$$L = \int_0^{30} \sqrt{(-7\sin t)^2 + (7\cos t)^2 + 49^2}\, dt = \int_0^{30} \sqrt{2450}\, dt = 1484.7$$

$r(30) = \langle 7\cos(30), 7\sin(30), 49(30)\rangle = \langle 1.08, -6.92, 1470\rangle$

$r'(30) = \langle -7\sin(30), 7\cos(30), 49\rangle = \langle 6.92, 1.08, 49\rangle$

Distance 1484.7

Position: $x = 1.08, y = -6.92, z = 1470$

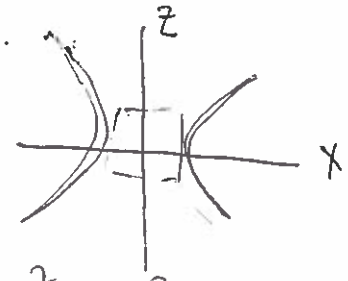
Direction: $\langle 6.92, 1.08, 49\rangle$

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

Instructions:

(4) $x^2 - y - z^2 = 1$ $y = -1, 0, 1$

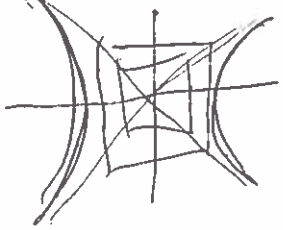
$x^2 - z^2 = 1$ ⟵ $y = 0$



$y = 1$

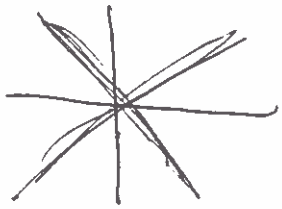
$y = -1$

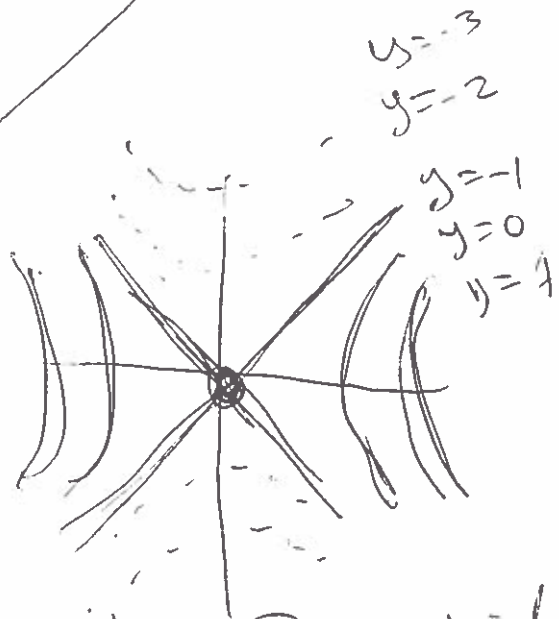
$x^2 - z^2 = 2$



$x^2 - z^2 = 0$

$x = \pm z$





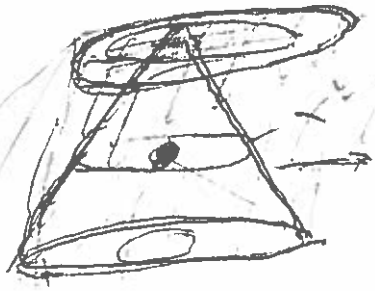
Hyperbolic Paraboloid

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

Instructions: (4) Draw and label curves for $y = -1$, 0, and 1. Describe the shape.

(4) $x^2 - y - z^2 = 1$ for $y = -1$

$x^2 - (-1) - z^2 = 1 \Rightarrow x^2 - z^2 = 0$



$x^2 - z^2 = 1$

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter: Daniel Cohen
Date:_____	Writer/Prep:_____
Topics:	QC/Leader:_____

Instructions: #5: Find max, min, and saddle points.

$f(x,y) = 400 + 3x^2 - 6xy - y^3$

$f_x = 6x - 6y = 0 \Rightarrow x = y$

$f_y = -6x - 3y^2 = 0 \Rightarrow -3y^2 \; 6x$

$-6x - 3x^2 = 0$

$-3x(2 + x) = 0$

$x = \frac{-y^2}{2}$

$x = \frac{-x^2}{2}$

$f_{xx} = 6 >$

$f_{yy} = -6y = 12$

$x = -2, y = -2$

$x = 0 \quad y = 0$

$f_{xy} = -6$

$f_{xx} f_{yy} - f_{xy}^2 = 72 - 36$

→ min at $f(-2,-2) = 396$

$D = f_{xx} f_{yy} - f_{xy}^2$

$(6)(-6y) - (-6)^2$

$-36y - 36$

$y = 0 \quad D = -36$ $(0,0)$ Saddle Point $(D < 0)$

$y = -2 \quad D = +36$ $(-2,-2)$ Max/Min $(D > 0)$

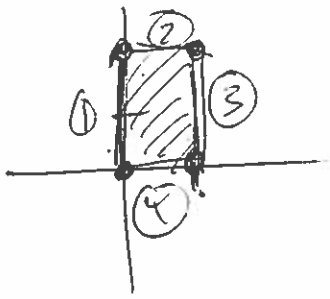
$f_{xx} = 6$ ⊕ Min

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

Instructions: $0 \le x \le 1 \quad 0 \le y \le 2$

#5

$f(x,y) = 400 + 3x^2 - 6xy - y^3$



① $x = 0 \quad 0 \le y \le 2 \quad z = 400 - y^3$

$z' = -3y^2 = 0$

$y = 0$

② $y = 2 \quad 0 \le x \le 1 \quad z = 400 + 3x^2 - 12x - 8$

$z' = 6x - 12 = 0$

$x = 2$ Nope.

③ $x = 1 \quad 0 \le y \le 2 \quad z = 400 + 3 - 6y - y^3$

$z' = -6 - 3y^2 = 0$ No Soln

~~$x = 1 \quad y^2 = y_2 \quad y = y = 1/4$~~

④ ~~y~~ $= 0 \quad 0 \le x \le 1$

$z = 400 + 3x^2$

$z' = 6x = 0 = 0.$

$f(0,0) = 400$

$f(0,2) = 392$

$f(1,2) = 400 + 3 - 12 - 8 = 383$ ← Absolute Min.

$f(1,0) = 403$ ← Absolute Max

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter:
Date: 12.5.13	Writer/Prep:
Topics: Midterm Review	QC/Leader: Olga Svitlik

Instructions: #6 Height of roof given $f(x,y) = 400 + 3x^2 - 6xy - y^2$
Find the value of the greatest slope @ (3, 5)

$\frac{f_x}{f_y} = \frac{6x - 6y}{-6x - 3y^2}$ at (3, 5) $\frac{6(3) - 6(5)}{-6(3) - 3(5)^2} = \frac{-12}{-93} = 0.52$

$|\nabla f(3,5)| = |\langle .12, .93\rangle| = |\langle f_x, f_y\rangle| = |\langle -6x-6y, -6x-3y^2\rangle|$
$= 93.77\ldots$

Find directional derivative from pt. (3, 5) towards (0, 0)

$\vec{v} = \langle -3, -5\rangle$, $\vec{u} = \frac{\vec{v}}{|v|} = \frac{\langle -3, -5\rangle}{\sqrt{34}}$

$= \langle \frac{-3}{\sqrt{34}}, \frac{-5}{\sqrt{34}} \rangle$

$D_u f = \nabla f \cdot u$

$D_u f = \langle -3(6x-6y) - 5(-6x-3y^2) \rangle$

$\langle -12, -93 \rangle \cdot \langle \frac{-3}{\sqrt{34}}, \frac{-5}{\sqrt{34}} \rangle$

$\frac{36 + 465}{\sqrt{34}} = \frac{501}{\sqrt{34}} = 85.92\ldots$

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter: Matt Persico
Date:	Writer/Prep:
Topics:	QC/Leader:

Instructions: #7

7) If the $f(x,y) = \frac{2x-7y^2}{7x^2-2y} + 100$, find the limit as $(x,y) \to (0,0)$ along the paths $x=0$.

$$\lim_{y\to 0} \frac{2(0)-7y^2}{7(0)^2-2y} + 100 = \lim_{y\to 0} \frac{-7y^2}{-2y} + 100$$

$$= \lim_{y\to 0} \frac{7y}{2} + 100$$

Along $y = x$

$$\lim_{x\to 0} \frac{2x-7x^2}{7x^2-2x} + 100 = \lim_{x\to 0} \frac{-7x^2}{7x^2} = -1 + 100$$

$= 100$ ✓

$= 99$ ✓

Is it continuous at $(0,0)$?

$f(x,y) = \frac{2x-7y^2}{7x^2-2y} + 100$

$=$ NO.

because $\lim_{(x,y)\to(0,0)} f(x,y) =$ two different answers depends on the path

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter:
Date:	Writer/Prep: Gary Greweling
Topics:	QC/Leader:

Instructions: #8 If the error in measuring the height is +/- .03 and radius is +/- .07 cm, find an estimate for the maximum error of the volume of the cylinder using the total differential when the cylindrical rod is 5 cm in radius and 10 cm in height.

Volume $= \pi r^2 h$

$\frac{\partial V}{\partial r} = 2\pi rh \qquad \frac{\partial V}{\partial h} = \pi r^2$

$dV = \frac{\partial V}{\partial r}\,dr + \frac{\partial r}{\partial h}\,dh$

$dV = 2\pi(5)(10)(\pm .07) + \pi(5)^2(\pm .03)$

± 24.347

$V(r=5, h=10) = \pi(25)\,10 = 785.39\ldots$

Volume $= 785.39 \pm 24.347$

% error $= \frac{24.347}{785.39} \times 100 = 3.1\%$

GROUP NAME: わかりません	Student Names (First and Last)
Logo: ?	Speaker/Presenter:
Date: 12/4/13	Writer/Prep:
Topics:	QC/Leader: Javier Blanco

Instructions: #9 Mid-term

#9

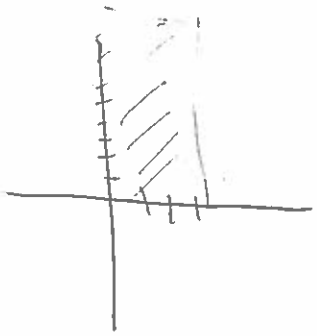
$$\int_0^3 \int_0^7 10y \, dy \, dx$$

$$\int_0^3 [5y^2]_0^7 \, dx$$

$$\int_0^3 245 \, dx$$

$$[245x]_0^3$$

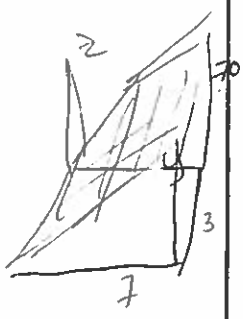
735



$z = 10y$

Le Region?

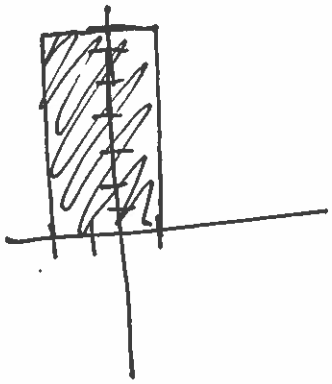
$0 \le x \le 3, \quad 0 \le y \le 7$



GROUP NAME:	Student Names (First and Last)
Logo: Engineers	Speaker/Presenter:
Date:	Writer/Prep: Chris Sholy
Topics:	QC/Leader:

Instructions: $\iint_R (x^2+4xy)\,dA$ $-2<x<1$, $0<y<7$

Midterm #10



$$\int_{x=-2}^{1}\int_{0}^{7}(x^2+4xy)\,dy\,dx$$

$$\int_{-2}^{1}\left(yx^2+2xy^2\Big|_{y=0}^{7}\right)dx$$

$$\int_{-2}^{1}7x^2+98x\,dx$$

$$\frac{7x^3}{3}+49x^2\Big|_{-2}^{1}$$

$\left[\frac{7}{3}+49\right]$

$$\left[\frac{7}{3}+49\right]-\left[\frac{7(-2^3)}{3}+49(-2)^2\right]-\left[\frac{-56}{3}+196\right]$$

$=188-126$

$\frac{63}{3}-147$

$21-147$

-126

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

Instructions: #11

$g(x,y) = y \cdot 5^{2x}$ $\quad x(u,v) = 5u+2v$ $\quad y(u,v) = 3u-v$

$\frac{\partial g}{\partial y} = 5^{2x} = 5^{2(5u+2v)}$ $\quad \frac{\partial g}{\partial x} = y \cdot 5^{2x} \cdot \ln 5 \cdot 2 = 2(3u-v)\ln 5 \cdot 5^{2(5u+2v)}$

$\frac{\partial x}{\partial u} = 5$ $\quad \frac{\partial y}{\partial u} = 3$

$$\frac{\partial g}{\partial u} = \frac{\partial g}{\partial x}\cdot\frac{\partial x}{\partial u} + \frac{\partial g}{\partial y}\cdot\frac{\partial y}{\partial u}$$

$$= 5^{2(5u+2v)} \cdot 5 + 2(3u-5)\ln 5\, 5^{2(5u+2v)} \cdot 3$$

GROUP NAME: Redacted to protect the ignorant

Logo: 

Date: Ben

Topics: #12 of midterm

Student Names (First and Last)

Speaker/Presenter: Face Palm

Writer/Prep: Derp McDerp

QC/Leader: AWOL, MIA

Instructions: Print Clearly eg:

12. a) $\frac{5x^2}{16} - \frac{y^2}{4.4} - \frac{7\pi z^2}{4} = 0$

~~Hyperboloid of Two Sheets~~

Elliptical Cone

b) $\frac{a^2}{16} - \frac{b}{9} - \frac{c^2}{4} = 0$

~~Elliptic Cone~~

Hyperbolic Paraboloid

c) $\frac{-a^2}{16} + \frac{B^2}{9} - \frac{r^2}{4} = -1$

$\frac{a^2}{16} + \frac{r^2}{4} - \frac{B^2}{9} = 1$

Hyperboloid of One Sheet