PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: Team ENG

Logo: 

Student Names (First and Last)

Speaker/Presenter: Eli Wang

Date: 10/18/2012

Writer/Prep: Tyler Wardlow

Topics: Test Review

QC/Leader: Pavel Litorvich

Instructions: What is Multivariable Calculus? Why would your major need to know this material? #1

- Study of change in multiple ~~dimensions~~ variables.
- Basis for higher learning; 3-d or multidimensional analysis.

PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: Supremum

Logo:

Date: 10/18/12

Topics:

Student Names (First and Last) Robert Alberto, Zahin Forezana

Speaker/Presenter:

Writer/Prep:

QC/Leader:

Instructions: #2 Given plane A(-2,0,1), B(3,1,2); C(0,2,0). Find the parametric equation of the line containing $\overleftrightarrow{AB}$. Does $\overleftrightarrow{AB}$ cross $S(t) = \langle -14t, 2-6t, 2-4t \rangle$?

#2

$\overrightarrow{AB} = (-2,0,1) - (3,1,2) = \langle -5, -1, -1 \rangle$

let $\vec{r}_0 = \langle x_0, y_0 z_0 \rangle = \langle 3,1,2 \rangle$

So that $\langle x, y, z \rangle = \langle 3,1,2 \rangle + t\langle -5, -1, -1 \rangle$

$\overleftrightarrow{AB}$

$x = 3-5t \quad ; y = 1-t \quad , t = 2-t$

point A occurs at $t=0$ & B occurs at $t=1$

$L(t) \rightarrow x = 3-5t \quad , y = 1-t \quad , z = 2-t$

$S(d) \rightarrow x = -14d \quad , y = 2-6d \quad , z = 2-4d$

$S(d)$ & $L(t)$ intersect when $d = \frac{1}{2}$ & $t = 2$

for $L(t) \Rightarrow$

$z = 2-2 = 0 \quad , y = 1-2 = -1 \quad , x = 3-5(2) = 3-10 = -7$

For $S(d) \Rightarrow$

$z = 2-4\left(\frac{1}{2}\right) = 2-2 = 0 \quad ; y = 2-6\left(\frac{1}{2}\right) = 2-3 = 1$

$x = -14\left(\frac{1}{2}\right) = -7$

So, they intersect at $(-7, -1, 0)$

PROF. PORTER

MATH CLASSWORK

Class 12

GROUP NAME: Logo: CSPM	Student Names (First and Last) Speaker/Presenter: Jessen Tim
Date:	Writer/Prep: Brendan Berrios
Topics:	QC/Leader: Brett Blaylock

Instructions:

#3

$\overrightarrow{AB} = \langle -5, -1, -1 \rangle$

$\overrightarrow{AC} = \langle -3, 1, -2 \rangle$

$\vec{n} = \langle 3, 7, -8 \rangle$

$$\begin{vmatrix} i & j & k \\ -5 & -1 & -1 \\ -3 & 1 & -2 \end{vmatrix}$$

i: $(-1(-2)) - (-1(1)) = 2 + 1 = 3i$

j: $(-5(-2)) - (-1(-3)) = 10 - 3 = 7j$

k: $(-5 \cdot 1) - (-1(-3)) = -5 - 3 = -8k$

$3x + 7y - 8z = -14$

PROF. PORTER | MATH CLASSWORK | Class 12

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

Instructions: #4

Test 1

$$3x - 7y - 8z = -14$$

$$(1, -2, 9)$$

$$3(1) - 7(-2) - 8(9) \neq -14$$

$$D = \frac{|ax_1 + by_1 + cz_1 + d|}{\sqrt{a^2 + b^2 + c^2}}$$

$$\frac{|3(1) - 7(3) + -8(0)^{+14}|}{\sqrt{3^2 + (-7)^2 + (-8)^2}}$$

$$\frac{|3 - 21 + 14|}{\sqrt{9 + 49 + 64}} = \frac{4}{\sqrt{122}}$$

PROF. PORTER

MATH CLASSWORK

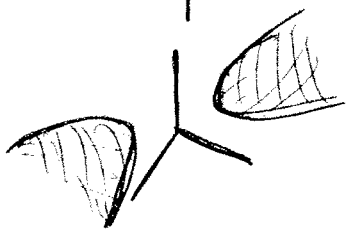
Class 12

GROUP NAME: jVector	Student Names (First and Last)
Logo:	Speaker/Presenter: Tom Donn
Date:	Writer/Prep: Shanna Tiana
Topics:	QC/Leader: David Torres

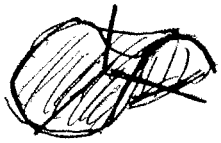
Instructions: #5

C

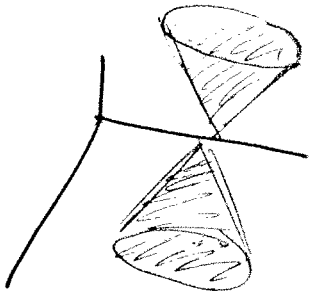
a. $\frac{x^2}{16} - \frac{y^2}{9} - \frac{z^2}{4} = 1$ hyperboloid 2 sheets



b. $\frac{x^2}{16} - \frac{y^2}{9} - \frac{z^2}{4} = 1$ ~~hyperboloi~~ C paraboloid



c. $\frac{x^2}{16} - \frac{y^2}{9} - \frac{(z-2)^2}{4} = 0$ eliptical Cone



PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: Imagination Logo: $\sqrt{-1}$ ♡ math!	Student Names (First and Last) Speaker/Presenter: Gabe Sashihara
Date: 10/18/12	Writer/Prep: Ksusha Rychkova
Topics: Test 1 Question # 6	QC/Leader:

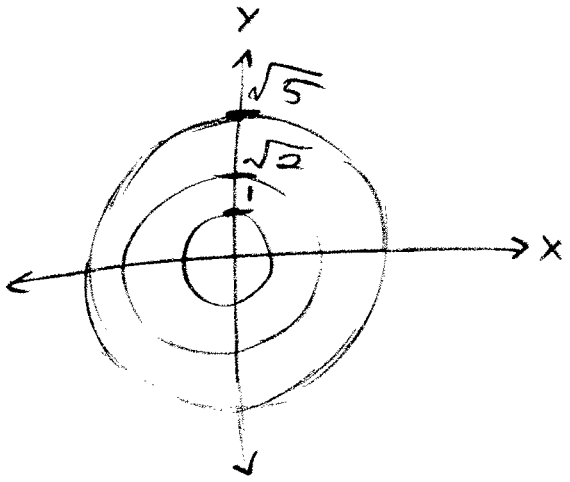
Instructions: Do problem #6 on Test 1 (Draw the level curves on the x-y plane for z at 0, 1, 2 for the surface: $x^2 + y^2 - z^2 = 1$)

6) $x^2 + y^2 - z^2 = 1$ for $z = 0, 1, 2$

$x^2 + y^2 = 1$

$x^2 + y^2 = 2$

$x + y^2 = 5$



PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: Logan

Logo:

Date:

Topics:

Student Names (First and Last)

Speaker/Presenter: Ryan Eggert

Writer/Prep: Maxx Autry

QC/Leader: Adam Burrows

Instructions:

#7

$r'(t) = \langle \cos t, 1 - t^2, e^{2t} \rangle$

$r(0) = \langle 1, 1, 0 \rangle$

$r(t) = \langle \sin t + 1, t - \frac{1}{3}t^3 + 1, \frac{1}{2}e^{2t} - \frac{1}{2} \rangle$

$\sin t + c$

$1 = \sin(0) + c$

$c = 1$

$\sin t + 1$

$t - \frac{1}{3}t^3 + c$

$1 = 0 - \frac{1}{3}(0^3) + c$

$c = 1$

$t - \frac{1}{3}t^3 + 1$

$\frac{1}{2}e^{2t} + c$

$0 = \frac{1}{2}e^{0} + c$

$c = -\frac{1}{2}$

$\frac{1}{2}e^{2t} - \frac{1}{2}$

PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: Logo:	Student Names (First and Last) Speaker/Presenter: Jason Meyers
Date: 10/18/12 Topics:	Writer/Prep: Matthew Steward QC/Leader:

Instructions:

#8

3) $t = 0$ $\quad r(t) = \langle 4\cos t, 4\sin t, 0 \rangle$

$$T(t) = \frac{r'(t)}{|r'(t)|} = \frac{\langle -4\sin t, 4\cos t, 0 \rangle}{\sqrt{(-4\sin t)^2 + (4\cos t)^2}} = \langle -\sin t, \cos t, 0 \rangle$$

$t = 0$ $\quad \boxed{\langle 0, 1, 0 \rangle}$

$$N(t) = \frac{T'(t)}{|T'(t)|} = \frac{\langle -\cos t, -\sin t, 0 \rangle}{\sqrt{(\sin t)^2 + (\cos t)^2}} = \boxed{\langle -\cos t, -\sin t, 0 \rangle}$$

$$B(t) = T \times N$$

$$\begin{vmatrix} -\sin t & \cos t & 0 \\ -\cos t & -\sin t & 0 \end{vmatrix} = \langle 0, 0, 1 \rangle$$

PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: Team # $-e^{i\pi}$	Student Names (First and Last)
Logo: $-e^{i\pi}$	Speaker/Presenter: Shawn Daniel
Date: 10/18/12	Writer/Prep: Husain Yaseen
Topics: Midterm Review	QC/Leader: Chintan Parekh

Instructions: Do questions from test #1
our group was assigned #9 all

#9

Question #9

a) $r(3) = \langle 9, 0, 9 \rangle$

$r(0) = \langle 3, 0, 0 \rangle$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

$$d = \sqrt{(9-3)^2 + (0)^2 + (9)^2} = \sqrt{117} = \boxed{10.816}$$

b)

$$S = \int \sqrt{(x'(t))^2 + (y'(t))^2 + (z'(t))^2}\, dt$$

$$S = \int_0^3 \sqrt{(2)^2 + (0)^2 + (2t)^2}\, dt$$

$$S = \int_0^3 \sqrt{4 + 4t^2}\, dt = \sqrt{4 + 4t^2}\Big|_0^3 = \boxed{11.3\ldots}$$

Using calculator

$y_1 = \sqrt{4 + 4t^2}$

2nd calc > $\int f(x)$

Lower bound = 0 = 11.3...

Upper bound = 3

PROF. PORTER | MATH CLASSWORK | Class 12

GROUP NAME: [illegible]	Student Names (First and Last)
Logo:	Speaker/Presenter: [illegible]
Date: _____	Writer/Prep: Louis Moscoso [illegible]
Topics:	QC/Leader: Justin Miller

Instructions:

10

10.) Find the curvature for the equation $r(t) = \langle t, t(t-1), t^2 \rangle$ at $t = 1$

$$K(t) = \frac{|r'(t) \times r''(t)|}{|r'(t)|^3}$$

$r'(t) = \langle 1, 2t-2, 1 \rangle$

$r''(t) = \langle 0, 2, 0 \rangle$

$$r'(t) \times r''(t) = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 2t-2 & 1 \\ 0 & 2 & 0 \end{vmatrix} = -2\hat{i} - 0\hat{j} + 2\hat{k} = -2\hat{i} + 2\hat{k}$$

$$|r'(t) \times r''(t)| = \sqrt{2^2 + 2^2} = \sqrt{8}$$

$$|r'(t)|^3 = \sqrt{1 + (2t-2)^2 + 1}^3$$

$$= \sqrt{2 + 4t^2 - 8t + 4}^3$$

$$= (2 + 4t - 8t + 4t^2)^{3/2}$$

$$K(t) = \frac{\sqrt{8}}{(2 + (2t-2)^2)^{3/2}} = \boxed{\frac{\sqrt{8}}{2^{3/2}}}$$

How does the curvature compare qualitatively to the [illegible] $t = 0$?

$$K(0) = \frac{\sqrt{8}}{2^{3/2}}$$

$$\frac{\sqrt{8}}{2^{3/2}}$$

At $t = 0$, the curvature is less than the curvature at $t = 1$.

PROF. PORTER

MATH CLASSWORK

Class 12

GROUP NAME: Bio Bros	Student Names (First and Last)
Logo:	Speaker/Presenter: Rohan B
Date: 10/18/12	Writer/Prep: Andrew C
Topics:	QC/Leader:

Instructions:

Question 11

#11

11. $r(t) = \langle 5t, 2\sin t, 2\cos t \rangle$

$r'(t) = \langle 5, 2\cos t, -2\sin t \rangle$

$r''(t) = \langle 0, -2\sin t, -2\cos t \rangle$

$r''(0) = \langle 0, 0, -2 \rangle$

$a(0) = \langle 0, 0, -2 \rangle$

Speed:

$$\text{Speed} = |V(t)| = \sqrt{25 + 4\cos^2 t + 4\sin t^2}$$

$$|V(0)| = \sqrt{25 + 4} = \sqrt{29}$$

$\text{Speed} = \sqrt{29}$

PROF. PORTER

MATH CLASSWORK

Class 12

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

Instructions:

#12