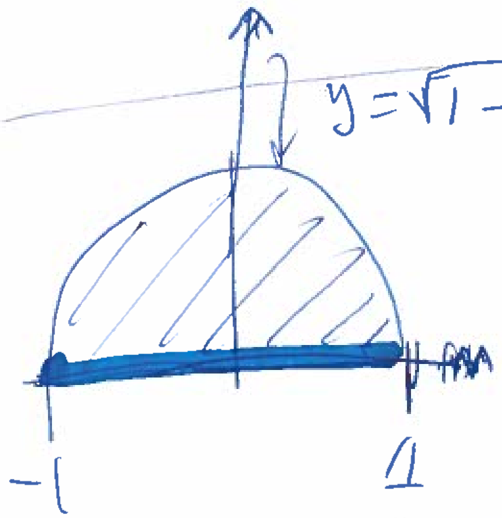
Double Integrals

$$\iint f(x,y)\,dA \Rightarrow \int_{(x=}\int_{y=)} f(x,y)\,dy\,dx$$

$$\Rightarrow \int_{y=}\int_{x=} f(x,y)\,dx\,dy$$



Region

$$\iint_R e^{-(x^2+y^2)}\,dA$$

$$\text{Volume}\ (\text{in}^3) = \int_{x=-1}^{1}\int_{y=0}^{\sqrt{1-x^2}} e^{-(x^2+y^2)}\,dy\,dx$$

$$|\nabla f| = |\langle f_x, f_y \rangle|$$

$$|\langle -12, -7 \rangle| = \sqrt{12^2+7^2} \approx$$

$$f(x,y) = yx^2 + 9\cos(xy)$$

$$f_x = 2xy - 9y\sin(xy)$$

$$f_y = x^2 - 9x\sin(xy)$$

at $(\pi, 2)$

$$D_u = \langle -12.37\ldots, -7\ldots \rangle \cdot \langle \tfrac{\sqrt{2}}{2}, \tfrac{\sqrt{2}}{2} \rangle$$

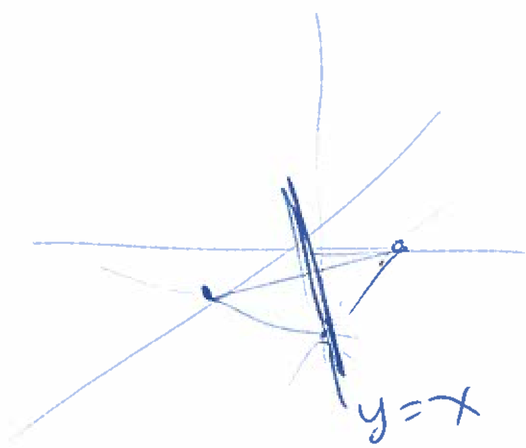
$$= |\nabla f|\,|u| \cdot \cos\theta$$

$0°$

$$\approx 14$$

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

$$f(x,y) = \begin{cases} \dfrac{x^2-y^2}{x-y} & \cancel{x\neq 0, y\neq 0} \quad y \neq x \\ x+y & \cancel{x=0, y=0} \quad y = x \end{cases}$$



$z = x+y$

$0 = x+y-z$

PROF. PORTER Bis . MATH CLASSWORK

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

Instructions:

(a) $\vec{BC} = \langle 1, 2, -1 \rangle$ $\vec{AC} = \langle -4, 2, -2 \rangle$

$$\cos^{-1} \frac{\langle 1, 2, -1 \rangle \cdot \langle -4, 2, -2 \rangle}{(\sqrt{6})(\sqrt{24})}$$

$$\cos^{-1} \frac{(-4 + 4 + 2)}{\sqrt{6}\,\sqrt{24}} = \cos^{-1}\left(\frac{2}{12}\right)$$

$$\theta = 80.4^\circ$$

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

$B(-2, 0, 1)$

$(x, y, z) = (-2, 0, 1) + t\langle -5, 0, -1 \rangle$

$$x = -2 - 5t$$
$$y = 0 + 0t$$
$$z = 1 - t$$

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

Instructions: #3 A (3,0,2) B (-2,0,1) C (-1,2,0)

a - Find equation of plane

b - draw a graph of a plane when x, y, z are all positive

3.) a.) $\vec{u} = \overrightarrow{AB} = \langle -5, 0, -1 \rangle$

$\vec{v} = \overrightarrow{AC} = \langle -4, 2, -2 \rangle$

$$\vec{u} \times \vec{v} = \begin{vmatrix} i & j & k \\ -5 & 0 & -1 \\ -4 & 2 & -2 \end{vmatrix} = \langle 0+2, 4-10, -10-0 \rangle = \langle 2, -6, -10 \rangle$$

pt $(-2, 0, 1)$ (B)

$$2(x+2) + (-6)(y-0) + (-10)(z-1) = 0$$

$$2x+4-6y+0-10z+10=0$$

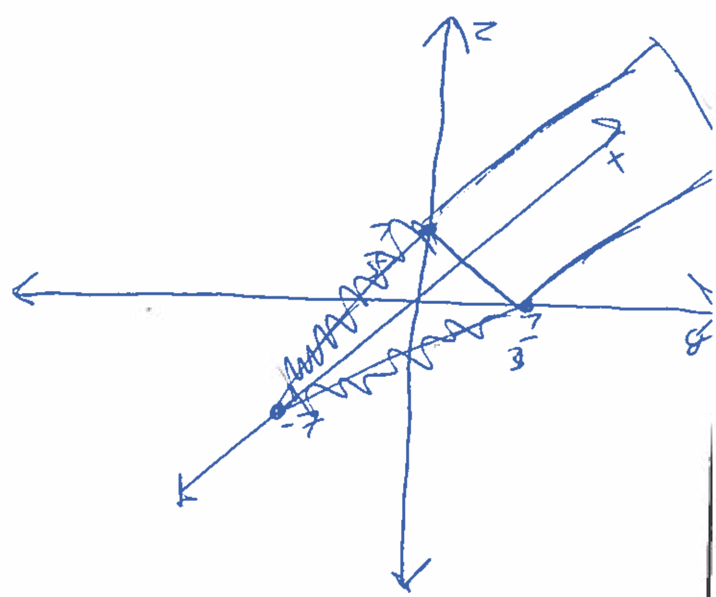
$$\boxed{2x-6y-10z=-14}$$

b.)

$z=0$, $y=0$: $2x=-14$, $x=-7$

$z=0$, $x=0$: $-6y=-14$, $y=\frac{7}{3}$

$x=0$, $y=0$: $-10z=-14$, $z=\frac{7}{5}$



GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter:
Date: 10/17	Writer/Prep: Shawnee
Topics:	QC/Leader:

Instructions:

#4 $\vec{AB} = \langle -5, 0, -1 \rangle$

$\vec{BC} = \langle 1, 2, -1 \rangle$

$$\vec{AB} \times \vec{BC} = \begin{vmatrix} i & j & k \\ -5 & 0 & -1 \\ 1 & 2 & -1 \end{vmatrix}$$

$$= \langle 0+2, -1-5, -10-0 \rangle$$

$$= \langle 2, -6, -10 \rangle$$

so $2(x-3) - 6(y-0) - 10(z-2) = 0$ $\quad 2x - 6y - 10z = -14$

$2(1-3) - 6(-2,0) - 10(9-2) = 0$

$-4 + 12 - 70 = 0$

a) $-62 \neq 0 \rightarrow$ No

b) $d = \dfrac{|2(1) - 6(3) - 10(0) + 14|}{\sqrt{(2)^2 + (-6)^2 + (-10)^2}} = \dfrac{2}{\sqrt{140}}$

GROUP NAME: **Logo:** 42	**Student Names (First and Last)** **Speaker/Presenter:** Ben **Writer/Prep:** Kyle **QC/Leader:** Gary
Date: **Topics:**	

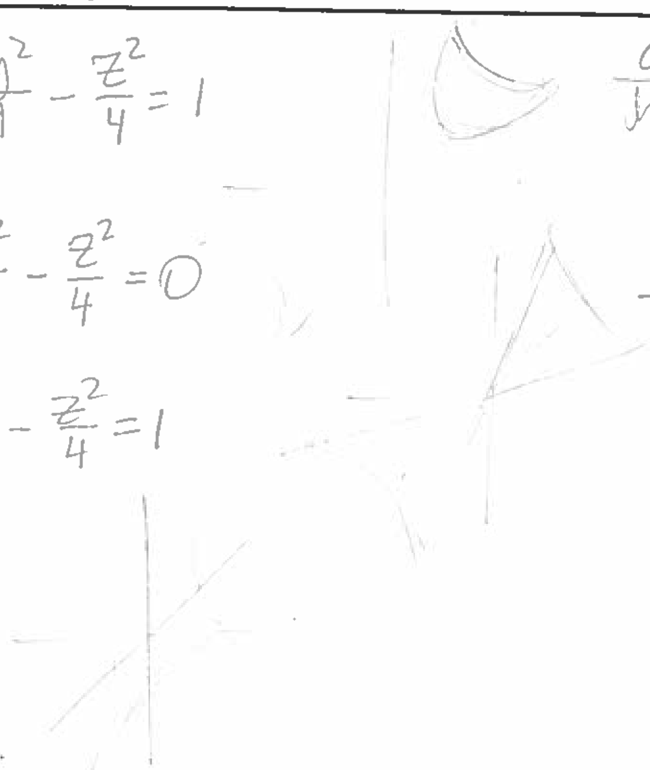
Instructions: 5

Identify the curves

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

b) $\frac{x^2}{16} - \frac{y^2}{9} - \frac{z^2}{4} = 0$

c) $\frac{x^2}{16} - \frac{y}{9} - \frac{z^2}{4} = 1$



a. hyperboloid of 2 sheets

b Elliptic Cone

c. hyperbolic paraboloid (saddle)

GROUP NAME: 42

Logo:

Date:

Topics:

Student Names (First and Last)

Speaker/Presenter: Kyle

Writer/Prep: Ben

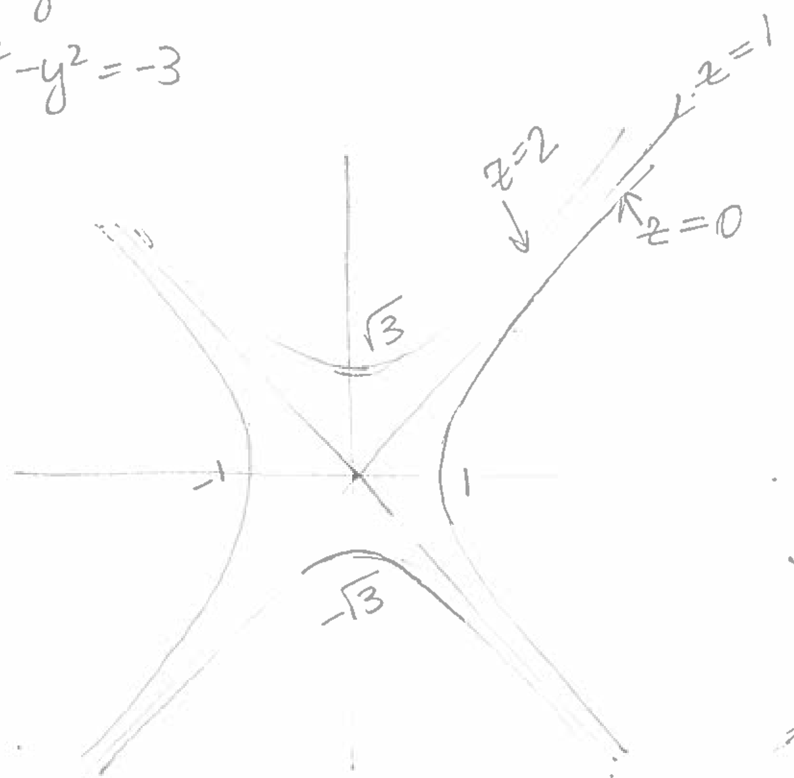
QC/Leader: Gary

Instructions: (6) Draw the Level Curves for z at 0, 1, 2 for the surface $x^2-y^2+z^2=1$

$z=0 \Rightarrow x^2-y^2=1$

$z=1 \Rightarrow x^2-y^2=0$

$z=2 \Rightarrow x^2-y^2=-3$



hyperboloid of 1 sheet

GROUP NAME: Team OP	Student Names (First and Last)
Logo: チーム オピ	Speaker/Presenter: [signature]
Date: 10/17/13	Writer/Prep: Olga Svidlik
Topics:	QC/Leader: Javier Blanco

Instructions:

#7

7) $\int r'(t) = \int\left(\frac{1}{t+1}\vec{i} + (1-t)\vec{j} + t\vec{k}\right)dt$

$= \log|t+1|\vec{i} + \frac{t-t^2}{2}\vec{j} + \frac{t^2}{2}\vec{k} + C.$

$3\vec{i} + \vec{j} = \vec{r}(0) = \vec{C} \therefore r(t) = \log|t+1|\vec{i} + \frac{t-t^2}{2}\vec{j} + \frac{t^2}{2}\vec{k} + 3\vec{i} + \vec{j}$

$\vec{r}(t) = \left(\log|t+1| + 3\right)\vec{i} + \left(\frac{t-t^2}{2} + 1\right)\vec{j} + \frac{t^2}{2}k$

GROUP NAME: Team OP **Logo:** チーム オピ	**Student Names (First and Last)** **Speaker/Presenter:** [signature]
Date: 10/17/13 **Topics:** Practice test #1, Q #8	**Writer/Prep:** Olga Sutlik **QC/Leader:** [signature]

Instructions: What is the length of the curve $r(t) = \langle 2t+1, 0, t \rangle$ over the interval $[0, 3]$? #8

Arc length $\Rightarrow$ $S = \int_a^b \|r'(t)\|\, dt$

$r'(t) = \langle 2, 0, 1 \rangle$

$\|r'(t)\| = \sqrt{4+0+1} = \sqrt{5}$

$S = \int_0^3 \|r'(t)\| = \int_0^3 \sqrt{5}\, dt$

$= 3\sqrt{5} \approx 6.7082$

GROUP NAME:

Logo:

Date:__________

Topics:

Student Names (First and Last)

Speaker/Presenter: [illegible]

Writer/Prep: [illegible]

QC/Leader: Chris

Instructions:

9. $r(t) = \langle t, 1-t, \cos t \rangle$

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

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

a) acceleration at $t = 0$

$a(0) = \langle 0, 0, -1 \rangle$

b) speed at $t = 0$

$v(0) = \langle 1, -1, 0 \rangle$

$|v(0)| = \sqrt{1+1+0} = \sqrt{2}$

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

Instructions:

#10

Path of spaceship 1: $\langle 1+\frac{200}{\sqrt{21}}t,\ 2+\frac{800}{\sqrt{21}}t,\ 3-\frac{400}{\sqrt{21}}t\rangle$

Path of spaceship 2: $\langle -2+\frac{400}{\sqrt{6}}t,\ 4+\frac{200}{\sqrt{6}}t,\ 3+\frac{200}{\sqrt{6}}t\rangle$

$$X_1(t) = X_2(t)$$

$$1+\frac{200}{\sqrt{21}}t = -2+\frac{400}{\sqrt{6}}t$$

$$t = .025072$$

$$Y_1(.025072) = 6.3769$$

$$Y_2(.025072) = 6.047$$

$$Y_1 \neq Y_2$$

The spaceships will not ~~[illegible]~~ crash.