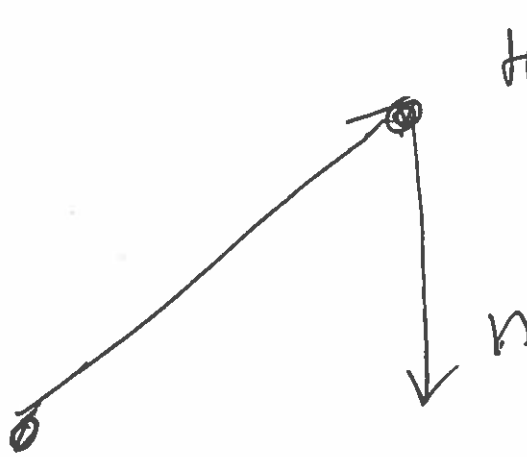



~~$Ax + By + C(z+1) = 0$~~

$\text{comp}_b^a = \frac{\vec{a} \cdot \vec{b}}{|\vec{b}|}$ $\quad \frac{Ax_0 + B}{|\vec{n}|} \Leftarrow |\vec{n}| = \sqrt{A^2 + B^2 + 1^2}$

$\langle x - x_0, y - y_0 - z - z_0 \rangle \cdot \langle A, B, C \rangle$

$A(x - x_0) + B(y - y_0) + C(z - z_0)$

$Ax^0 + By_0 + Cz_0 + \underbrace{Ax + By + Cz}_{1}$

GROUP NAME: Gang of Four

Date: 9/2/14

Student Names (First and Last)

Speaker/Presenter: Zhihao Guan, Sean Titus

Writer/Prep: Alex Ameri,

Leader/Collaborator: Dominic Connor

Independant Variable (x-axis):

Dependant Variable (y-axis):

Conclusion (in words):

Prof. Porter isn't in danger

Supporting Work:

1. $H: \langle 2, 4, 1 \rangle$ $\quad \vec{GH} = \langle -2, 2, -3 \rangle$

$D: \langle 1, 7, 1 \rangle$ $\quad \vec{GD} = \langle -3, 5, -3 \rangle$

$G: \langle 4, 2, 4 \rangle$

2. $$\begin{vmatrix} i & j & k \\ 2 & -2 & 3 \\ -3 & 5 & 3 \end{vmatrix} = i \begin{vmatrix} -2 & 3 \\ 5 & 3 \end{vmatrix} - j \begin{vmatrix} 2 & 3 \\ -3 & 3 \end{vmatrix} + k \begin{vmatrix} 2 & -2 \\ -3 & 5 \end{vmatrix}$$

$$= 9i + 3j - 4k$$

$$\therefore \quad V_n = \langle 9, 3, -4 \rangle$$

3. plug in a point (Ghost):

$$9(x-2) + 3(y-4) - 4(z-1) = 0$$

4. Is Prof. Porter in danger? $\quad P_{porter} = (2, 2, 1)$

$$9(2-2) + 3(2-4) - 4(1-1) \neq 0 \quad \therefore \boxed{\text{NO}}$$

| | |
|---|---|
| GROUP NAME: Mechanics | Student Names (First and Last) |
| Date: 09/02/14 | Speaker/Presenter: Pablo Arroyo |
| Independant Variable (x-axis): | Writer/Prep: Joe Hyppolite, Peter Chien |
| Dependant Variable (y-axis): | Leader/Collaborator: Connor Krumsman |

Conclusion (in words):

$-8x + 0.5y + 11z = 1$

Supporting Work:

A. head (2, 1, 1.5)
B. Ghost (4, 4, 3)
C. Door (1, 6, 1)

$\vec{AB} \times \vec{AC} = \vec{m}$

$\vec{AB} = \langle 2, 1, 1.5 \rangle$

$\vec{AC} = \langle -1, 5, -0.5 \rangle$

$\langle 2, 1, 1.5 \rangle \times \langle -1, 5, -0.5 \rangle = \vec{m}$

$\vec{m} = \langle -8, 0.5, 11 \rangle$

$\langle -8, 0.5, 11 \rangle \cdot \langle x - a_1, y - a_2, z - a_3 \rangle = 0$

$-8(x - a_1) + 0.5(y - a_2) + 11(z - a_3) = 0$

($a_1$ = 2, $a_2$ = 1, $a_3$ = 1.5)

$-8x + 8a_1 + 0.5y - 0.5a_2 + 11z - 11a_3 = 0$

$-8x + 8(2) + 0.5y - 0.5(1) + 11z - 11(1.5) = 0$

$-8x + 16 + 0.5y - 0.5 + 11z - 16.5 = 0$

$-8x + 0.5y + 11z - 1 = 0$

$-8x + 0.5y + 11z = 1$

GROUP NAME: THREE DIMENTIONS

Date: 09/02/2014

Student Names (First and Last)

Speaker/Presenter: Sam Adieze

Writer/Prep: OKSANA POBEREZHNYK

Leader/Collaborator: Xiao Zheng

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

Supporting Work:

$G=(4,2,4)$

$D=(1,8,\frac{3}{2})$

$H=(3,1,2)$

$PH(2,2,1)$

$\overrightarrow{GH}=(-1,-1,-2)$

$\overrightarrow{GD}=(-3,6,2,5)$

$\overrightarrow{GH}\times\overrightarrow{GD}=\begin{vmatrix} i & j & k \\ -1 & -1 & -2 \\ -3 & 6 & 2,5 \end{vmatrix} = i\begin{vmatrix} -1 & -2 \\ 6 & 2,5 \end{vmatrix} - j\begin{vmatrix} -1 & -2 \\ -3 & 2,5 \end{vmatrix} + k\begin{vmatrix} -1 & -1 \\ -3 & 6 \end{vmatrix} =$

$= i(-2,5-12) - j(-2,5-6) + k(-6-3) =$

$= -14,5i + 8,5 - 9k \rightarrow n=\langle -14,5;\ 8,5;\ 9\rangle$

Equat. of Plane: (we using $PH=(2,2,1)$

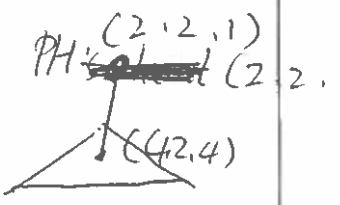
$-14,5(x-4)+8,5(y-2)+9(z-4)=0$

$-14,5(2-4)+8,5(2-2)+9(1-4)=0$

$-14,5\cdot(-2)+8,5\cdot 0+9\cdot(-3)=0$

$29-27\neq 0$

PH - is not in a danger



GROUP NAME: Civil DOCtors

Date: 9-2-14

Student Names (First and Last)

Speaker/Presenter: Jon Gaskill

Writer/Prep: Sneha Rangu

Leader/Collaborator: Sneha Rangu

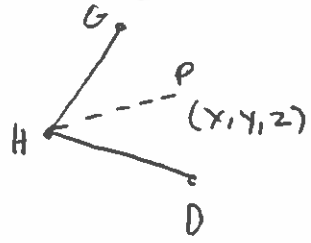
Independant Variable (x-axis):

Dependant Variable (y-axis):

Conclusion (in words): In conclusion, Porter is not in our plane since $-32 \neq -57$. Porter's head is ~~6.210~~ 1.710 m away from our plane.

Supporting Work:

Ghost: $\langle 4,3,2 \rangle$
Door: $\langle 1,6,1 \rangle$
Head: $\langle 8,3,1 \rangle$




$\overrightarrow{HG} = \langle 4,0,-1 \rangle$

$\overrightarrow{HD} = \langle 7,-3,0 \rangle$

$\langle 4,0,-1 \rangle \times \langle 7,-3,0 \rangle$

$$\begin{vmatrix} i & j & k \\ 4 & 0 & -1 \\ 7 & -3 & 0 \end{vmatrix} = i \begin{vmatrix} 0 & -1 \\ -3 & 0 \end{vmatrix} - j \begin{vmatrix} 4 & -1 \\ 7 & 0 \end{vmatrix} + k \begin{vmatrix} 4 & 0 \\ 7 & -3 \end{vmatrix}$$

$-3i - 7j - 12k = \langle -3,-7,-12 \rangle$ = normal

~~[illegible]~~

Porter: $\langle 2,2,1 \rangle$

$\overrightarrow{HP} = \langle x-8, y-3, z-1 \rangle$

$\langle -3,-7,-12 \rangle \cdot \langle x-8, y-3, z-1 \rangle = 0$

$-3(x-8) + -7(y-3) - 12(z-1) = 0$

$-3x+24 - 7y+21 - 12z+12$

$-3x - 7y - 12z = -57$ ← our plane

$-3(2) - 7(2) - 12(1) =$

$-6 - 14 - 12$

$-32 \neq -57$ Porter not on plane

→

GROUP NAME: Math-Busters

Date: 9/2/19

Student Names (First and Last)

Speaker/Presenter: Varun Jain

Writer/Prep: Varun Jain

Leader/Collaborator: Jason D.

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

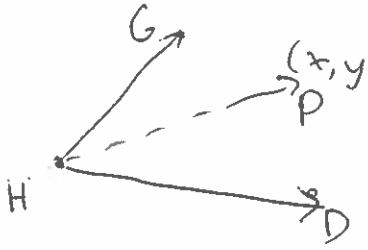
Conclusion (in words): The equation of the plane is $4x + 11y + 12z = -82$ and Prof. Porter's Head is not in their plane, and is approximately 2.4 m away from the plane.

Supporting Work:

GHOST = (3, 2, 4)

Doorknob = (1, 6, 1)

Head = (5, 4, 1.5)




$\overrightarrow{HG} = \langle -2, -2, +2.5 \rangle$

$\overrightarrow{HD} = \langle -4, 2, -.5 \rangle$

$$\overrightarrow{HG} \times \overrightarrow{HD} = \begin{vmatrix} i & j & k \\ -2 & -2 & 2.5 \\ -4 & 2 & -.5 \end{vmatrix} = i(1-5) - j(1+10) + k(-4+8)$$

$$= -4i - 11j - 12k$$

$\vec{n} = \langle -4, -11, -12 \rangle$

$\overrightarrow{HP} = \langle x-5, y-4, z-1.5 \rangle$

$\vec{n} \cdot \overrightarrow{HP} = -4(x-5) + -11(y-4) + -12(z-1.5) = 0$

OR

$-4x - 11y - 12z = -82$

$4x + 11y + 12z = +82$

Professor's Head = (2, 2, 1)

$4(2) + 11(2) + 12(1) = 42 \neq -82 \Rightarrow$ Not in the plane

GROUP NAME:

Date: 9/2/14

Student Names (First and Last)

Speaker/Presenter: _____

Writer/Prep: Deep Gajjar

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Leader/Collaborator: Ronito Santos

Conclusion (in words):

Supporting Work:

Ghost $(6, 4, 5)$

Door $(1, 9, 1)$

Leaders Head $(15, 7, 2)$

Ghost to door $(1-6, 9-4, 1-5) = (-5, 5, -4)$

Ghost to Head $(15-6, 7-4, 2-5) = (9, 3, -3)$

$$\begin{vmatrix} i & j & k \\ -5 & 5 & -4 \\ 9 & 3 & -3 \end{vmatrix} \quad i\begin{vmatrix} 5 & -4 \\ 3 & -3 \end{vmatrix} - j\begin{vmatrix} -5 & -4 \\ 9 & -3 \end{vmatrix} + k\begin{vmatrix} -5 & 5 \\ 9 & 3 \end{vmatrix}$$

$$-3i - 51j + -60k$$

$(-3, -51, -60) \cdot (x-1, y-9, z-1)$

$-3(x-1) - 51(y-9) - 60(z-1) = 0$

$-3x + 3 - 51y + 459 - 60z + 60 = 0$

$3x + 51y + 60z = 522$

Plot $(4, 4, 2)$

$3(4) + 51(4) + 60(2) = 522$

$536 = 522$ ← Not on plane.

$$\frac{336}{\sqrt{4 + 2601 + 3600}}$$

$= 0.0541$

$4.26$

$z = 2.13\,m$

GROUP NAME: Mechanics

Date: 05/04/14

Student Names (First and Last)

Speaker/Presenter: Pablo Arroyo

Writer/Prep: Joe Hippolite, Peter C.

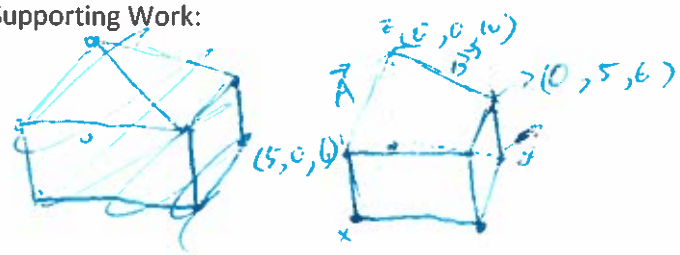
Leader/Collaborator: Conor Krugsman

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

Supporting Work:




$\vec{A} \times \vec{B}$

$\vec{A} = \langle 5-0, 0-0, 0-6 \rangle$

$\vec{A} = \langle 5, 0, -6 \rangle$

$\vec{B} = \langle 0-0, 5-0, 6-10 \rangle$

$\vec{B} = \langle 0, 5, -4 \rangle$

$\vec{A} \times \vec{B} = \begin{vmatrix} -5 & 0 & 4 \\ 0 & 5 & -4 \end{vmatrix}$

$= (0-20)\vec{i} - (20-4)\vec{j} + (-25-0)\vec{k}$

$= -20\vec{i} - 16\vec{j} - 25\vec{k}$

$\vec{A} \times \vec{B} = \vec{m}$

$= \langle -20, -16, -25 \rangle = \vec{N}$

$= -20(x-0) - 16(y-0) - 25(z-10)$

$\vec{A} \times \vec{B} = \begin{vmatrix} 5 & 0 & -4 \\ 0 & 5 & -4 \end{vmatrix}$

$20\vec{i} + 20\vec{j} + 25\vec{k}$

$\vec{A} \times \vec{B} = \vec{N}$

$\langle 20, 20, 25 \rangle = \vec{N}$

$0 = 20(x-0) + 20(y-0) + 25(z-10)$

GROUP NAME: Cyclist Crashers

Date: 9/4/14

Student Names (First and Last)

Speaker/Presenter: Jaquain Baldwin

Writer/Prep: Deep Gajjar

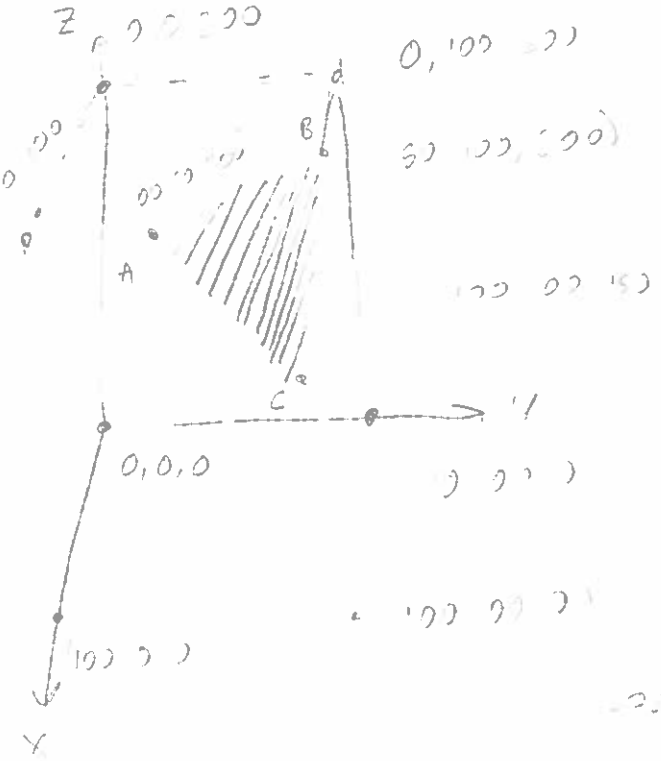
Leader/Collaborator: Benito Santos

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

Supporting Work:




$\vec{AB}$

$\vec{BC}$

$\vec{AB} \times \vec{BC} = \begin{vmatrix} i & j & k \\ -50 & 0 & 0 \\ 0 & 50 & -100 \end{vmatrix}$

$-7500 - 7500) + 2500k$

$-2500(z - 50) - 2500(y - 100) + 2500(x - 50) = 0$

$7500z + 375000 - 2500z = 375000$

GROUP NAME: Gang of Four

Date: _____

Student Names (First and Last)

Speaker/Presenter: Alex Amen

Writer/Prep: Dominic Conde; Zhihao Guo

Leader/Collaborator: Sean Titas

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

$500x + 500y + 400(z-100) = 0$

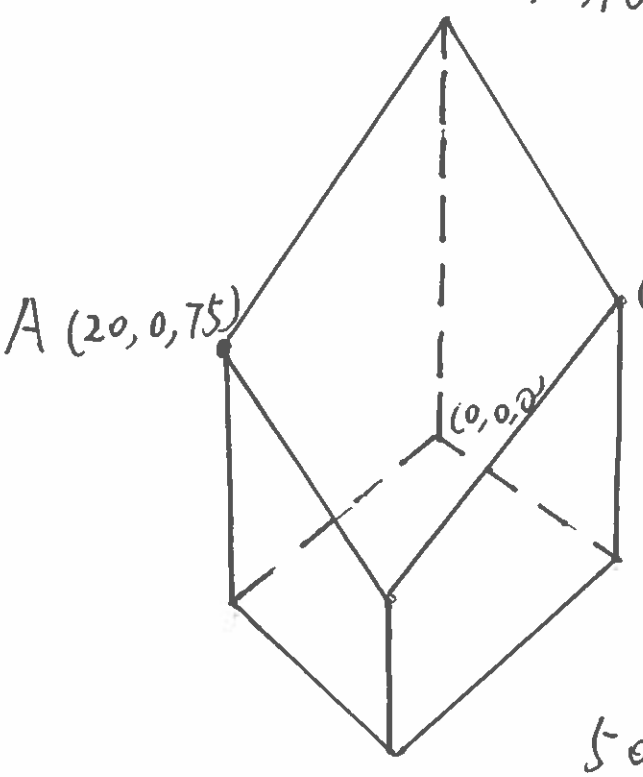
Supporting Work:

$\overrightarrow{BA} = \langle 20, 0, -25 \rangle$

$\overrightarrow{BC} = \langle 0, 20, -25 \rangle$

$\overrightarrow{BA} \times \overrightarrow{BC} = \begin{vmatrix} i & j & k \\ 20 & 0 & -25 \\ 0 & 20 & -25 \end{vmatrix}$

$= 500i + 500j + 400k$




$\therefore 500(x-0) + 500(y-0) + 400(z-100) = 0$

$500x + 500y + 400(z-100) = 0$

Dome:

(Assuming roof at $z = 75$) $(x-10)^2 + (y-10)^2 + (z-75)^2 = 100$

GROUP NAME: Three Dimentions

Date: 09/04/2014

Student Names (First and Last)

Speaker/Presenter: Matt Pecsico

Writer/Prep: Oksana Poberezhnyk

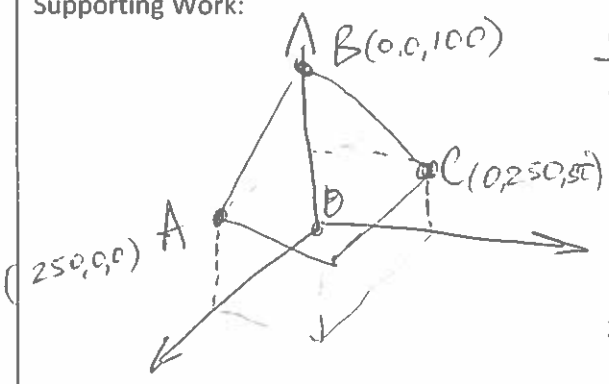
Leader/Collaborator: Xiao

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

Supporting Work:




$\overrightarrow{BA} = \langle 250, 0, -50 \rangle$

$\overrightarrow{BC} = \langle 0, 250, -50 \rangle$

$\overrightarrow{BA} \times \overrightarrow{BC} = \begin{vmatrix} i & j & k \\ 250 & 0 & -50 \\ 0 & 250 & -50 \end{vmatrix} =$

$= i\begin{vmatrix} 0 & -50 \\ 250 & -50 \end{vmatrix} - j\begin{vmatrix} 250 & -50 \\ 0 & -50 \end{vmatrix} + k\begin{vmatrix} 250 & 0 \\ 0 & 250 \end{vmatrix} =$

$= i(0 + 12500) + 12500j + 62500k = \langle 12500, 12500, 62500 \rangle$

$\vec{n}$

[redacted]

$12500(x - 0) + 12500(y - 0) + 62500(z - 100) = 0$

$12500x - 0 + 12500y - 0 + 62500z - 6250000 = 0$

$12500x + 12500y + 62500z = 6250000$

| | |
|---|---|
| GROUP NAME: CIVIL DOCTORS | Student Names (First and Last) |
| Date: September 04, 2014 | Speaker/Presenter: SNEHA RANGU |
| Independant Variable (x-axis): | Writer/Prep: LAUREN ROBO |
| Dependant Variable (y-axis): | Leader/Collaborator: JON GASKILL |

Conclusion (in words): THE EQUATION OF OUR BUILDING IS $-x-y+2z=20$

Supporting Work:

$\vec{N} = \vec{A} \times \vec{B}$

$A_x + B_y + C_z = D$

A (0,20,20)
B (20,20,30)
C (20,0,20)
D (0,0,10)

$AB \times AC$

$\langle 20,0,10 \rangle \times \langle 0,20,10 \rangle$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 20 & 0 & 10 \\ 0 & 20 & 10 \end{vmatrix}$$

$$\hat{i}\begin{vmatrix} 0 & 10 \\ 20 & 10 \end{vmatrix} - \hat{j}\begin{vmatrix} 20 & 10 \\ 0 & 10 \end{vmatrix} + \hat{k}\begin{vmatrix} 20 & 0 \\ 0 & 20 \end{vmatrix}$$

$= -200\hat{i} - 200\hat{j} + 400\hat{k}$

$\langle -200, -200, 400 \rangle$ NORMAL

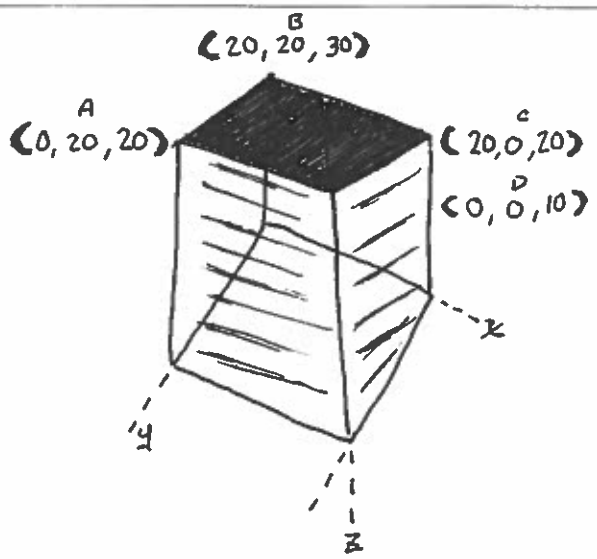
$(x,y,z)\ \langle -200,-200,400 \rangle \times \langle (x-20), (y-20), (z-30) \rangle$

$-200(x-20) - 200(y-20) + 400(z-30)$

$-200x + 4000 - 200y + 4000 + 400z - 12000 = 0$

$-200x - 200y + 400z = 4000$

$-x - y + 2z = 20$



GROUP NAME: The Math Busters

Date: 9/4/14

Student Names (First and Last)

Speaker/Presenter: Angad Chadha

Writer/Prep: Varun Jain

Leader/Collaborator: Jason Deleon

Independant Variable (x-axis): _____

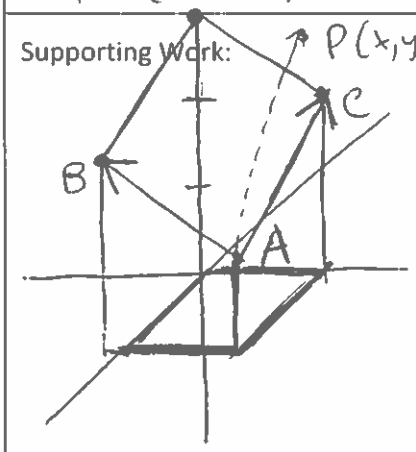
Dependant Variable (y-axis): _____

Conclusion (in words):

The plane of the slice of the building has the equation:

$-10,000(x-100)+10,000(y-100)-10,000(z-100)=0$

Supporting Work:




$A = (100, 100, 100)$

$B = (100, 0, 200)$

$C = (0, 100, 200)$

$P = (x, y, z)$

$\vec{AP} = \langle x-100, y-100, z-100 \rangle$

$\vec{AB} = \langle 0, -100, 100 \rangle$

$\vec{AC} = \langle -100, 0, 100 \rangle$

$\vec{AB} \times \vec{AC} = \vec{n}$

$$\vec{n} = \begin{vmatrix} i & j & k \\ 0 & -100 & 100 \\ -100 & 0 & 100 \end{vmatrix} = -10,000\,\hat{i} - 10,000\,\hat{j} - 10,000\,\hat{k}$$

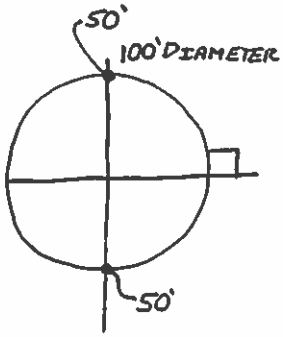
$\vec{n} = \langle -10,000, -10,000, -10,000 \rangle$

$\vec{AP} \cdot \vec{n} = -10,000(x-100) - 10,000(y-100) - 10,000(z-100) = 0$

| | |
|---|---|
| GROUP NAME: CIVIL DOCTORS | Student Names (First and Last) |
| Date: 09/09/2014 | Speaker/Presenter: JON BASKILL |
| Independant Variable (x-axis): | Writer/Prep: LAUREN DORO |
| Dependant Variable (y-axis): | Leader/Collaborator: SNEHA RANGU |

Conclusion (in words): THE LENGTH OF GOLD FOR THE SPIRAL STAIRCASE IS 1573.98 Ft

Supporting Work:




$x = -50\cos t$

$y = 50\sin t$

$z = (10t)/2\pi$

[redacted]

$$S = \int_0^{10\pi} \sqrt{x^2 + y^2 + z^2}\, dt$$

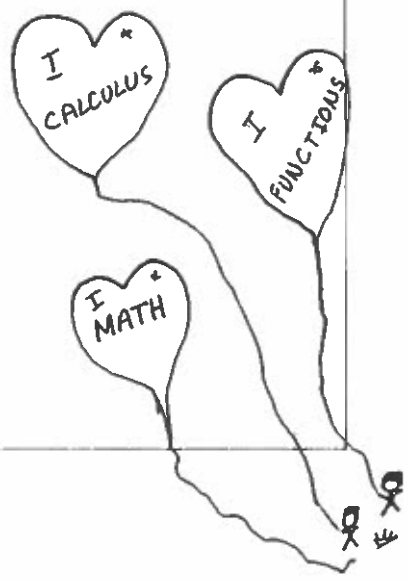
$$S = \int_0^{10\pi} \sqrt{(-50\cos t)^2 + (50\sin t)^2 + (10t/2\pi)^2}\, dt$$

$$S = \int_0^{10\pi} \sqrt{50^2 + 100/\pi^2}\, dt$$

$$= \left[50^2 + \frac{100}{\pi^2}\right]_0^{10\pi}$$

$$= \sqrt{2500 + \frac{100}{\pi^2}}$$

$$= 1573.98 \text{ ft}$$



GROUP NAME: Math Busters

Date: 9/9/14

Student Names (First and Last)

Speaker/Presenter: Angad Chadha

Writer/Prep: Varun Jain

Leader/Collaborator: Jason Delcon

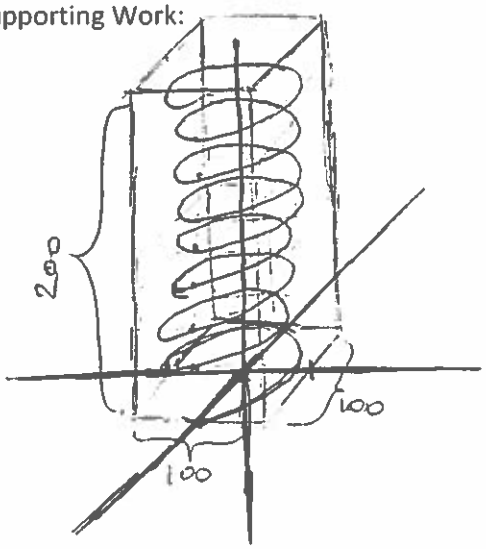
Independant Variable (x-axis): _____

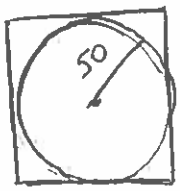
Dependant Variable (y-axis): _____

Conclusion (in words):

The amount of gold needed to make the railing of the spiral staircase is 6286.4 ft

Supporting Work:




$x^2 + y^2 = r^2 = 2500$

$x = 50\cos t$

$y = 50\sin t$

$z = \frac{10t}{2\pi}$

$\vec{r}(t) = \langle 50\cos t, 50\sin t, \frac{10t}{2\pi} \rangle$

$\vec{r}'(t) = \langle -50\sin t, 50\cos t, \frac{10}{2\pi} \rangle$

$z = 200 = \frac{10t}{2\pi}$

$400\pi = 10t$

$t = 40\pi$

$$\text{arc length} = \int_0^{40\pi} \sqrt{2500 + \frac{100}{4\pi^2}}\, dt$$

$$= \boxed{6286.4 \text{ ft of gold railing}}$$

GROUP NAME: Gang of Five

Date: 9/9/14

Student Names (First and Last)

Speaker/Presenter: Dom

Writer/Prep: Alex, Sean

Leader/Collaborator: Zhihao Guan

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words): Our railing is 543.65 feet

Supporting Work:

$f(t) = \langle 10\sin t, 10\cos t, \frac{10t}{2\pi} \rangle$

$f'(t) = \langle 10\cos t, -10\sin t, \frac{10}{2\pi} \rangle$

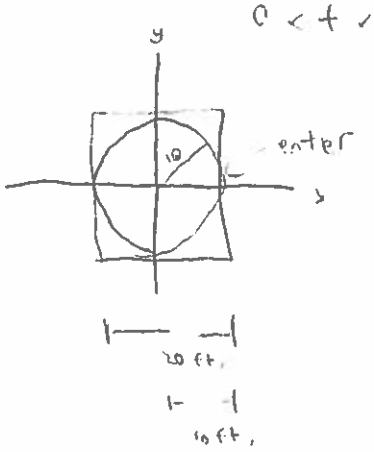
$arc = \int_0^{12\pi} \sqrt{100\cos^2 t + 100\sin^2 t + \frac{100}{4t}}$

$= 543.65$ feet

6 stories tall

$\therefore$

$0 < t < 12\pi$



GROUP NAME: THREE DIMENTIONSH

Date: 09/09/2014

Student Names (First and Last)

Speaker/Presenter:

Writer/Prep: OKSANA POBEREZHNYK

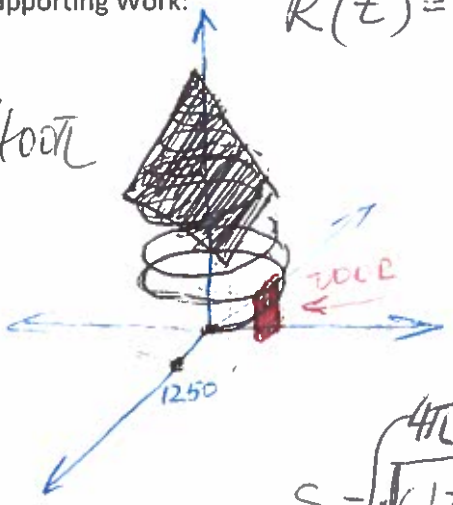
Independant Variable (x-axis):

Dependant Variable (y-axis):

Leader/Collaborator: Xiao Zheng
Sam + Irene

Conclusion (in words):

Supporting Work:




$\vec{R}(t) = \langle x(t), y(t), z(t) \rangle$

$x = 1250\cos t$

$y = 1250\sin t$

$z = \frac{t}{4\pi} \cdot 100 \quad 100t$

$\vec{r}(t) < 1250\cos t, 1250\sin t, 100t >$

$0 < t < 4\pi$

$$S = \int_0^{4\pi} \sqrt{(-1250\sin t)^2 + (1250\cos t)^2 + (100)^2}\, dt = 15707.96 \text{ ft.}$$

GROUP NAME: Mechanics

Date: 09/09/14

Student Names (First and Last)

Speaker/Presenter: Pablo Arroyo

Writer/Prep: Joe, Peter Hippolyte, & Peter

Leader/Collaborator: connor Kruysman

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

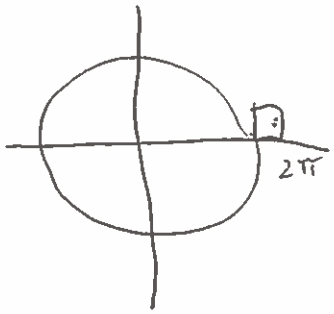
$= 6283.685$ ft

Supporting Work:

$x = 100\cos t \qquad 0 \le t \le 10(2\pi)$

$y = 100\sin t$

$z = \frac{10t}{2\pi}$

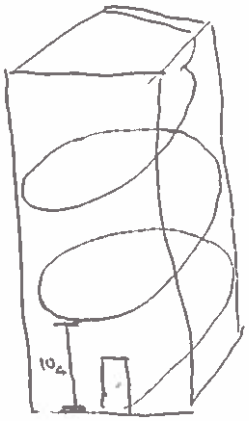



$$\int_0^{20\pi} \sqrt{(x')^2 + (y')^2 + (z')^2}$$

$$\int_0^{20\pi} \sqrt{10000\sin^2 t + 10000\cos^2 t + \frac{5}{\pi}}$$

$$\int_0^{20\pi} \sqrt{10000\left(\sin^2 t + \cos^2 t\right) + \frac{5}{12}}$$

$= 6283.685$ FT



GROUP NAME: Circuit breakers

Date: 9/9/14

Student Names (First and Last)

Speaker/Presenter: Jaquain Baldwin

Writer/Prep: Deep Gajjar

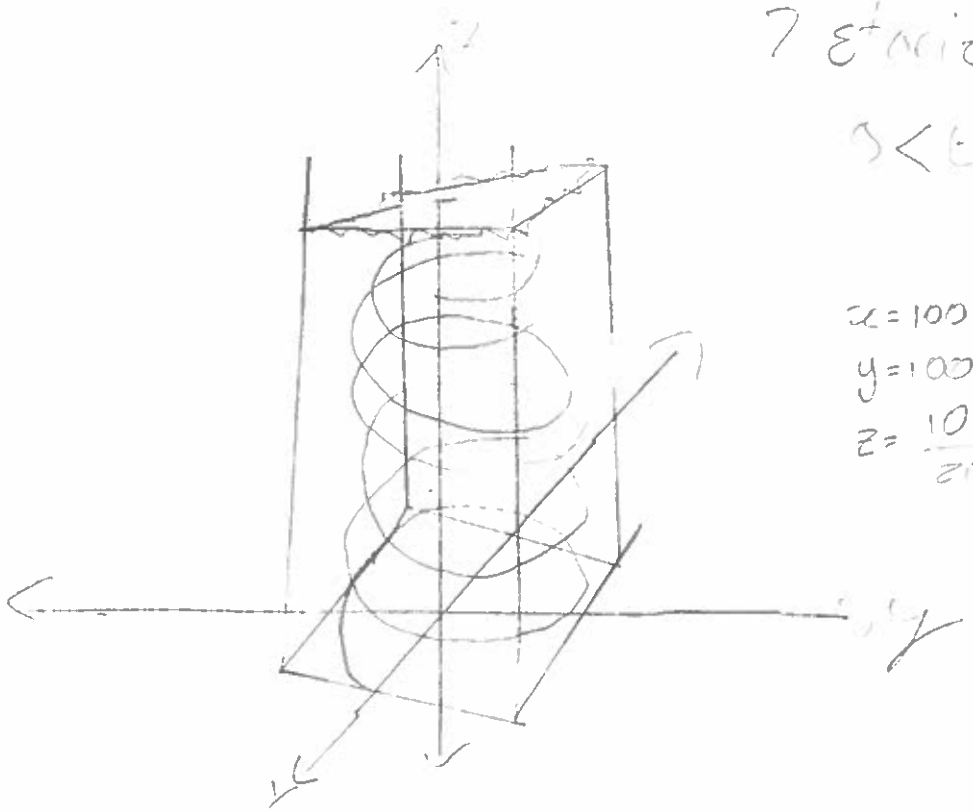
Leader/Collaborator: Benito Santos

Independant Variable (x-axis): _____

Dependant Variable (y-axis): _____

Conclusion (in words):

Supporting Work:



7 Extra = Draft

$3 < t < 14\pi$

$x = 100\cos t$

$y = 100\sin t$

$z = \frac{10t}{2\pi}$

$\vec{r}(t) = \langle 100\cos t \quad 100\sin t \quad \frac{10t}{2\pi} \rangle$

$\vec{r}'(t) = \langle -100\sin t \quad 100\cos t \quad \frac{10}{2\pi} \rangle$

$\int_0^{14\pi} \sqrt{(-100\sin t)^2 + (100\cos t)^2 + \left(\frac{10}{2\pi}\right)^2}\, dt = \int_0^{14\pi} 100^2 + \frac{25}{\pi^2}\, dt = 4+00\ 45$