Q, Z= V2(-X2-242+5) = A(x-a) + B(y-b) + ((z-c) = 0 T t coordinate } y coordinate z coordinate

Stope of y slope of y R1 P (1,1,1) · a(+- x0) + b(y-y0) + 20 ((x,y)=a(x-1)+5(y-1)+c(2-1) a= = = (1,1) == of (1,1) of = 2.1/2 (xy)=1(x-1)+2(y-1)+12(-1-x) 1 (x-1) + 2(y71) + 45 x-1+(2y2) +1

X + 24 + 255 5

Qz 
$$P = (2.1) = w = x^2 - xy^3$$
  
 $A = 3i + 4j$ 

$$\nabla_A P = 3 \frac{\partial P}{\partial x} + 4 \frac{\partial P}{\partial y}$$

$$\nabla_{3}P = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} \end{bmatrix} = \begin{bmatrix} \frac{\partial P}{\partial x} \\ \frac{\partial P}{\partial y} \\ \frac{\partial P}{\partial y} 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$$\nabla_{x}^{2} \left(2, 1\right) = \begin{bmatrix} -1^{3} + 2(2) \\ -3(1^{2}) \cdot 2 \end{bmatrix} = \begin{bmatrix} 3 \\ -6 \end{bmatrix}$$

$$= \begin{bmatrix} 3 \\ -6 \end{bmatrix} \circ \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

$$= 3(3) + (-6)(4)$$

$$= -15$$

## #FREELE CONTRACTIONS

$$h^{2} = 0.01$$

$$h^{3} = \begin{bmatrix} 3h \\ -6h \end{bmatrix}$$

$$= \begin{bmatrix} 0.03 \\ -0.06 \end{bmatrix} \cdot \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

$$= 0.03(3) + (-0.06)(4)$$

$$= -0.15$$

Q3 Plane = 
$$2x + y - z = 6$$
  
 $x = x^2 + y^2 + z^2$   
 $2x = 2\lambda$   
 $2y = \lambda$   
 $2z = -\lambda$   
 $2\lambda + \frac{\lambda}{2} = 6$   
 $2\lambda \cdot z + \frac{\lambda}{2} = 6$ 

$$\frac{6}{2} = 6$$

Qy A 1 0 3 4 Rov (= Rov A - Row B,

5 -2 1 -1 -2 so matrix is lineary dependent

A= ail + az) + azk B=bii + bzj +bs/

-2 2 9

1 = 32 -2 x + 14=-12 - 1x + 19 =

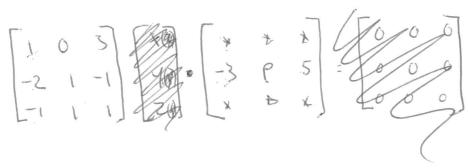
C= A x B=

$$Q_{5} = \begin{bmatrix} 1 & 0 & 3 \\ -2 & 1 & -1 \\ -1 & 1 & 2 \end{bmatrix} \begin{bmatrix} 1 \times & 0 & 3 \times \\ 2 & -2 \times & 1 & -1 \times \\ -1 & 1 & 2 \end{bmatrix} \begin{bmatrix} 1 \times & 0 & 3 \times \\ 2 & -2 \times & 1 & -1 \times \\ -1 & 1 & 2 & 2 \end{bmatrix}$$

multi

$$1x = 32$$
  
 $-2x + 1y = -12$   
 $-1x + 1y = 22$ 

## 





$$\frac{\partial f}{\partial x} = 1 - \frac{2}{x^2 y} = 0 \left| \frac{1}{x^2 y} - \frac{41}{x^2} \right| \quad \frac{2}{x^2} = y \quad y = 8y^2 - \frac{1}{2}$$

$$\frac{\partial f}{\partial y} = y - \frac{2}{y^2 x} = 0 \left| \frac{x^2}{y^2 x} - \frac{4y}{y^2 x} - \frac{1}{2y^2} - \frac{1}{2} \right| \quad x = \frac{x^4}{8} - 2$$

$$\frac{\partial f}{\partial x^2} = \frac{4}{x^3 y}$$

$$\frac{\partial f}{\partial x^2} = \frac{2}{x^2 y^2} = \frac{2}{x^2 y^2} = \frac{106 - 2^2 > 0}{100 - 2^2 > 0}$$

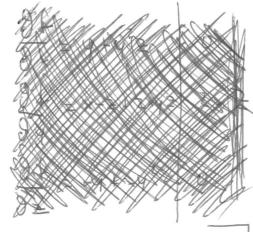
$$\frac{\partial f}{\partial y^2} = \frac{4}{y^2 x}$$

$$\frac{\partial k}{\partial x} = \frac{\partial i}{\partial z} = 4^{2}$$

$$\frac{\partial i}{\partial x} = \frac{\partial i}{\partial y} = 1 + 24^{2}$$

$$\frac{\partial i}{\partial x} = \frac{\partial k}{\partial z} = 0$$

$$\frac{\partial k}{\partial y} = \frac{\partial i}{\partial z} = -1 + 24y$$



$$\frac{\partial f}{\partial x} = (y + y^{2} \pm )x + g(y, \pm) = F \Rightarrow xy + xy^{2} \pm \frac{\partial f}{\partial y} = (x - 2)y + x \pm y^{2} + g(x, \pm) = F \Rightarrow -2y$$

$$\frac{\partial f}{\partial y} = (x - 2)y + x \pm y^{2} + g(x, \pm) = F \Rightarrow + C$$

$$\frac{\partial f}{\partial z} = (-y + xy^{2}) \pm g(x, y) = F \Rightarrow + C$$

$$f = xy + xy^{2} \pm -2y + C$$

Q. 
$$A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$$
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix} = 0$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix} = 0$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$ 
 $A = \begin{bmatrix} 1 & 1 \\ -1 \end{bmatrix}$ 

Q2 
$$A = \begin{bmatrix} 2 & 3 \\ x & y \end{bmatrix}$$
  
 $\lambda = 4 \cdot 0$   
 $\det (\begin{bmatrix} \lambda & 0 \\ 0 & \lambda \end{bmatrix} - \begin{bmatrix} 2 & 3 \\ 2 & y \end{bmatrix}) = 0$   
 $\det (\begin{bmatrix} \lambda & 2 & -3 \\ -x & \lambda & -y \end{bmatrix})$   
 $(\lambda - 2)(\lambda - y) + 3x = 0$   
 $2(\theta - y) = -3x \rightarrow 16 - 2y = -3x$   
 $6(4 - y) = -3x \rightarrow 24 - 6y = -3x$   
 $6 - 2y = -x$   
 $x = -4$   
 $y = 2$ 

$$x + 3y = 3$$
 $-4y = -1$ 
 $y = \frac{1}{7}$ 

one solution:  $x, x = \frac{3}{7}, \frac{1}{4}$ 
 $x = \frac{3}{7}$