① given,
$$A = \begin{bmatrix} 1 & 2 & 1 \\ 4 & 4 & 5 \\ 6 & 7 & 7 \end{bmatrix}; A' = \begin{bmatrix} -7 & -7 & 6 \\ 2 & 1 & -1 \\ 4 & 5 & -4 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}$$

$$X = \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -7 & -7 & 6 \\ 2 & 1 & -1 \\ 4 & 5 & -4 \end{bmatrix} \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}$$

$$X' = \begin{bmatrix} (-7 \times 2) + (-7 \times 0) + (6 \times 1) \\ (2 \times 2) + (1 \times 0) + (-1 \times 1) \\ (4 \times 2) + (5 \times 0) + (-4 \times 1) \end{bmatrix}$$

$$X = \begin{bmatrix} -14+6 \\ 4-1 \\ 8-4 \end{bmatrix}$$

(3) a) (4) 3 (8 6)

Determinant = 
$$A(6) - 3(8)$$
=  $24 - 24$ 
= 0

Sing, Determinant is zero, the matrix is not invertible.

b) (4 3)
8 7)

Determinant =  $A(7) - 3(8)$ 
=  $28 - 24$ 
=  $4$ 

Alternative is invertible.

c) (6 6)

Determinant =  $6(0) - 6(6)$ 
=  $-36$ 

Alternative is invertible.

d) (6 6)

Determinant =  $6(0) - 6(6)$ 
=  $-36$ 

The matrix is invertible.

e) (1 0 0)

Determinant =  $1(1(1) - 0) + 0 + 0$ 
=  $1$ 

The matrix is invertible.

Peterminant = 
$$1(1-0)-1(1-0)$$
  
 $+1(1-1)$   
 $+1(1-1)$   
 $= 1-1+0$   
 $= 0$   
Solven,  $A = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 3 & 2 & 1 \end{pmatrix}$   
The given motion  $A^{-1}$  is invertible only if the determinant of the matrix  $u$  non-zero.  
Determinant =  $1(1-2(2))-2(3(1)-3(2))$   
 $= 1(-3)-2(-3)+3(3)$   
 $= -3+6+9$   
 $= 12$   
Hence, the given matrix  $A^{-1}$  is  $A^{-1}$  invertible.

5) we know that, If  $A \in B$  are invertible matrices than AB is invertible and  $(AB)^{-1} = B^{-1}A^{-1}$ 

This is also known as shoes & socks rule.

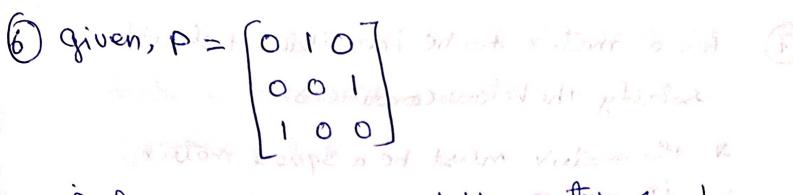
Since, A, B, C are invertible tox n matrices,

ABC is also invertible.

(ABC) = C-1. B-1 A-1

The product BTCATB is also invertible & its inverse is given by

 $\left(B^{-1}CA^{-1}B\right)^{-1} = B^{-1}A.C^{-1}B.$ 



If the inverse of a permutation matrix can be found out by taking the transpose of the matrix itself. As, Permutation matrix is orthogonal hence,  $D \cdot P' = P^T$ 

Porton Zelos ( O O O ) and long of rot sound

Her, the i's indicates which columns of the identity matrix get moved where.

It is called as permutation matrix because it represents a permutation or re-ordering of columns of the identity motrix.

ild Houri gd lower x retom who mostly

as it give non-zero as determinant

- For a mateix to be invertible it should satisfy the below conditions:
  - I the mother must be a square matrix
  - The determinate of the moder's must be non zero.

Herr, It is given as the moitrix is a square matrix and one condition is satisfied.

housever, for the Second Condition, as this matrix is made up of 0's and 1's, is more likely that it might took rusult the determinant to be zero. (assuming the 1's 2,0's are assunged according to the given figure). Hence, making the matrix not - investible.

If the 0's & 1's are arranged in a specific pattern, the mateix could be invertible. as it gives non-zero as determinant.