

Problem 1: Calculation

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \end{bmatrix}$$

- (a)  $AC$    (b)  $BA$    (c)  $B^2$    (d)  $B^3$    (e)  $C^2$    (f)  $C^3$

Problem 2: Give examples of  $2 \times 2$  matrices  $A, B, C$  such that

(a)  $AB \neq BA$

(b)  $A, B$  not  $0$  but  $AB = 0$

(c)  $A \neq B$  but  $AC = BC$

Problem 3:  $A = \begin{bmatrix} 2 & 5 \\ -3 & 1 \end{bmatrix}$     $B = \begin{bmatrix} 4 & -5 \\ 3 & k \end{bmatrix}$

for what value of  $k$  will  $AB = BA$ ?

Problem 4: Find inverse of  $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

Problem 5: Suppose  $A = PBP^{-1}$     $P$  invertible then

solve  $B$  in terms of  $A$ .