

1. Solve the IVP:  $x^2y'' + 3xy' - 3y = 0$ ;  $y(1) = 3$ ,  $y'(1) = 0$ .

2. Suppose that  $A = \begin{pmatrix} 1 & 0 & -1 \\ 2 & 3 & -3 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 2 & -1 \\ -1 & 0 & 2 \\ 1 & 3 & 0 \\ 0 & 5 & -2 \end{pmatrix}$

- (a) Circle the matrix products which are well defined:  $BA$ ,  $A^T B$ ,  $AA^T$ ,  $A^2$ .
- (b) Choose one of the matrix products that you have circled and compute it.

1. Solve the IVP:  $x^2 y'' - 6y = 0$ ;  $y(1) = 3$ ,  $y'(1) = 0$ .

2. Suppose that  $A = \begin{pmatrix} 1 & 0 \\ 2 & 3 \\ -1 & -3 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 2 & -1 & 0 \\ -1 & 0 & 2 & 5 \\ 1 & 3 & 0 & -2 \end{pmatrix}$

(a) Circle the matrix products which are well defined:  $AB$ ,  $BA^T$ ,  $A^T A$ ,  $A^2$ .

(b) Choose one of the matrix products that you have circled and compute it.

1. Solve the IVP:  $x^2y'' - 4xy' + 4y = 0$ ;  $y(1) = 3$ ,  $y'(1) = 0$ .

2. Suppose that  $A = \begin{pmatrix} 1 & 2 & -1 \\ -1 & 0 & 2 \\ 1 & 3 & 0 \\ 0 & 5 & -2 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 0 & -1 \\ 2 & 3 & -3 \end{pmatrix}$

- (a) Circle the matrix products which are well defined:  $AB$ ,  $B^T A$ ,  $BB^T$ ,  $A^2$ .
- (b) Choose one of the matrix products that you have circled and compute it.