Operazioni con le matrici

stabilire se le seguenti matrici sono invertibili e in caso affermativo calcolarne l'inversa

1	$\begin{pmatrix} -9 & -8 \\ 5 & 3 \end{pmatrix}$	$\begin{pmatrix} -3 & 10 \\ 6 & -7 \end{pmatrix}$	$\begin{pmatrix} 3/13 & 8/13 \\ -5/13 & -9/13 \end{pmatrix}$	$\begin{pmatrix} 7/39 & 10/39 \\ 2/13 & 1/13 \end{pmatrix}$
2	$\begin{pmatrix} -10 & -1 \\ -8 & 8 \end{pmatrix}$	$\begin{pmatrix} -6 & -8 \\ -9 & 1 \end{pmatrix}$	$\begin{pmatrix} -1/11 & -1/88 \\ -1/11 & 5/44 \end{pmatrix}$	$\begin{pmatrix} -1/78 & -4/39 \\ -3/26 & 1/13 \end{pmatrix}$
3	$\begin{pmatrix} 4 & 0 \\ -1 & -7 \end{pmatrix}$	$\begin{pmatrix} -9 & 12 \\ -3 & 4 \end{pmatrix}$	$\begin{pmatrix} 1/4 & 0 \\ -1/28 & -1/7 \end{pmatrix}$	*Non invertibile*
4	$\begin{pmatrix} -6 & 8 \\ -9 & 9 \end{pmatrix}$	$\begin{pmatrix} -10 & 7 \\ 6 & -4 \end{pmatrix}$	$\begin{pmatrix} 1/2 & -4/9 \\ 1/2 & -1/3 \end{pmatrix}$	$\begin{pmatrix} 2 & 7/2 \\ 3 & 5 \end{pmatrix}$
5	$\begin{pmatrix} 2 & -4 \\ 7 & 6 \end{pmatrix}$	$\begin{pmatrix} 5 & 9 \\ 2 & 4 \end{pmatrix}$	$\begin{pmatrix} 3/20 & 1/10 \\ -7/40 & 1/20 \end{pmatrix}$	$\begin{pmatrix} 2 & -9/2 \\ -1 & 5/2 \end{pmatrix}$
6	$\begin{pmatrix} 7 & 2 \\ 9 & 3 \end{pmatrix}$	$\begin{pmatrix} 4 & -10 \\ -6 & -3 \end{pmatrix}$	$\begin{pmatrix} 1 & -2/3 \\ -3 & 7/3 \end{pmatrix}$	$\begin{pmatrix} 1/24 & -5/36 \\ -1/12 & -1/18 \end{pmatrix}$
7	$\begin{pmatrix} -2 & 5 \\ -3 & 7 \end{pmatrix}$	$\begin{pmatrix} 0 & -5 \\ -9 & -10 \end{pmatrix}$	$\begin{pmatrix} 7 & -5 \\ 3 & -2 \end{pmatrix}$	$\begin{pmatrix} 2/9 & -1/9 \\ -1/5 & 0 \end{pmatrix}$
8	$\begin{pmatrix} 5 & 2 \\ -8 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 \\ 6 & -7 \end{pmatrix}$	$\begin{pmatrix} 1/21 & -2/21 \\ 8/21 & 5/21 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 \\ 6/7 & -1/7 \end{pmatrix}$
9	$\begin{pmatrix} -9 & 3 \\ 15 & -5 \end{pmatrix}$	$\begin{pmatrix} -2 & 3 \\ 9 & -6 \end{pmatrix}$	*Non invertibile*	$\begin{pmatrix} 2/5 & 1/5 \\ 3/5 & 2/15 \end{pmatrix}$
10	$\begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$	$\begin{pmatrix} 3 & -4 \\ 6 & -8 \end{pmatrix}$	$\begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$	*Non invertibile*
11	$\begin{pmatrix} -2 & 0 & 0 \\ 10 & 4 & -2 \\ -1 & 0 & 3 \end{pmatrix}$	$\begin{pmatrix} -4 & -5 & 0 \\ 7 & 10 & 0 \\ 0 & -4 & 6 \end{pmatrix}$	$\begin{pmatrix} -1/2 & 0 & 0 \\ 7/6 & 1/4 & 1/6 \\ -1/6 & 0 & 1/3 \end{pmatrix}$	$\begin{pmatrix} -2 & -1 & 0 \\ 7/5 & 4/5 & 0 \\ 14/15 & 8/15 & 1/6 \end{pmatrix}$
12	$\begin{pmatrix} -10 & 0 & -10 \\ 0 & -8 & 0 \\ -4 & 5 & -8 \end{pmatrix}$	$\begin{pmatrix} 2 & 0 & 1 \\ -1 & -3 & 7 \\ 5 & 0 & -1 \end{pmatrix}$	$\begin{pmatrix} -1/5 & 5/32 & 1/4 \\ 0 & -1/8 & 0 \\ 1/10 & -5/32 & -1/4 \end{pmatrix}$	$\begin{pmatrix} 1/7 & 0 & 1/7 \\ 34/21 & -1/3 & -5/7 \\ 5/7 & 0 & -2/7 \end{pmatrix}$
13	$\begin{pmatrix} 0 & -4 & 0 \\ 5 & -1 & 3 \\ -3 & 0 & 6 \end{pmatrix}$	$\begin{pmatrix} 0 & -8 & 4 \\ 0 & -3 & 0 \\ -8 & 10 & -9 \end{pmatrix}$	$\begin{pmatrix} -1/26 & 2/13 & -1/13 \\ -1/4 & 0 & 0 \\ -1/52 & 1/13 & 5/39 \end{pmatrix}$	$\begin{pmatrix} -9/32 & 1/3 & -1/8 \\ 0 & -1/3 & 0 \\ 1/4 & -2/3 & 0 \end{pmatrix}$

Operazioni con le matrici

14	$\begin{pmatrix} 0 & 0 & -2 \\ 6 & 1 & 2 \\ 0 & 0 & 7 \end{pmatrix}$	$\begin{pmatrix} -6 & 0 & 4 \\ -3 & 0 & 7 \\ -5 & 7 & 5 \end{pmatrix}$	*Non invertibile*	$\begin{pmatrix} -7/30 & 2/15 & 0 \\ -2/21 & -1/21 & 1/7 \\ -1/10 & 1/5 & 0 \end{pmatrix}$
15	$\begin{pmatrix} 9 & 4 & 0 \\ 3 & 0 & 0 \\ 0 & -4 & 3 \end{pmatrix}$	$\begin{pmatrix} -4 & 0 & -3 \\ 6 & 9 & 0 \\ 0 & 8 & -5 \end{pmatrix}$	$\begin{pmatrix} 0 & 1/3 & 0 \\ 1/4 & -3/4 & 0 \\ 1/3 & -1 & 1/3 \end{pmatrix}$	$\begin{pmatrix} -5/4 & -2/3 & 3/4 \\ 5/6 & 5/9 & -1/2 \\ 4/3 & 8/9 & -1 \end{pmatrix}$
16	$\begin{pmatrix} 3 & -5 & -10 \\ -8 & 0 & 2 \\ 3 & 0 & 3 \end{pmatrix}$	$\begin{pmatrix} -10 & 0 & 0 \\ -9 & 0 & 0 \\ 9 & -3 & 10 \end{pmatrix}$	$\begin{pmatrix} 0 & -1/10 & 1/15 \\ -1/5 & -13/50 & -37/75 \\ 0 & 1/10 & 4/15 \end{pmatrix}$	*Non invertibile*
17	$\begin{pmatrix} 2 & 1 & 0 \\ 0 & -4 & -3 \\ 0 & -5 & -1 \end{pmatrix}$	$\begin{pmatrix} 10 & 0 & -2 \\ 8 & 1 & 2 \\ 0 & 5 & 0 \end{pmatrix}$	$\begin{pmatrix} 1/2 & -1/22 & 3/22 \\ 0 & 1/11 & -3/11 \\ 0 & -5/11 & 4/11 \end{pmatrix}$	$\begin{pmatrix} 1/18 & 1/18 & -1/90 \\ 0 & 0 & 1/5 \\ -2/9 & 5/18 & -1/18 \end{pmatrix}$

calcolo i prodotti righe per colonne vA e Av, rispettando l'orientamento dei vettori

18	$v = (3 \quad -6)$;	$A = \begin{pmatrix} 7 & 0 \\ 4 & -9 \end{pmatrix}$	$(-3 \quad 54)$	$\begin{pmatrix} 21 \\ 66 \end{pmatrix}$
19	$v = (-6 \quad 7)$;	$A = \begin{pmatrix} -3 & 1 \\ 0 & 10 \end{pmatrix}$	$(18 \quad 64)$	$\begin{pmatrix} 25 \\ 70 \end{pmatrix}$
20	$v = (-9 \quad -4)$;	$A = \begin{pmatrix} 0 & -7 \\ 0 & 1 \end{pmatrix}$	$(0 \quad 59)$	$\begin{pmatrix} 28 \\ -4 \end{pmatrix}$
21	$v = (-6 \quad 9)$;	$A = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$	$(3 \quad -6)$	$\begin{pmatrix} 3 \\ -6 \end{pmatrix}$
22	$v = (4 \quad -1)$;	$A = \begin{pmatrix} -1 & 9 \\ 10 & 0 \end{pmatrix}$	$(-14 \quad 36)$	$\begin{pmatrix} -13 \\ 40 \end{pmatrix}$
23	$v = (0 \quad -5)$;	$A = \begin{pmatrix} 6 & 4 \\ -1 & 5 \end{pmatrix}$	$(5 \quad -25)$	$\begin{pmatrix} -20 \\ -25 \end{pmatrix}$
24	$v = (7 \quad 0)$;	$A = \begin{pmatrix} -4 & 4 \\ 0 & 1 \end{pmatrix}$	$(-28 \quad 28)$	$\begin{pmatrix} -28 \\ 0 \end{pmatrix}$
25	$v = (-3 \quad -5)$;	$A = \begin{pmatrix} -1 & 0 \\ 7 & -7 \end{pmatrix}$	$(-32 \quad 35)$	$\begin{pmatrix} 3 \\ 14 \end{pmatrix}$

Operazioni con le matrici

26	$v = (0 \quad 6)$; $A = \begin{pmatrix} 0 & -9 \\ -5 & 3 \end{pmatrix}$	$(-30 \quad 18)$	$\begin{pmatrix} -54 \\ 18 \end{pmatrix}$
27	$v = (-2 \quad -2)$; $A = \begin{pmatrix} 0 & 5 \\ 8 & -6 \end{pmatrix}$	$(-16 \quad 2)$	$\begin{pmatrix} -10 \\ -4 \end{pmatrix}$
28	$v = (-5 \quad 4 \quad 4)$; $A = \begin{pmatrix} -6 & -1 & -2 \\ 9 & -6 & -10 \\ 4 & 0 & -10 \end{pmatrix}$	$(82 \quad -19 \quad -70)$	$\begin{pmatrix} 18 \\ -109 \\ -60 \end{pmatrix}$
29	$v = (7 \quad -10 \quad 9)$; $A = \begin{pmatrix} -6 & -9 & 0 \\ 9 & -8 & -4 \\ 0 & -10 & -1 \end{pmatrix}$	$(-132 \quad -73 \quad 31)$	$\begin{pmatrix} 48 \\ 107 \\ 91 \end{pmatrix}$
30	$v = (10 \quad 3 \quad 10)$; $A = \begin{pmatrix} 0 & -6 & -5 \\ 10 & -2 & -8 \\ -10 & -3 & -6 \end{pmatrix}$	$(-70 \quad -96 \quad -134)$	$\begin{pmatrix} -68 \\ 14 \\ -169 \end{pmatrix}$
31	$v = (3 \quad 0 \quad -7)$; $A = \begin{pmatrix} 7 & 1 & -10 \\ 8 & 10 & 3 \\ 0 & -1 & -7 \end{pmatrix}$	$(21 \quad 10 \quad 19)$	$\begin{pmatrix} 91 \\ 3 \\ 49 \end{pmatrix}$
32	$v = (9 \quad 2 \quad -10)$; $A = \begin{pmatrix} 3 & -8 & -2 \\ 0 & -8 & 0 \\ -2 & -9 & -9 \end{pmatrix}$	$(47 \quad 2 \quad 72)$	$\begin{pmatrix} 31 \\ -16 \\ 54 \end{pmatrix}$
33	$v = (8 \quad -1 \quad -9)$; $A = \begin{pmatrix} -1 & -3 & -10 \\ 0 & 10 & 1 \\ -8 & -5 & 3 \end{pmatrix}$	$(64 \quad 11 \quad -108)$	$\begin{pmatrix} 85 \\ -19 \\ -86 \end{pmatrix}$

date le matrici A e B, calcola i prodotti righe per colonne AB e BA

34	$A = (7 \quad 0 \quad 1)$; $B = (6 \quad 5 \quad 3)$	45
35	$A = (10 \quad -4 \quad 7)$; $B = (-7 \quad -6 \quad 0)$	-46
36	$A = (-1 \quad 6 \quad 4)$; $B = (8 \quad 0 \quad 3 \quad 1)$	*Non è possibile calcolare i prodotti (perchè?)*
37	$A = \begin{pmatrix} -4 & 7 \\ -10 & 10 \\ 0 & 8 \end{pmatrix}$; $B = \begin{pmatrix} 0 & 0 & -5 \\ 2 & 4 & 0 \end{pmatrix}$	$\begin{pmatrix} 14 & 28 & 20 \\ 20 & 40 & 50 \\ 16 & 32 & 0 \end{pmatrix}$ $\begin{pmatrix} 0 & -40 \\ -48 & 54 \end{pmatrix}$
38	$A = \begin{pmatrix} 3 & -9 \\ 4 & 0 \\ 8 & 0 \end{pmatrix}$; $B = \begin{pmatrix} 2 & 0 & 2 \\ 0 & 10 & 5 \end{pmatrix}$	$\begin{pmatrix} 6 & -90 & -39 \\ 8 & 0 & 8 \\ 16 & 0 & 16 \end{pmatrix}$ $\begin{pmatrix} 22 & -18 \\ 80 & 0 \end{pmatrix}$

Operazioni con le matrici

39	$A=\begin{pmatrix}0 & 2\\ -1 & 7\\ 0 & 0\end{pmatrix}$; $B=\begin{pmatrix}0 & -8 & 6\\ 2 & 9 & 0\end{pmatrix}$	$\begin{pmatrix}4 & 18 & 0\\ 14 & 71 & -6\\ 0 & 0 & 0\end{pmatrix}$	$\begin{pmatrix}8 & -56\\ -9 & 67\end{pmatrix}$
40	$A=\begin{pmatrix}0 & 0\\ -6 & 7\\ 6 & 0\end{pmatrix}$; $B=\begin{pmatrix}0 & -10 & -3\\ -1 & -1 & 10\end{pmatrix}$	$\begin{pmatrix}0 & 0 & 0\\ -7 & 53 & 88\\ 0 & -60 & -18\end{pmatrix}$	$\begin{pmatrix}42 & -70\\ 66 & -7\end{pmatrix}$
41	$A=\begin{pmatrix}0 & -8\\ 9 & 0\\ 0 & -8\end{pmatrix}$; $B=\begin{pmatrix}-6 & -5 & 0\\ 0 & 2 & -10\end{pmatrix}$	$\begin{pmatrix}0 & -16 & 80\\ -54 & -45 & 0\\ 0 & -16 & 80\end{pmatrix}$	$\begin{pmatrix}-45 & 48\\ 18 & 80\end{pmatrix}$
42	$A=\begin{pmatrix}10 & -5\\ 5 & -2\\ 8 & -4\end{pmatrix}$; $B=\begin{pmatrix}4 & 5 & 10\\ 5 & 6 & -9\end{pmatrix}$	$\begin{pmatrix}15 & 20 & 145\\ 10 & 13 & 68\\ 12 & 16 & 116\end{pmatrix}$	$\begin{pmatrix}145 & -70\\ 8 & -1\end{pmatrix}$
43	$A=\begin{pmatrix}1 & 8\\ 0 & 10\\ 5 & 0\end{pmatrix}$; $B=\begin{pmatrix}0 & 7 & 4\\ -2 & 0 & -4\end{pmatrix}$	$\begin{pmatrix}-16 & 7 & -28\\ -20 & 0 & -40\\ 0 & 35 & 20\end{pmatrix}$	$\begin{pmatrix}20 & 70\\ -22 & -16\end{pmatrix}$
44	$A=\begin{pmatrix}0 & -1\\ -4 & -4\\ 0 & -3\end{pmatrix}$; $B=\begin{pmatrix}3 & 0 & 0\\ 7 & 0 & -3\end{pmatrix}$	$\begin{pmatrix}-7 & 0 & 3\\ -40 & 0 & 12\\ -21 & 0 & 9\end{pmatrix}$	$\begin{pmatrix}0 & -3\\ 0 & 2\end{pmatrix}$
45	$A=\begin{pmatrix}5 & 0\\ 2 & -3\\ -1 & 0\end{pmatrix}$; $B=\begin{pmatrix}-6 & -4 & 10\\ -3 & 0 & 0\end{pmatrix}$	$\begin{pmatrix}-30 & -20 & 50\\ -3 & -8 & 20\\ 6 & 4 & -10\end{pmatrix}$	$\begin{pmatrix}-48 & 12\\ -15 & 0\end{pmatrix}$
46	$A=\begin{pmatrix}1 & 2\\ -7 & 0\\ -5 & -3\end{pmatrix}$; $B=\begin{pmatrix}0 & 7 & -9\\ -3 & 8 & 0\end{pmatrix}$	$\begin{pmatrix}-6 & 23 & -9\\ 0 & -49 & 63\\ 9 & -59 & 45\end{pmatrix}$	$\begin{pmatrix}-4 & 27\\ -59 & -6\end{pmatrix}$
47	$A=\begin{pmatrix}9 & 0\\ 1 & -7\\ 0 & -7\\ -10 & 0\end{pmatrix}$; $B=\begin{pmatrix}1 & 2 & 0\\ 8 & -1 & -2\end{pmatrix}$	$\begin{pmatrix}9 & 18 & 0\\ -55 & 9 & 14\\ -56 & 7 & 14\\ -10 & -20 & 0\end{pmatrix}$	*Non è possibile calcolare BA (perchè?)*
48	$A=\begin{pmatrix}6 & 0 & -4\\ 6 & 0 & -5\\ 0 & -5 & -3\end{pmatrix}$; $B=\begin{pmatrix}4 & 5 & -7\\ -7 & 0 & -7\\ 5 & -7 & -8\end{pmatrix}$	$\begin{pmatrix}4 & 58 & -10\\ -1 & 65 & -2\\ 20 & 21 & 59\end{pmatrix}$	$\begin{pmatrix}54 & 35 & -20\\ -42 & 35 & 49\\ -12 & 40 & 39\end{pmatrix}$
49	$A=\begin{pmatrix}-10 & 0 & 10\\ -4 & 4 & 4\\ 4 & -4 & 0\end{pmatrix}$; $B=\begin{pmatrix}-6 & 8 & 0\\ -2 & 10 & 0\\ -6 & 6 & 3\end{pmatrix}$	$\begin{pmatrix}0 & -20 & 30\\ -8 & 32 & 12\\ -16 & -8 & 0\end{pmatrix}$	$\begin{pmatrix}28 & 32 & -28\\ -20 & 40 & 20\\ 48 & 12 & -36\end{pmatrix}$
50	$A=\begin{pmatrix}10 & 0 & -2\\ -9 & 0 & 1\\ -1 & -6 & 6\end{pmatrix}$; $B=\begin{pmatrix}5 & -3 & -2\\ 0 & 6 & 6\\ 0 & 10 & 0\end{pmatrix}$	$\begin{pmatrix}50 & -50 & -20\\ -45 & 37 & 18\\ -5 & 27 & -34\end{pmatrix}$	$\begin{pmatrix}79 & 12 & -25\\ -60 & -36 & 42\\ -90 & 0 & 10\end{pmatrix}$