Matrices Worksheet-1 Mathematics

True or False statement

a) A matrix denotes a number.
b) Matrices of any order can be added.
c) Two matrices are equal if they have same number of rows and same number of columns.
d) Matrices of different order cannot be subtracted.
e) Matrix addition is associative as well as commutative.
f) Matrix multiplication is commutative.
g) A square matrix where every element is unity is called an identity matrix.
h) If A and B are two square matrices of the same order, then A + B = B + A.
i) If A and B are two matrices of the same order, then A – B = B – A.
j) If matrix AB = O, then A = O or B = O or both A and B are null matrices.
k) Transpose of a column matrix is a column matrix.
l) If A and B are two square matrices of the same order, then AB = BA.
m) . If each of the three matrices of the same order are symmetric, then their sum is a symmetric matrix.
n) If A and B are any two matrices of the same order, then $(AB)^2 = A^2B^2$
o). If $(AB)^2 = B^2A^2$, where A and B are not square matrices, then number of rows in A is equal to number of columns in B and number of columns in A is equal to number of rows in B.
p) If A, B and C are square matrices of same order, then AB = AC always implies that B = C.
q). If

$$A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 4 & 2 \end{bmatrix}$$

and

$$B = \begin{bmatrix} 2 & 3 \\ 4 & 5 \\ 2 & 1 \end{bmatrix}$$

, then AB and BA are defined and equal.

r). If A is skew symmetric matrix, then A^2 is a symmetric matrix.
s). $(AB)^{-1} = A^{-1} . B^{-1}$ where A and B are invertible matrices satisfying commutative property with respect to multiplication.

Answer
a) False
b) False

c) False
d) True
e) True
f) False
g) False
h) True
i) False
j) False
k) False
l) False
m) True
n) False
o) True
p) False
q) False
r) True
s) True

Question

Construct A= $a_{2\times2}$ Matrix when the elements are of the forms
i) $a_{ij} = e_{2x}$ sinjx

ii) $a_{ij} = 2i - 3j$

Answer

i)

$$A = \begin{bmatrix} e^{2x}\sin x & e^{2x}\sin 2x \\ e^{4x}\sin x & e^{4x}\sin 2x \end{bmatrix}$$

ii)
-1 -4
1 -2