Recommended Book: "*Elementary Linear Algebra (Applications Version)*" by Howard Anton and Chris Rorres, 11th Edition, Wiley, USA, 2014.

Exercises (from the recommended book):

Exercise Set 1.4

True-False Exercises

TF. In parts (a)–(k) determine whether the statement is true or false, and justify your answer.

(a) Two $n \times n$ matrices, A and B, are inverses of one another if and only if $AB = BA = 0$.

False, They are inverses of one another if and only if AB=BA= I

(b) For all square matrices A and B of the same size, it is true that $(A + B)^2 = A^2 + 2AB + B^2$.

False

(c) For all square matrices A and B of the same size, it is true that $A^2 - B^2 = (A - B)(A + B)$.

False

(d) If A and B are invertible matrices of the same size, then AB is invertible and $(AB)^{-1} = A^{-1}B^{-1}$.

False

(e) If A and B are matrices such that AB is defined, then it is true that $(AB)^T = A^T B^T$.

False

(f) The matrix

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

is invertible if and only if $ad - bc \neq 0$.

True

(g) If A and B are matrices of the same size and k is a constant, then $(kA + B)^T = kA^T + B^T$.

True

(h) If A is an invertible matrix, then so is A^T.

True

(i) If $p(x) = a_0 + a_1x + a_2x^2 + \cdots + a_mx^m$ and I is an identity matrix, then $p(I) = a_0 + a_1 + a_2 + \cdots + a_m$.

False, p(I) is a matix not a number.

(j) A square matrix containing a row or column of zeros cannot be invertible.

True

(k) The sum of two invertible matrices of the same size must be invertible.

False