Practice Problems

a) The first row of AB is the first row of A multiplied on the right by B.

b) If A and B are 3×3 matrices and $B = [\mathbf{b}_1\ \mathbf{b}_2\ \mathbf{b}_3]$, then $AB = [A\mathbf{b}_1 + A\mathbf{b}_2 + A\mathbf{b}_3]$.

c) If A is an $n \times n$ matrix, then $(A^2)^T = (A^T)^2$

d) $(ABC)^T = C^T A^T B^T$

e) The transpose of a sum of matrices equals the sum of their transposes.

Solution

a) True.

b) False. AB must be a 3×3 matrix, but the formula given here implies that it is a 3×1 matrix. The plus signs should just be spaces (between columns). This is a common mistake.

c) True. Apply Theorem $(AB)^T = B^T A^T$ to $A^2 = AA$

d) False. The left-to-right order of $(ABC)^T$, is $C^T B^T A^T$. The order cannot be changed in general.

e) True. This general statement follows from Theorem $(A + B)^T = A^T + B^T$.