Rule for derivatives of a scalar by a vector

1. **A is not a function of x:**
   - Row layout: $\frac{\partial x^T Ax}{\partial x} = x^T(A^T + A)$
   - Column layout: $\frac{\partial x^T Ax}{\partial x} = (A + A^T)x$
2. **A is not a function of x and A is symmetric:**
   - Row layout: $\frac{\partial x^T Ax}{\partial x} = 2x^T A$
   - Column layout: $\frac{\partial x^T Ax}{\partial x} = 2Ax$
3. **A is not a function of x:**
   - Row layout: $\frac{\partial Ax}{\partial x} = A$
   - Column layout: $\frac{\partial Ax}{\partial x} = A^T$
4. **A is not a function of x:**
   - Row layout: $\frac{\partial x^T A}{\partial x} = A^T$
   - Column layout: $\frac{\partial x^T A}{\partial x} = A^T$