Remember that your work is graded on the quality of your writing and explanation as well as the validity of the mathematics.

(1) (10 Points) For the following subspace, (a) find a basis, and (b) state the dimension.

$$A = \{ \begin{bmatrix} -3a + b - 2c \\ a + 2c \\ 5b - c \\ -9a + 5b + 3c \end{bmatrix} \Big| a, b, c \in \mathbb{R} \}$$

(2) (10 Points) The first four Hermite polynomials are $1, 2t, -2 + 4t^2$ and $-12t + 8t^3$. Show that the first four Hermite polynomials form a basis of $\mathbb{P}^3$.