This quiz is worth 10 points. Name: _____

1. (4 points) The 4-vector $c = (c_1, c_2, c_3, c_4)$ represents the coefficients of a cubic polynomial $p(x) = c_1 + c_2x + c_3x^2 + c_4x^3$. Express the conditions

$$p(0) = 1,\ p'(0) = 0,\ p(2) = 1,\ p'(2) = 0$$

as a set of linear equations of the form $Ac = b$.

Bonus: **Use your knowledge of Calculus** to solve the system of equations above or determine that no solution is possible.

2. (6 points) Which of the following are linear or affine functions $f : \mathbb{R}^{\not 2} \to \mathbb{R}^3$? For ones which are linear, express them in the form $f(x) = Ax$ for some specific matrix A. For ones which are affine but not linear, express them in the form $f(x) = Ax + b$ for some specific matrix A and vector b. For ones which are not affine, demonstrate your conclusion is correct but selecting an appropriate example.

   (a) $f(x_1, x_2) = (x_2, x_2 - x_1, x_2 x_1)$

   (b) $f(x_1, x_2) = (0, x_1, \frac{x_1+x_2}{3})$

   (c) $f(x_1, x_2) = (\frac{x_1+1}{2}, \frac{x_2+1}{2}, x_1)$