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(1) (5 points) Find a basis for the solution space of the following system

$$x_1 - 3x_2 + 2x_3 = 0$$
$$2x_1 + 3x_2 + 2x_3 = 0$$
$$4x_1 - 3x_2 + 6x_3 = 0.$$

ANS: basis consists of one vector (-4/3,2/9,1) (or a scalar multiple of its).

- Write the matrix: 1 point
- Reduce to an echelon form: 2 points
- Realize there is one free variable: 1 point
- Get a correct basis vector: 1 point

(2) (5 points) Find a basis for the vector space spanned by the vectors $\vec{v}_1 = (1, 0, 3, 2)$, $\vec{v}_2 = (-1, 1, 0, 1)$, $\vec{v}_3 = (-1, 3, 6, 7)$.

- Write the matrix (either row OR column form): 1 point
- Reduce to an echelon form: 2 points
- Correct method (take nonzero rows in case of row matrix OR vectors corresponding to pivot columns in case of column matrix): 2 point

(Let us give full credit if they follow a correct method but make computational mistakes)