> Answer the questions below. You may answer in the space provided. You may use the back or a separate sheet of paper if you need more space. You are to work in groups of no more than four people. Make sure to enter the names of your groupmates below.

Name: _____

Section: _____

Group Members: _____

1. (10 points) Find a basis for $\mathcal{P}_3$, the real vector space of polynomials of degree at most 3, that contains the vectors $x^3 + x$ and $x^2 - x$. Justify your answer.

2. (10 points) Let V be a real vector space such that $\dim V = n$ and let V have a basis $B = \{\mathbf{v}_1, \ldots, \mathbf{v}_n\}$. Prove that for $\mathbf{u}, \mathbf{v} \in V$, $\mathbf{u} = \mathbf{v}$ if and only if $[\mathbf{u}]_B = [\mathbf{v}]_B$ in $\mathbb{R}^n$.