Name: _____

Math 2250, Fall 2011, Quiz 14 **December 9, 2011** **R. Bruner**

Both

$$\mathcal{B} = \{x^2 - 2x, x^2 - 3x + 2, x^3 - 4x^2 + 4x\}$$

and

$$\mathcal{C} = \{x - 2, x^2 - 4, x^3 - 8\}$$

are bases for the space $N = \{p \in P_3 \mid p(2) = 0\}$ of cubic polynomials whose value at 2 is 0. The coordinate change matrix $P_{\mathcal{C}\leftarrow\mathcal{B}}$ which converts from $\mathcal{B}$ coordinates to $\mathcal{C}$ coordinates is

$$P_{\mathcal{C}\leftarrow\mathcal{B}} = \begin{bmatrix} -2 & -3 & -4 \\ 1 & 1 & -4 \\ 0 & 0 & 1 \end{bmatrix}.$$

1. Find the inverse matrix $P_{\mathcal{B}\leftarrow\mathcal{C}}$.
2. Use it to write $x - 2$, $x^2 - 4$ and $x^3 - 8$ as linear combinations of elements of $\mathcal{B}$.