Name: _____ Sort #: _____

Worksheet 12

Change of Basis MATH 2250, Fall 2018

1. Find the vector $\mathbf{x}$ determined by the basis

$$\mathcal{B} = \left\{ \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ -5 \\ 2 \end{bmatrix}, \begin{bmatrix} 4 \\ -7 \\ 3 \end{bmatrix} \right\}$$

and the coordinate vector $[\mathbf{x}]_{\mathcal{B}} = \begin{bmatrix} -4 \\ 8 \\ -7 \end{bmatrix}$

2. Let $\mathcal{B} = \{\mathbf{b}_1, \mathbf{b}_2\}$ and $\mathcal{C} = \{\mathbf{c}_1, \mathbf{c}_2\}$ where

$$\mathbf{b}_1 = -\mathbf{c}_1 + 4\mathbf{c_2} \quad \text{and} \quad \mathbf{b}_2 = 5\mathbf{c}_1 - 3\mathbf{c_2}$$

(a) Find the change of coordinates matrix from $\mathcal{B}$ to $\mathcal{C}$.

(b) Find $[\mathbf{x}]_{\mathcal{C}}$ for $\mathbf{x} = 5\mathbf{b}_1 + 3\mathbf{b}_2$.