

**WORKSHEET 10/13/22**  
**MATH 2331, FALL 2022**

- (1) Suppose that  $\mathfrak{B} = \{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$  is a basis for  $\mathbb{R}^3$ . What is  $[\vec{v}_2]_{\mathfrak{B}}$ ?
- (2) Suppose that  $A = S^{-1}BS$ . Are  $A$  and  $B$  similar?
- (3) Suppose that  $T$  is a linear transformation with matrix  $A$ , and that  $A = SBS^{-1}$ . In which basis does  $B$  represent  $T$ ?
- (4) Describe the columns of  $[T]_{\mathfrak{B}}$ .
- (5) Is there a basis for  $\mathbb{R}^2$  in which reflection over the line  $L$  is represented by a diagonal matrix?
- (6) Is there a basis for  $\mathbb{R}^2$  in which a 90 degree rotation is represented by a diagonal matrix?