



2. Let  $T : \mathbf{R}^2 \rightarrow \mathbf{R}^2$  be rotation *clockwise* by  $60^\circ$ . Let  $U : \mathbf{R}^2 \rightarrow \mathbf{R}^2$  be the linear transformation satisfying  $U(1, 0) = (-2, 1)$  and  $U(0, 1) = (1, 0)$ .

a) Find the standard matrix for the composition  $U \circ T$  using matrix multiplication.

b) Find the standard matrix for the composition  $T \circ U$  using matrix multiplication.

c) Is rotating clockwise by  $60^\circ$  and then performing  $U$ , the same as first performing  $U$  and then rotating clockwise by  $60^\circ$ ?