

Quiz 5 Sample**Question 1. (10 pts)**

Let $F : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the linear transformation defined by $F(x, y) = (2x+3y, 4x-5y)$. Find the matrix representation of F with respect to the basis $S = \{u_1, u_2\} = \{(1, 2), (2, 5)\}$.

Solution: This is in fact **Example 6.1** on Page 196 of the textbook. You can check out the solution in the book.

Question 2. (10 pts)

Let V be a vector space spanned by some functions on \mathbb{R} . Assume $S = \{e^{3t}, te^{3t}, t^2e^{3t}\}$ is a basis of V . Let \mathbf{D} be the differential operator on V , that is,

$$\mathbf{D}(f) = \frac{df}{dt}.$$

Find the matrix representation of \mathbf{D} relative to the basis S .

Solution: This is in fact **Problem 6.8** on Page 209 of the textbook. You can check out the solution in the book.