TRACE WORKSHEET

DECEMBER 2, 2024

1. Let $A \in M_{m \times n}(\mathbb{F})$ and $B \in M_{n \times m}(\mathbb{F})$. Show that $\text{tr}(AB) = \text{tr}(BA)$.

2. Let A be the $n \times n$ matrix all of whose entries are 1.
   (a) Compute the trace of A.

   (b) Using your response from the previous part, determine the eigenvalues of A, together with their geometric multiplicities.