Consider the matrix given below.

\[
[T] = \begin{bmatrix}
1 & 0 & 0 \\
0 & 1 & 0 \\
0 & 1 & 0 \\
0 & 0 & 1 \\
\end{bmatrix}
\]

1) What is the domain of the associated linear operator \( T \)?
\[ \mathbb{R}^3 \]

2) What is codomain of \( T \)?
\[ \mathbb{R}^4 \]

3) Is \[ \begin{bmatrix}
239587983479829820245 \pi \\
2387238936849423905609 \\
3495489349804509.34 \\
0 \\
\end{bmatrix} \] in the range of \( T \)?
No, as the second and third components are always equal.

4) What is the rank of \([T]\)?
3

5) What is the null space of \([T]\)?
\[ \{ \vec{0} \} \]