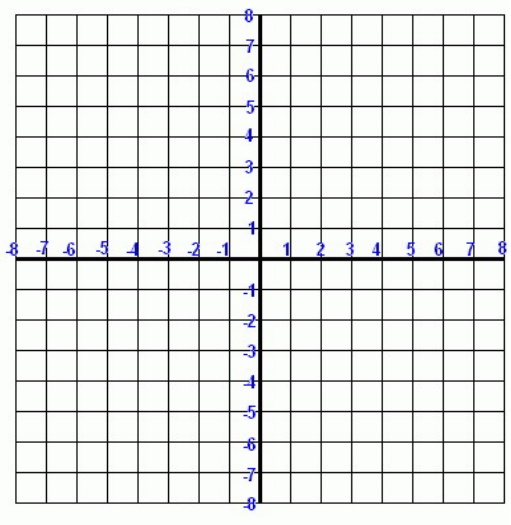
1. (Sudden death) Let $A \in R^{n \times n}$ be a matrix of rank $m \leq n$. Let $b \in R^n$ be a vector, rank $[A|b] = m$. What is the dimensionality of the solution of

$$Ax = b?$$

2. Let $\mathbf{l} = (3, 2, 0)^\top$ be homogenous coordinates of a line. Parameterize all lines $\mathbf{p}$ that are parallel to $\mathbf{l}$.

3. Draw lines with homogenous coordinates $\mathbf{l_1} = (-1, 1, 0)^\top$, $\mathbf{l_2} = (1, 1, -1)^\top$, and $\mathbf{l_3} = (0, 0, 0)^\top$ into the image.



4. Is the following matrix F a valid fundamental matrix? Why? Give details.

$$F = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}.$$

5. What features are good for tracking? Explain in words and derive the math.

6. Robust estimation of a line in 3D space using RANSAC. The input are 3D points. What is the procedure? How many samples are needed to ensure 95% confidence in the solution if the fraction of inliers (points on a line) is $0 < \varepsilon < 1$?