1. "What inequality must be true between the rank r and the number of rows m of a matrix?"
2. "What inequality must be true between the rank r and the number of columns n of a matrix?"
3. "What is the dimension of the left nullspace of a matrix with rank r and m rows?"
4. "When is the equation ATy = d solvable?"
5. "When is the solution y for the equation ATy = d unique?"
6. "How can the 3 by 3 identity matrix be expressed as a combination of the other five permutation matrices?"
7. "What is the form of the coefficients c1, c2, c3, c4, and c5 when c1P1 + c2P2 + c5P5 = 0 for the five permutation matrices?"
8. "What is the basis of the nullspace of A when A is a rank 2 matrix in the space of three by three matrices?"
9. "What is the determinant of BTB for a three by three matrix B with eigenvalues 0, 1, and 2?"
10. "What is the rank of a three by three matrix B with eigenvalues 0, 1, and 2?"
11. "What are the eigenvalues of the matrix A with diagonal entries 1, 4, and 6?"
12. "What are the eigenvalues of the matrix B where $\det(B - \lambda I) = (\lambda^2 - 3)(2 - \lambda)$?"
13. "What are the eigenvalues of the matrix C where $\det(C - \lambda I) = \lambda^2(\lambda - 6)$?"
14. "What multiple of the first equation should be subtracted from the second equation in the system 2x + 3y = 5 and 6x + 15y = 12 when using elimination?"
15. "What are the pivots when applying elimination to the matrix A derived from the system 2x + 3y = 5 and 6x + 15y = 12?"
16. "What is the form of the upper triangular matrix U after elimination for the system 2x + 3y = 5 and 6x + 15y = 12?"
17. "What is the solution for y after back substitution in the system 2x + 3y = 5 and 6x + 15y = 12?"
18. "What matrix reduces Pascal's matrix to a smaller Pascal matrix?"
19. "What is the form of X when AX = 0 for a rank 2 matrix A in the space of three by three matrices?"
20. "What is the form of matrices that have the form AX for some matrix X in the space of three by three matrices?"
21. "What are the dimensions of the nullspace and column space of AX in the space of three by three matrices?"
22. "What is the determinant of BTB for a three by three matrix B with eigenvalues 0, 1, and 2?"
23. "What are the eigenvalues of the matrix A = [[4, 0], [1, 2]]?"
24. "What is the eigenvalue associated with a Markov matrix where the sum of the columns is 1?"
25. "What is the determinant of A - I for a matrix A where each row sums to 1?"
26. "What are the eigenvalues of a matrix C with a characteristic equation $\det(C - \lambda I) = \lambda^2(\lambda - 6)$?"
27. "Verify that the Haar wavelet basis vectors are orthogonal. What operation is used to ensure they are orthonormal?"
28. "Describe a basis for the set of all 2×2 matrices with real entries."
29. "What is the rank of the matrix A = [[1, 5, 7, 9], [0, 4, 1, 7], [2, -2, 11, -3]]?"
30. "What are the special solutions to the equation Ax = 0 for the matrix A = [[1, 5, 7, 9], [0, 4, 1, 7], [2, -2, 11, -3]]?"
31. "If S and T are two subspaces of a vector space V, what is the span of $S \cup T$?"
32. "What is the general form of a 4×4 symmetric matrix, and how many entries can be chosen independently?"
33. "How many independent entries can be chosen for a 4×4 skew-symmetric matrix?"
34. "If C = AB, how is the nullspace of C related to the nullspaces of A and B?"
35. "What matrix E transforms A into an upper triangular form U for A = [[1, 3, 0], [2, 4, 0], [2, 0, 1]]?"
36. "What is the row reduced form of the matrix A = [[1, 5, 7, 9], [0, 4, 1, 7], [2, -2, 11, -3]]?"
37. "If A is a Markov matrix with eigenvalues $\lambda1 = 1$ and $\lambda2 = -0.3$, what is the steady-state vector as $k \to \infty$?"
38. "What are the eigenvalues of A = [[6, 9], [4, 1]] and the corresponding eigenvectors?"
39. "Describe the general form of vectors on the plane x - 3y - z = 12."
40. "What is the determinant of a permutation matrix P with $P^3 = I$ but $P \neq I$?"
41. "How many pivots are required for a 4×4 matrix A to satisfy A = LU with four pivots?"
42. "What are the independent variables when solving Ax = 0 for A = [[1, 5, 7, 9], [0, 4, 1, 7], [2, -2, 11, -3]]?"
43. "How is the nullspace of a product C = AB related to the nullspaces of A and B?"