1. If the rank of the augmented matrix of a system of \( n \) linear equations in \( n \) unknowns is greater than the rank of the matrix of coefficients, then the matrix of coefficients is nonsingular.

(a) Always true
(b) Sometimes true
(c) Never true, i.e., false
(d) None of the above

2. If the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns has an inverse, then the system does not have infinitely many solutions.

(a) Always true
(b) Sometimes true
(c) Never true, i.e., false
(d) None of the above

3. If the determinant of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns is non-zero, then the system does not have infinitely many solutions.

(a) Always true
(b) Sometimes true
(c) Never true, i.e., false
(d) None of the above

4. If a system of \( n \) linear equations in \( n \) unknowns is inconsistent, then the reduced row echelon form of the matrix of coefficients is not \( I_n \).

(a) Always true
(b) Sometimes true
(c) Never true, i.e., false
(d) None of the above
5. If the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns is nonsingular, then the trivial solution is the only solution of the system.

(a) Always true 
(b) Sometimes true 
(c) Never true, i.e., false 
(d) None of the above 

6. The rank of the matrix of coefficients of a homogeneous system of \( m \) linear equations in \( n \) unknowns is never less than the rank of the augmented matrix.

(a) Always true 
(b) Sometimes true 
(c) Never true, i.e., false 
(d) None of the above 

7. If the determinant of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns is zero, then the rank of the matrix of coefficients is less than \( n \).

(a) Always true 
(b) Sometimes true 
(c) Never true, i.e., false 
(d) None of the above 

8. If the reduced row echelon form of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns is not the identity, then the system is inconsistent.

(a) Always true 
(b) Sometimes true 
(c) Never true, i.e., false 
(d) None of the above 

9. If a system of \( n \) linear equations in \( n \) unknowns has infinitely many solutions, then the rank of the matrix of coefficients is \( n - 1 \).

(a) Always true. 
(b) Sometimes true. 
(c) Never true. 
(d) None of the above.
10. If 0 is an eigenvalue of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns, then the system has infinitely many solutions.

   (a) Always true.
   (b) Sometimes true.
   (c) Never true.
   (d) None of the above.

11. If 0 is an eigenvalue of the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns, then the system does not have infinitely many solutions.

   (a) Always true.
   (b) Sometimes true.
   (c) Never true.
   (d) None of the above.

12. If the determinant of the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns is 0, then the system has infinitely many solutions.

   (a) Always true.
   (b) Sometimes true.
   (c) Never true.
   (d) None of the above.

13. If a system of \( n \) linear equations in \( n \) unknowns is dependent, then 0 is an eigenvalue of the matrix of coefficients.

   (a) Always true.
   (b) Sometimes true.
   (c) Never true.
   (d) None of the above.

14. If 0 is not an eigenvalue of the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns, then the system has a unique solution.

   (a) Always true.
   (b) Sometimes true.
   (c) Never true.
   (d) None of the above.
15. If the reduced row echelon form of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns is \( I_n \), then the matrix of coefficients is singular.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

16. If the rank of the augmented matrix of a system of \( n \) linear equations in \( n \) unknowns equals the rank of the matrix of coefficients, then the system has a unique solution.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

17. If 0 is an eigenvalue of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns, then the system has no solution.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

18. If 0 is an eigenvalue of the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns, then the system has infinitely many solutions.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

19. If the reduced row echelon form of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns is \( I_n \), then the matrix of coefficients is singular.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.
20. If the rank of the augmented matrix of a system of \( n \) linear equations in \( n \) unknowns is greater than the rank of the matrix of coefficients, then the system is inconsistent.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

21. If 0 is not an eigenvalue of the matrix of coefficients of a homogeneous system of \( n \) linear equations in \( n \) unknowns, then the system has infinitely many solutions.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

22. If the reduced row echelon form of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns is \( I_n \), then the matrix of coefficients is singular.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

23. If the rank of the augmented matrix of a system of \( n \) linear equations in \( n \) unknowns is greater than the rank of the matrix of coefficients, then the determinant of the matrix of coefficients is 0.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.

24. If 0 is an eigenvalue of the matrix of coefficients of a system of \( n \) linear equations in \( n \) unknowns, then the system has infinitely many solutions.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.
25. If the matrix of coefficients of a homogeneous system of $n$ linear equations in $n$ unknowns is singular, then the trivial solution is the only solution of the system.

(a) Always true.
(b) Sometimes true.
(c) Never true.
(d) None of the above.