Tips and Tricks

1. Make neat and understandable notes from lecture videos. They will help a lot during revision.

2. Never read maths, always have a rough notebook with you to do some math(that is solving problems).

3. Make cheat sheet for each chapter that can be revised quickly before exam. It should very short, approx 10% of notes.

4. As always practice lots and lots of problems. This thing decides who get marks in Maths or not.

5. Try to solve problems as if you are giving an exam. Time them and note down your times, so that you can improve.
Remember: What gets measured, gets improved.

Concepts and Formulas

First Order Determinant(1x1):

$$\text{If } A = [a], \text{ then } \det(A) = |A| = a$$

Second Order Determinant(2x2):

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix},$$

$$|A| = a_{11}a_{22} - a_{21}a_{12}$$

Third Order Determinant(3x3):

$$\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = a\begin{vmatrix} e & f \\ h & i \end{vmatrix} - b\begin{vmatrix} d & f \\ g & i \end{vmatrix} + c\begin{vmatrix} d & e \\ g & h \end{vmatrix}$$

Properties of Determinants:

(i) The value of the determinant remains unchanged, if rows are changed into columns and columns are changed into rows e.g.,

$$|A'| = |A|$$

(ii) If A = [aij]n x n , n > 1 and B be the matrix obtained from A by interchanging two of its rows or columns, then

$$\det(B) = -\det(A)$$

(iii) If two rows (or columns) of a square matrix A are proportional, then |A| = O.

(iv) |B| = k |A| ,where B is the matrix obtained from A, by multiplying one row (or column) of A by k.

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(iii) If two rows (or columns) of a square matrix A are proportional, then |A| = 0.

(iv) |B| = k |A| ,where B is the matrix obtained from A, by multiplying one row (or column) of A by k.

(v) |kA| = kn|A|, where A is a matrix of order n x n.

(vi) If each element of a row (or column) of a determinant is the sum of two or more terms, then the determinant can be expressed as the sum of two or more determinants, e.g.,

$$\begin{vmatrix} a_1 + a_2 & b & c \\ p_1 + p_2 & q & r \\ u_1 + u_2 & v & \end{vmatrix} = \begin{vmatrix} a_1 & b & c \\ p_1 & q & r \\ u_1 & v & \end{vmatrix} + \begin{vmatrix} a_2 & b & c \\ p_2 & q & r \\ u_2 & v & \end{vmatrix}$$

(vii) If the same multiple of the elements of any row (or column) of a determinant are added to the corresponding elements of any other row (or column), then the value of the new determinant remains unchanged, e.g.,

$$\begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix} = \begin{vmatrix} a_{11} + ka_{31} & a_{12} + ka_{32} & a_{13} + ka_{33} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$$

(viii) If each element of a row (or column) of a determinant is zero, then its value is zero.

(ix) If any two rows (columns) of a determinant are identical, then its value is zero.