***Determinant***

******

******

**By: *Fred E. Khoury***

The determinant is associated with a square matrix .

The total terms (summation) of a determinant is equal to  with ***n*** entries (elements) to each product term. Half are positive (product sign stay the same) and the other half sign has to be multiplied by negative sign (or opposite sign).

***Block Method***



***Proof***











***Example***

  



***Example***

  









***Co-Factor Method***





***Diagonal Method***

 



***Plus***

***Another Method***





  (*Opposite sign*)





1. Copy the  &  rows bellow  row respectively.
2. Copy the ,  and  column next to the  column respectively as is shown below



***Determinant*** =





























Row number always 1 2 3 4 sequence to all the terms values 

***Up*** (Column Number)



***Up*** (Column Number)

As for the column numbers:

1 2 3 4 2 3 4 1 3 4 1 2 4 1 2 3

1 3 4 2

1 4 2 3

***Down*** (Column Number)



***Down*** (Column Number)

As for the column numbers:

1 4 3 2 2 1 4 3 3 2 1 4 4 3 2 1

1 3 2 4

1 2 4 3

The red product terms have to be opposite sign (multiply by minus)













































































The Row subscript (first) always will be 



It is the combination of the second subscript number (column). 

 where  the ways that we can arrange 



First write the first sequence, then when you switch the last 2 numbers (34 to 43) change the sign to negative. However, see below for more when you have to do that.







***Change sign when the subscript is value is increasing***







|  |  |
| --- | --- |
|  | ***starts* 2-1*, down*** |

|  |  |  |
| --- | --- | --- |
|  |  |  |

***Graphically***

   

   

   

   

  

  

  

  