Theorem 3. Prove that the ==maximum degree== of any vertex in a ==simple graph== having n vertices is $n-1$.   *Atmost*

Theorem 4. Show that the ~~maximum number of edges~~ in a ==simple== graph with n vertices is $\dfrac{n(n-1)}{2} = {}^nC_2$ *Atmost*

Theorem 5. Prove that the number of edges in a ==complete graph== with n vertices is $\dfrac{n(n-1)}{2}$.

The number of vertices of odd degree in a graph is
a) Twice the number of edges   b) always odd   c) always even   d) zero

The maximum number of edges in a simple graph with 10 vertices is
a) 45   b) 10   c) 55   d) 65

Degree of pendent vertex is
a) 1   b) 2   c) 0   d) 4

Degree of Isolate Vertex

Is there Exist a graph with 5 Vertices having degrees ①, ③, 2, 2, ⑤

$$1+3+2+2+5 = \boxed{13} \longrightarrow \text{odd Number}$$

odd degree
3 in Number

Example 3. A graph G has ㉑ edges, 3 vertices of degree 4 and all other vertices are of degree 3. Find the number of vertices in G.

(A) 11   (B) 12   (C) 13   (D) 14

$e = 21$

Let n be no. of Vertices.

$$\text{Sum of degree} = 2e$$

$$(4+4+4) + (3+3+3+ - - (n-3)\text{ term}) = 2\times 21$$

$$\Rightarrow \quad 12 + 3(n-3) = 42$$

$$\Rightarrow \quad 3(n-3) = 30$$

$$\Rightarrow \quad n-3 = 10$$

$$\Rightarrow \quad \boxed{n=13}$$

Example 5. Is there a ==simple== graph G with six vertices of degree ①, ①, ③, 4, 6, ⑦?

$n=6$ **NO**

Maxi. Degree of a Vertex in Simple graph $= n-1$

$6,7$

$= 6-1$

$= 5$

$1+1+3+4+6+7 = \boxed{22}$ Even.

$\underline{1, 1, 3, 7}$ Even

Graph is possible