

Exercise 2: A simple graph is called **regular** if every vertex of this graph has the same degree. A regular graph is called n -regular if every vertex in this graph has degree n .

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(a.) Give an example of a family of graphs where each member is a regular graph and give an example of a family of graphs where each member is not regular. Justify your examples.

Simple cycle graphs are regular because every vertex is of degree 2. Connected trees when the number of vertices that are > 2 are non-regular because in such a graph there is at least one vertex with degree 1 and one vertex with degree > 1 .

(b.) For what values of m and n is the complete bipartite graph $K_{m,n}$ regular? Justify your answer.

For values $m = n$ the complete bipartite graph is regular because if $m \neq n$ one set will have vertices with degree $|m - n|$ less than the others.

(c.) How many vertices does a 4-regular graph with 10 edges have?

5 vertices (shown in graph below):

