M.15: Use the Handshaking Theorem and Theorem 2 to draw conclusions about edges and nodes in a graph.

Work these two mini-problems:

1. Two undirected graphs have 20 nodes each, and they have the same degree sequence, namely:

   $$[5, 1, 5, 3, 3, 4, 3, 3, 3, 2, 7, 6, 2, 4, 4, 7, 4, 2, 2, 4]$$

   Must these two graphs have the same number of edges? If you think so, write "Yes", then find the number of edges each graph has, and show your work as to how you found that number of edges. If you think not, write "No" and then explain or give a counterexample. (Note: Both the answer and the reasoning must be correct and clear in order to Pass.)

2. Below is a list of 30 integers. Does a graph exist that has this list as its degree sequence? Clearly state "yes" or "no" and then explain your reasoning briefly. (Note: Both the answer and the reasoning must be correct and clear in order to Pass.)

   $$[3, 2, 5, 2, 2, 0, 0, 4, 3, 4, 1, 3, 2, 5, 3, 1, 3, 6, 4, 3, 2, 4, 2, 3, 2, 2, 6, 1, 3, 4]$$