

► **Problem 9.2-31**

A graph G with 17 edges has the property that all its vertices have the same degree d . Find all possible values for d . For each such value, state briefly what the corresponding graph looks like.

Solution. Suppose G has vertex set V and edge set E . Since $\sum_{v \in V} \deg v = 2|E|$, we have $d \cdot n = 34$, so $d = 1, 2, 17, 34$, respectively. Clearly, the cases $d = 34, n = 1$ and $d = 17, n = 2$ are impossible. The case $d = 1, n = 34$ defines a graph with 17 components each of which is a single edge. The case $d = 2, n = 17$ defines a cycle containing 17 vertices.

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