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## PoTW 10: Week of 7-29-2021

Problem of the Week at [shsmathteam.com](https://shsmathteam.com)

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### Problem of the Week #10: Graveling Graphs

*Combinatorics*

Let  $G$  be a graph with vertex set  $V(G) = \{1, 2, \dots, 10\}$ , and  $A = \{1, 2, 3, 4\}$  be a subset of  $V(G)$ . Suppose there exists a subgraph of  $G$  such that the vertices in  $A$  have odd degree, and the vertices not in  $A$  have even degree. If we let  $f(G)$  denote the least number of edges in every possible such subgraph, then how many graphs  $G$  satisfy  $f(G) = 9$ ?