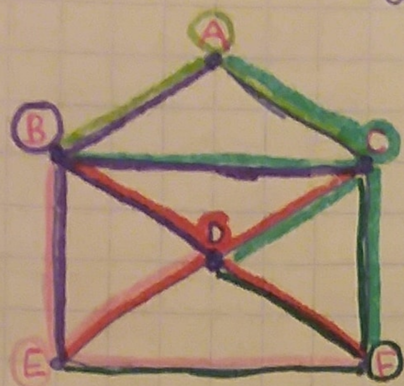
#6.1

#4

Question: Does the graph have an Euler Circuit?



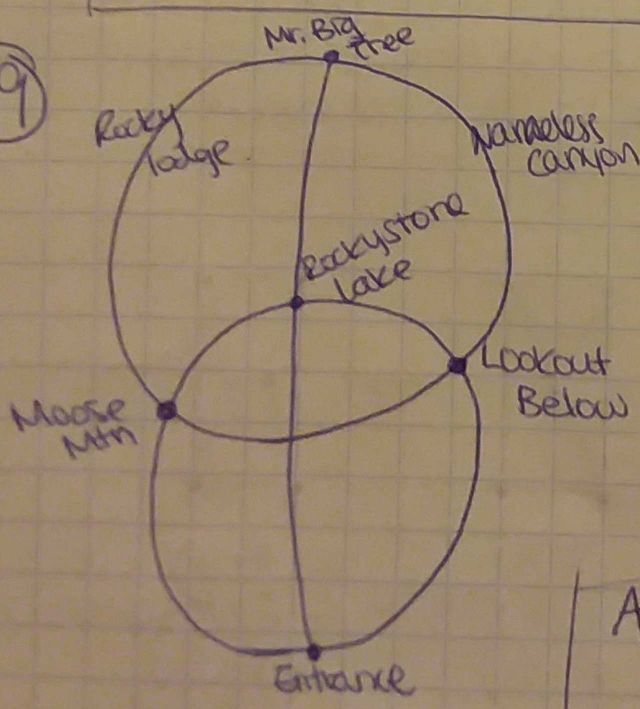

*Start by checking the degree of each vertex*

deg(A) = 2 ✓
deg(B) = 4 ✓
deg(C) = 4 ✓
deg(D) = 4 ✓
deg(E) = 3 x } odd # degrees
deg(F) = 3 x }

B/C each degree must be even to have an Euler Circuit (thus being able to walk across each bridge exactly once & return to starting point).

A: deg(E) and deg(F) are odd, therefore a walk around this graph to prove an Euler Circuit is impossible

#9



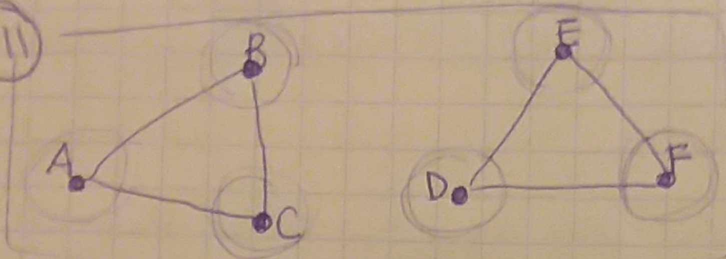

What we know:

* deg(Entrance) = 3 (Moose Mtn, lake, lookout)

To drive each road exactly once and return to the starting point, the degree of each vertex must be an even #.

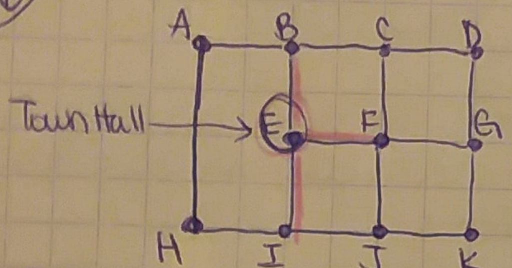
A: deg(Entrance) is 3, odd #
∴ impossible for a trip that traverses each road exactly once and returns to the entrance

#11



Each vertex degree is 2, even number, thus if each triangle were its seperate graphe Euler Circuit would be possible. However, in this graph we have a set of disconnected graph triangles and no path exists between e.g. A to D, ∴ no even Euler Circuit in this graph. //

#16




In order for snowplow to clear each street exactly once and return to starting point, the degree of each vertex must be an even #.

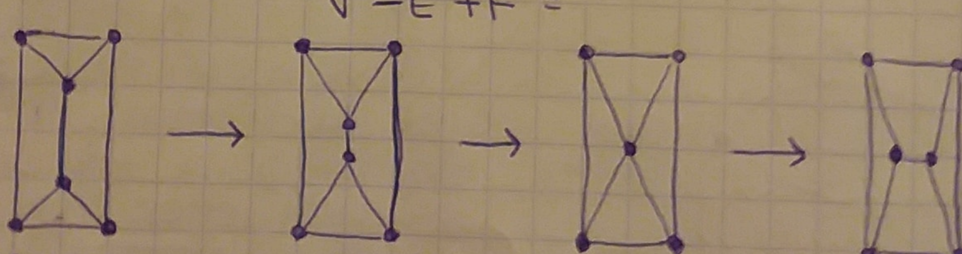
deg(E) = 3

A: There'd be no way to both leave from and arrive at vertex E (Town Hall) on each plow to go through each street. Therefore with no even Euler Circuit, it is impossible. //

#6.2

#10

$V - E + F =$



$V = 6$, $E = 9$, $F = 5$ } $6-9+5=2$

$V = 6$, $E = 9$, $F = 5$ } $6-9+5=2$

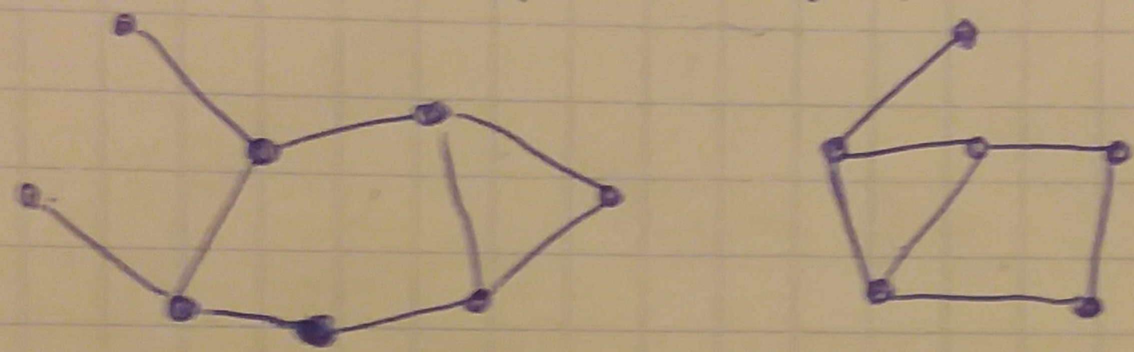
$V = 5$, $E = 8$, $F = 5$ } $5-8+5 = 2$

$V = 6$, $E = 9$, $F = 5$ } $6-9+5=2$

A: The changes in the # of edges and vertices keeps the Euler characteristic constant at 2. //

#26

-two component graph-



V = 14
E = 16
F = 5

V - E + F
↓
$14 - 16 + 5 = 3$

A This graph has an euler characteristic of 3