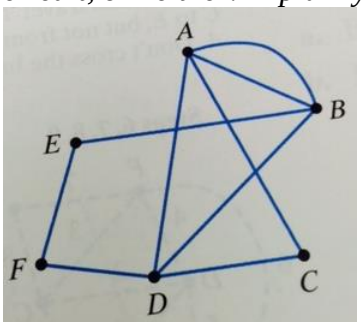
**Prob/Stats** **Name**_____

**12.2 Worksheet**

*In Exercises 1-3, use the graph shown. In each exercise, a path along the graph is described. Trace this path with a pencil and number the edges. Then determine if the path is an Euler path, an Euler circuit, or neither. Explain your answer.*

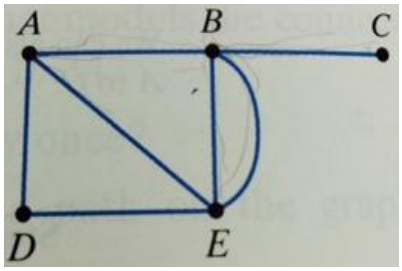



1. F, E, B, A, B D, C, A, D
2. F, E, B A, B D C, A ,D, F
3. A, B, A, C, D, F, E, B, D

*In Exercise 4, a graph is given.*

*a) Explain why the graph has at least one Euler Path.*

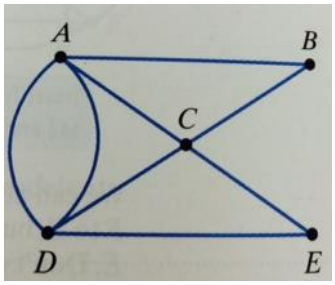
*b) Use trial and error or Fleury's Algorithm to find one such path.*

4. 

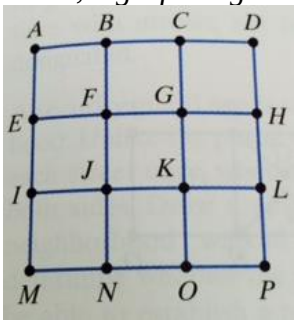

*In Exercise 5, a graph is given.*

*a) Explain why the graph has at least one Euler circuit.*

*b) Use trial and error or Fleury's Algorithm to find one such circuit.*

5. 


*In Exercise 6, a graph is given. Explain why the graph has no Euler paths and no Euler circuits.*

6. 

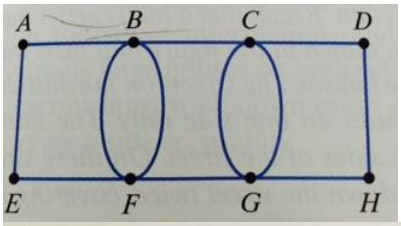
*In Exercises 7-9, a connected graph is described. Determine whether the graph has an Euler path (but not an Euler circuit), an Euler circuit, or neither an Euler path nor an Euler circuit. Explain your reasoning.*

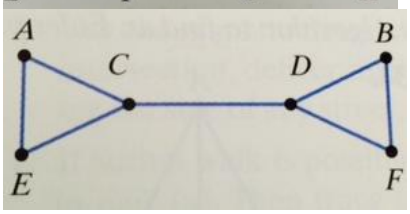
7. The graph has 80 even vertices and no odd vertices.
8. The graph has 78 even vertices and two odd vertices.
9. The graph has 77 even vertices and four odd vertices.

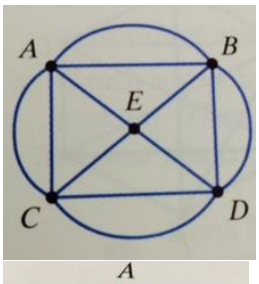
*In Exercises 10-16, a graph is given.*

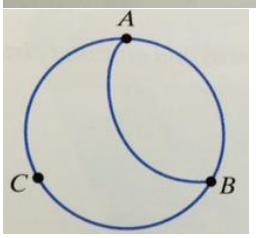
*a) Determine whether the graph as an Euler path, and Euler circuit, or neither.*

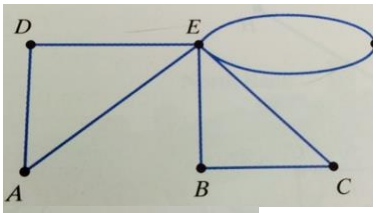
*b) If the graph has an Euler path or circuit, use trial and error or Fleury's Algorithm to find one.*

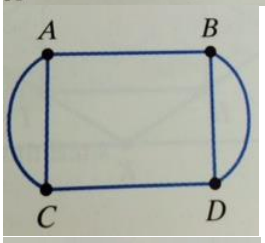
10. 

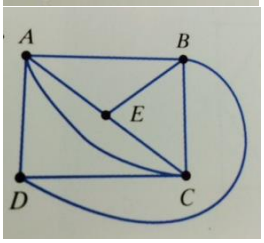

11. 


12. 

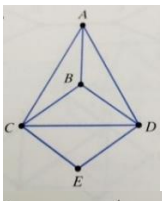

13. 

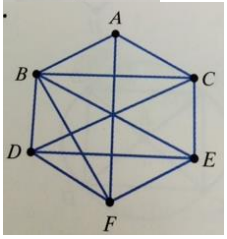

14. 

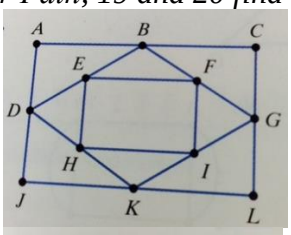

15. 

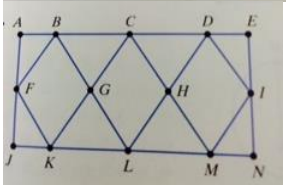

16. 


*In Exercises 17 and 18, use Fleury's Algorithm to find an Euler Path, 19 and 20 find an Euler Circuit.*

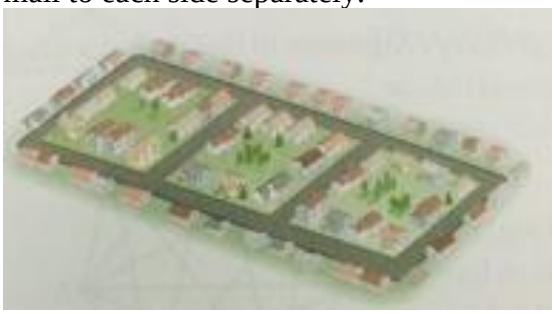
17. 


18. 


19. 


20. 

21. A mail carrier needs to deliver mail to each house in the three-block neighborhood shown. He plans to park at one of the street intersection and walk to deliver mail. All streets have houses on both sides. This means that the mail carrier must walk down every street twice, delivering mail to each side separately.

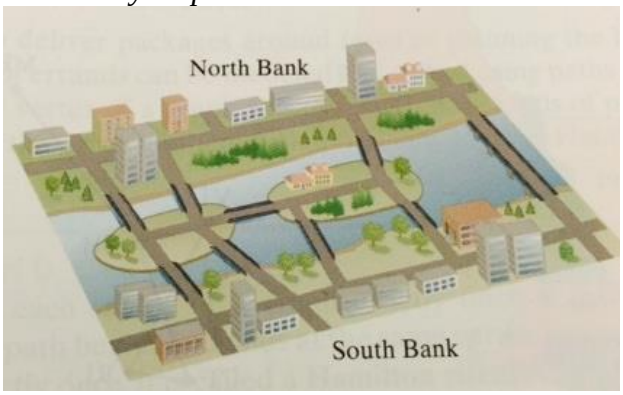


a) Draw a graph that models the streets of the neighborhood walked by the mail carrier.
b) Use the graph to determine if the carrier can park at an intersection, deliver mail to each house without retracing the side of any street, and return to the parked truck.
c) If such a walk is possible, show the path on your neighborhood map in a manner that is clear to the mail carrier.

*In Exercise 22, the layout of a city with land masses and bridges is shown.*

*a) Draw a graph that models the layout of the city. Use vertices to represent land masses and edges to represent the bridges.*
*b) Use the graph to determine if the city residents would be able to walk across all the bridges without crossing the same bridge twice.*
*c) If such a walk is possible, show the path on your graph in part (a). Then trace this route on the city map in a manner that is clear to the city's residents.*

22.

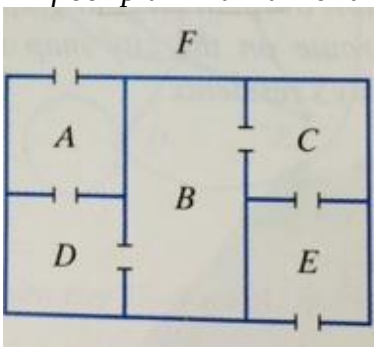


*In Exercise 23, a floor plan is shown.*

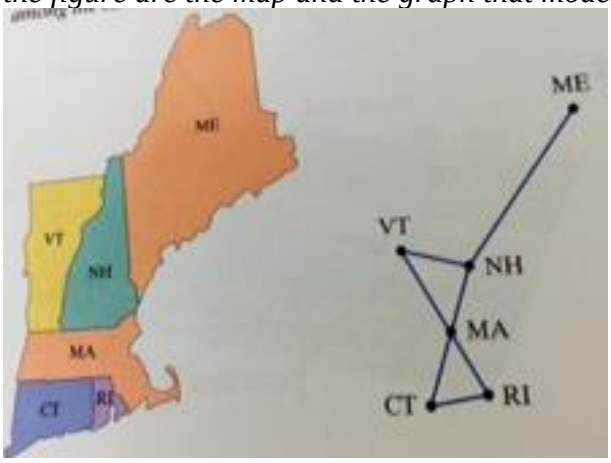
*a) Draw a graph that models the connecting relationships in each floor plan. Use vertices to represent the rooms and the outside, and the edges to represent the connecting doors.*

*b) Use your graph to determine if it is possible to find a path that uses each door once.*

*c) If such a path is possible, show it on your graph in part (a). Then trace this route on the floor plan in a manner that is clear to a person strolling through the house.*

23. 


*In Exercise 24, we revisited the map of New England states discussed in the previous section. Shown in the figure are the map and the graph that models the bordering relationships among the six states.*




24. Use Euler's Theorem to explain why it is possible to find a path that crosses each common state border exactly once.