

Math 107
Dusty Wilson

Name KEY
Circle Class 9:00 or 11:00

Reading Assignment Ch. 5

Read Chapter Five and answer the following questions. If there is a fill-in, write that word/phrase in the space given. This chapter has LOTS of new terms we need to understand and this worksheet focuses on those terms.

1. What ^{was} ~~is~~ Leonhard Euler's (pronounced oiler) profession?

Mathematician

2. The type of mathematical problems that include design of delivery routes are called what?

Euler circuit problems

3. The common thread in an Euler circuit problem is what? What does it mean?

The exhaustion requirement that a route must go everywhere.

4. Graphs consist of two pieces. Dots called vertices and lines called edges.

5. A special line that connects back to the same dot is called a loop.

6. If we have more than one line that connects the same two dots (directly) these lines are called

multiple edges.

7. If a graph comes in two or more parts we call this a disconnected graph.

8. Two vertices that have an edge connecting them are said to be adjacent.

9. Two edges that share a common vertex are said to be adjacent edges.

10. The number of edges that meet at one vertex is called the degree of the vertex.

11. What is a path?

a sequence of vertices; each adjacent to the next one. An edge can only be traveled once

(OVER)

12. How is a circuit different than a path?

A path that begins & ends
@ the same vertex.

13. What is a bridge?

an edge that, if removed, would cause
the graph to be disconnected.

14. State both parts of Euler's Circuit Theorem.

- If a graph is connected & every vertex is even, then it has an Euler circuit.
- If a graph has any odd vertices, then it does not have an Euler circuit.

15. State both parts of Euler's Path Theorem.

- If a graph is connected & has exactly two odd vertices, then it has an Euler path.
- If a graph has more than two odd vertices, then it cannot have an Euler path.

16. State both parts of Euler's Sum of Degrees Theorem.

- The sum of the degrees of all vertices is twice the number of edges.
- A graph always has an even number of odd vertices.

17. What is deadhead travel?

an additional pass along an edge.

18. What is meant by eulerizing a graph?

adding duplicate edges to create an
Euler circuit.

19. What is meant by optimal eulerization of a graph?

~~An Eulerization requiring the fewest the
additional dupl
etc~~

An Eulerization requiring the addition
of the fewest duplicate edges.