

MAT 141 Exam 5

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Problem 1		Grade:
Find the paths, closed walks, trails, and circuits in graph 1a. (a) This is a circuit. It starts and ends at a , and does not repeat any edges or vertices. (b) This is a trail. It doesn't repeat any edges or vertices. (c) This is a trail. It does not repeat any edges, but it repeats vertices. (d) This is a path. It repeats edge e_1 and vertices a and b .		<i>Faculty Comments</i>
Problem 2		Grade:
Using graph 1a, there are 5 paths from b to c .		<i>Faculty Comments</i>
Problem 3		Grade:
There are no bridges in graph 1a. I would also argue that there are no bridges in graph 1c, since the graph is already disconnected. Removing another edge would not disconnect the graph. However, if I had to choose one then I would say either edge DG or CF .		<i>Faculty Comments</i>
Problem 4		Grade:
Graph 1c, by definition of it being disconnected, cannot have an Euler circuit. No matter where you start, you will not be able to traverse the entire graph due to the fact that some of the vertices are not connected.		<i>Faculty Comments</i>

Problem 5	Grade:
<p>This is one example of a Hamiltonian circuit in graph 1a:</p> $E \rightarrow C \rightarrow F \rightarrow B \rightarrow A \rightarrow E$	<p><i>Faculty Comments</i></p>
Problem 6	Grade:
<p>The adjacency matrix for graph 1d is:</p> $\begin{pmatrix} 0 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \end{pmatrix}$	<p><i>Faculty Comments</i></p>
Problem 7	Grade:
<p>I will include this matrix as a separate piece of paper with this document.</p>	<p><i>Faculty Comments</i></p>
Problem 8	Grade:
<p>The product of these two matrices is:</p> $\begin{pmatrix} 18 & 0 & 0 \\ 1 & -1 & 0 \end{pmatrix}$	<p><i>Faculty Comments</i></p>
Problem 9	Grade:
<p>The trees in figure 1 are graphs <i>b</i> and <i>d</i>. Besides them looking like trees, there are no circuits in either of them, which follows the definition of trees.</p>	<p><i>Faculty Comments</i></p>
Problem 10	Grade:
<p>The number of binary trees in figure 1 is just one. Graph <i>d</i> is the only one that is a binary tree, since for every vertex, there are at most two children. Graph <i>b</i> is not a binary tree since vertex <i>c</i> has three children.</p>	<p><i>Faculty Comments</i></p>

Problem 11		Grade:
<p>You can create a connected graph with 9 edges and 9 vertices. Once again, I will include this graph on a separate piece of paper.</p>		<i>Faculty Comments</i>

Problem 12		Grade:
<p>You cannot draw a tree with 9 edges and 9 vertices. Having this combination of edges and vertices would create at least one guaranteed circuit, which would violate the definition of a tree.</p>		<i>Faculty Comments</i>