Discrete Mathematics
HW5

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Exercise 11.1

2. For the graph in Fig. 11.7, determine (a) a walk from b to d that is not a trail; (b) a b-d trail that is not a path; (c) a path from b to d; (d) a closed walk from b to b that is not a circuit; (e) a circuit from b to b that is not a cycle; and (f) a cycle from b to b.

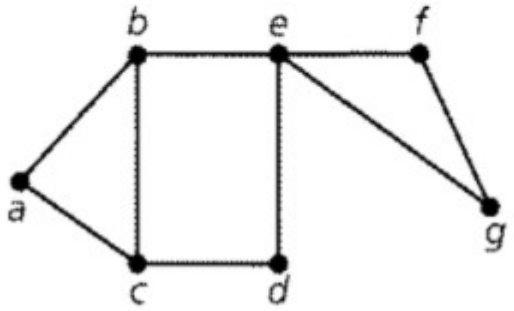

Figure 11.7

5. Let $G = (V, E)$ be the undirected graph in Fig. 11.8. How many paths are there in G from a to h? How many of these paths have length 5?

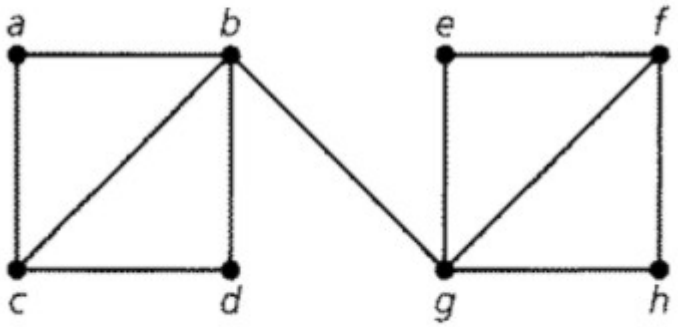

Figure 11.8

Exercise 11.2

4. If $G = (V, E)$ is an undirected graph, how many spanning subgraphs of G are also induced subgraphs?

6. Find all (loop-free) nonisomorphic undirected graphs with four vertices. How many of these graphs are connected?

Exercise 11.3

2. If $G = (V, E)$ is a connected graph with $|E| = 17$ and $\deg(v) \geq 3$ for all $v \in V$, what is the maximum value for $|V|$?

9. **a)** What is the dimension of the hypercube with 524,288 edges?

b) How many vertices are there for a hypercube with 4,980,736 edges?

Exercise 11.4

8. What is the length of a longest path in each of the following graphs?

a) $K_{1,4}$ **b)** $K_{3,7}$ **c)** $K_{7,12}$

d) $K_{m,n}$, where $m, n \in \mathbf{Z}^+$ with $m < n$.

Exercise 11.5

7. **a)** For $n \geq 3$, how many different Hamilton cycles are there in the complete graph K_n?

b) How many edge-disjoint Hamilton cycles are there in K_{21}?

c) Nineteen students in a nursery school play a game each day where they hold hands to form a circle. For how many days can they do this with no student holding hands with the same playmate twice?

Exercise 11.6

2. As the chair for church committees, Mrs. Blasi is faced with scheduling the meeting times for 15 committees. Each committee meets for one hour each week. Two committees having a common member must be scheduled at different times. Model this problem as a graph-coloring problem, and tell how to determine the least number of meeting times Mrs. Blasi has to consider for scheduling the 15 committee meetings.