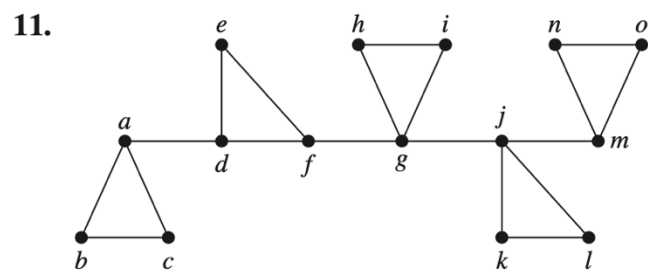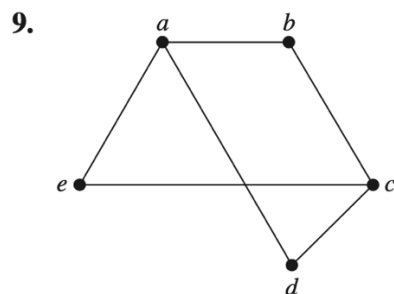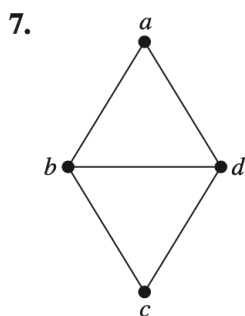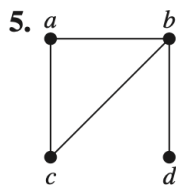*The *chromatic number* of a graph is the least number of colors needed for a coloring of the graph.

In Exercises 5–11 find the chromatic number of the given graph.

5.

7.

9.

11.

13. Which graphs have a chromatic number of 1?

15. What is the chromatic number of W_n?

An **edge coloring** of a graph is an assignment of colors to edges so that edges incident with a common vertex are assigned different colors. The **edge chromatic number** of a graph is the smallest number of colors that can be used in an edge coloring of the graph. The edge chromatic number of a graph G is denoted by $\chi'(G)$.

23. Find the edge chromatic numbers of

    a) C_n, where $n \geq 3$.

    b) W_n, where $n \geq 3$.