3.1.11

In Exercises 3.1.3 through 3.1.12, either draw the required graph or explain why no such graph exists.

3.1.**11** A 10-vertex, 3-component, forest with exactly nine edges.

3.1.14

3.1.**14** Prove that if G is a tree having an even number of edges, then G must contain at least one vertex having even degree.

3.1.19

3.1.**19** Prove or disprove: There does not exist a connected n-vertex simple graph with $n+2$ edges that contains four edge-disjoint cycles.

3.1.29

3.1.**29** Let T be a tree with at least two vertices. Prove that the center $Z(T)$ is a single edge if and only $diam(T) = 2rad(T) - 1$.

3.2.4

3.2.**4** Draw all possible binary trees of height 3 whose internal vertices have exactly two children. Group these into classes of isomorphic rooted trees.

3.2.12

In Exercises 3.2.5 through 3.2.13, draw the specified tree(s) or explain why no such tree(s) can exist.

3.2.**12** A ternary tree of height 3 with exactly four vertices.

3.5.3

In Exercises 3.5.1 through 3.5.3, use the Huffman tree constructed in Example 3.5.3 to decode the given string.

3.5.**3** 0111011000010110011.

3.5.6

In Exercises 3.5.4 through 3.5.6, construct a Huffman code for the given list of symbols and weights, calculate its average weighted length, and encode the strings "defaced" and "baggage". Use the left-to-right ordering to break ties.

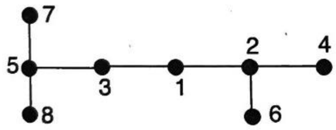
3.5.**6**

letter	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*
frequency	*.15*	*.1*	*.15*	*.12*	*.08*	*.25*	*.05*	*.1*

3.7.5

In Exercises 3.7.1 through 3.7.6, encode the given labeled tree as a Prüfer sequence. Then decode the resulting sequence, to demonstrate that Proposition 3.7.3 holds.

3.7.5



3.7.9

In Exercises 3.7.7 through 3.7.12, construct the labeled tree corresponding to the given Prüfer sequence.

3.7.9 $\langle 1, 3, 7, 2, 1 \rangle$.

3.7.15

3.7.15 Prove Proposition 3.7.3, by showing that the Prüfer encoding of an arbitrary n-vertex labeled tree, followed by the Prüfer decoding of the resulting Prüfer sequence, recaptures the original tree.