

Exercise 1

Build a graph that has treewidth equal to 4, but is 3-degenerate. Is it chordal?

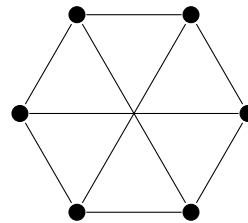
Exercise 2

Show that a graph G is chordal if and only if every induced subgraph of G has a simplicial vertex.

Exercise 3

Show that the three definitions of treewidth seen in the course are equivalent.

Exercise 4



What is the treewidth of the following graph? Justify your answer.

Exercise 5

Is it true that a graph is outerplanar if and only if it is planar and with treewidth at most 2? Justify your answer.

Exercise 6

If G is a graph and H a subgraph of G , prove that the treewidth of H is at most that of G .

Exercise 7

If G is a graph and H is obtained from G by deleting a single edge, is it possible that the treewidth of H and that of G differ by exactly 2? What about if you delete two edges instead of one? Justify your answers (in each case, either build such a pair of graphs (G, H) or prove it is impossible).

Exercise 8

Let k be a fixed integer. Give a polynomial algorithm to 3-color graphs with treewidth at most k (you can assume that you are given a tree decomposition of the input graph).