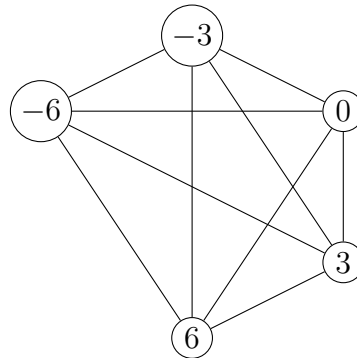
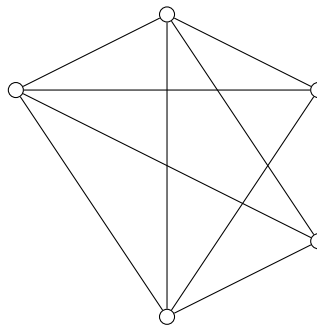


- 1.4 Let  $S = \{-6, -3, 0, 3, 6\}$ . Draw the graph  $G$  whose vertex set is  $S$  and such that  $ij \in E(G)$  for  $i, j \in S$  if  $i + j \in S$  or  $|i - j| \in S$ .



- 1.15 Draw all connected graphs of order 5 in which the distance between every two distinct vertices is odd. Justify your answer.



This works because the graph is connected and the distance between any two vertices is 1, which is odd. This is the only graph because if we remove any edge, the distance between some vertices will become 2.

1.16

1.17

a

b

- 1.20 a) What is the minimum size of a connected subgraph of  $G$  containing  $u$  and  $v$ ?  
By definition,  $d(u, v)$  is the shortest  $u$ - $v$  path. A path is a connected subgraph. Therefore, the minimum size of a connected subgraph of  $G$  containing  $u$  and  $v$  is  $d(u, v)$ .