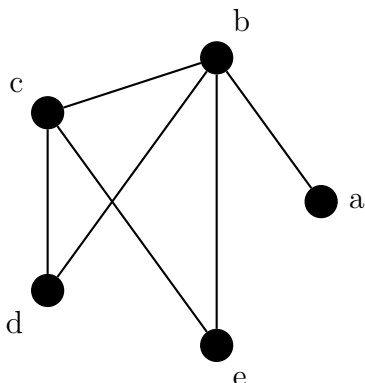# Graphs

1. How many vertices does this graph have? How many edges? What is $\deg(c)$? Which vertex has the highest degree?

2. Let G be the graph with $VG = \{v_1, v_2, v_3, v_4, v_5\}$ and $EG = \{v_1v_2, v_1v_3, v_3v_4, v_4v_2, v_1v_5, v_5v_4\}$. Draw G.

3. Let $V = \{$amble, ample, amply, apple, apply, imply, aptly$\}$. Draw the graph with V as vertices, and an edge between any two words that differ by one letter.

4. Let V be the set of divisors of 100. Draw the digraph with V as vertices, and with a directed edge from v to w if $v|w$ and w/v is prime.

5. The *complete graph* K_n has n vertices, and has edges connecting all pairs of vertices.

   Draw K_1, K_2, K_3, K_4, and K_5. How many edges does K_n have?

6. A graph is *regular* if all vertices have the same degree.

   Draw a regular graph with eight vertices, where each vertex has degree three.

7. For any graph G, there is a relation between the number of edges of G and the sum of the degrees of the vertices of G. What is it? Prove it.

8. Let G be a graph, and let $Q(G)$ be the number of vertices of G with odd degree.

   What possible values can $Q(G)$ take?