Date	**Section**	**Exercises***
11/20	1.1.2	1, 2, 4, 9, 11, 14, 15
11/22*	1.1.3	1, 2
11/27	1.3.1	1, 3
11/27	1.3.2	3, 5, 7, 8
11/29	1.3.3	4, 5
11/29*	1.3.4	2, 3, 4, 5
12/01*	1.6.1	1ae, 2, 4, 5 (see item 9 on page 13 of HHM text)
12/04*	1.6.2	5
12/06*	1.6.4	1, 2

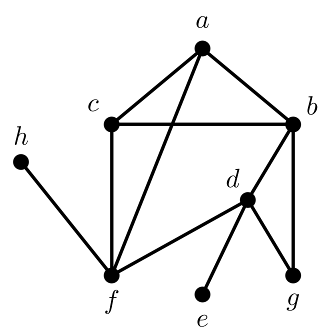


Figure 1: Graph G

11/22 Use the graph G above to answer the questions that follow.

(a) Sketch the graph $G \setminus d$. Is d a cut vertex? List all of the cut vertices of G.

(b) Sketch the graph $G \setminus ab$. Is ab a bridge? List all the bridges for G.

(c) Find the connectivity $\kappa(G)$. Now add eh to $E(G)$ and call the new graph H. What is the connectivity of H?

(d) Is G complete? Is G regular? Sketch the *complement* of G.

11/29 Prove that if T is a tree, then the average degree of a vertex is strictly less than 2.

12/01 Let T be a tree with max degree $\Delta = \Delta(T)$. Prove that T has at least Δ leaves.

*Exercises from the *Combinatorics and Graph Theory*, John M. Harris, et al., Springer 2008

12/01 Use the method outlined in Brooks's theorem to color the graph below. Be sure to specify the sets $S_0, S_1, \ldots, S_t$ and label the corresponding vertices. For colors, use 1, 2, 3, ...

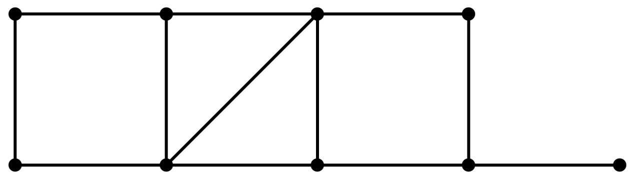


Figure 2: G

12/06 Let G be a graph with chromatic polynomial $C_G(x) = x(x-1)^{n-1}$. What kind of graph is G? Prove your claim.

12/06 For $n \geq 3$, prove that the chromatic polynomial of the cycle graph C_n is $(x-1)^n + (-1)^n(x-1)$.
Hint: Try induction on n.

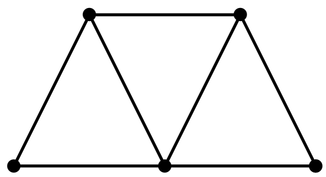
12/06 For $n \geq 4$, prove that the chromatic polynomial of the wheel graph W_n is $x\left((x-2)^{n-1} - (-1)^n(x-2)\right)$.
Note: For the base case, $W_4 = K_4$. Also, check out the collection of chromatic polynomials at Wolfram's MathWorld.

*Exercises from the *Combinatorics and Graph Theory*, John M. Harris, et al., Springer 2008

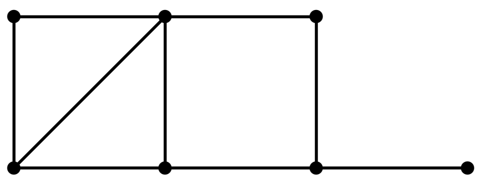
12/06 Find the chromatic polynomials of the graphs below.

(a) A star graph with n vertices.

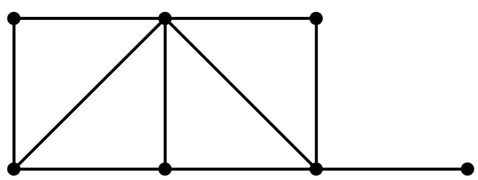
(b)



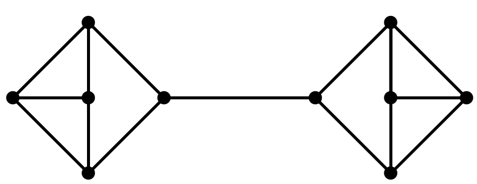
(c)



(d)



(e) Notice that G is 3-regular with a cut vertex.



*Exercises from the *Combinatorics and Graph Theory*, John M. Harris, et al., Springer 2008