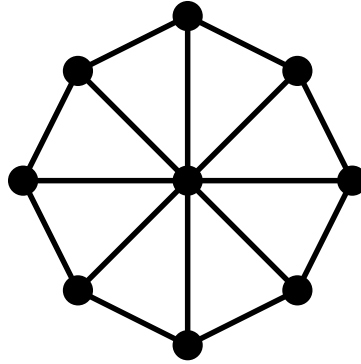


Fall 2019, Math 579: Preliminary Problem Set 8  
Due: Thursday, October 24th, 2019  
Planar Graphs

**Preliminary problems.** These problems should be completed before discussion on Thursday.

- (P1) Given below is a planar graph. Find a different embedding in which the degree-8 vertex borders the “outside” face.



- (P2) Find the dual  $G^*$  of the graph  $G$  depicted above (with the original embedding).

- (P3) Find an isomorphism between  $G$  and  $G^*$  (in this case, we say  $G$  is *self-dual*).