

**Set Theory**

1. Suppose that  $A$  and  $B$  are two events. Write expressions involving unions, intersections, and complements that describe the following:
  - (a) Both events occur
  - (b) At least one occurs
  - (c) Neither occurs
  - (d) Exactly one occurs
2. Suppose  $A$  and  $B$  are two disjoint sets in some sample space  $\mathcal{S}$ . What needs to be true about  $A$  and  $B$  such that the sets  $A^c$  and  $B^c$  are disjoint? *Hint: DeMorgan's Law.*