Solutions to HW 10.

1. How many 5-card poker hands have cards of every suit?

2. Let $X = \{x_1, x_2, \ldots, x_n\}$.
   (a) How many binary relations on X are there?
   (b) How many binary relations on X are reflexive?
   (c) How many binary relations on X are reflexive and symmetric?
   (d) Explain why there are B_n binary relations on X that are reflexive, symmetric, and transitive.

3. These problems are about seating people at a round table. Two seating arrangements are considered the same if they differ by a rotation. (So, for example, the arrangement ABCDEF is the same as BCDEFA.)
   (a) How many ways are there to seat 3 couples at a round table?
   (b) What if couples must sit together?
   (c) What if couples are not allowed to sit together?