

Math 213, Section B1, Quiz 3 (Solutions); Friday, February 9, 2007

1. For a standard 52-card deck find the number of all 4-card hands that contain exactly one ace. Give the details of your work.

Solution.

There are 4 aces and 48 non-ace cards in a 52-card deck. Choosing a 4-card hand with exactly one ace consists in picking a one-card subset from the set of four aces and a 3-card subset from the set of the 48 non-aces. Therefore by the product rule the number of 4-card hands with exactly one ace is:

$$C(4, 1)C(48, 3) = 4 \cdot \frac{48 \cdot 47 \cdot 46}{1 \cdot 2 \cdot 3} = 69184.$$