Chapter 6. Problems 6.4, 6.8, 6.12, 6.16, 6.20

The following problems deal with the game of bridge. In bridge one is dealt 13 cards from the usual 52 card deck. The order of the cards is immaterial.

1. How many possible hands are there?
2. How many hands are there where every card has the same suit? What are the odds on getting such a hand? If everyone on earth was dealt one hand is it likely or unlikely that someone would get such a hand?
3. How many hands are there with (precisely) seven of a suit? (Idea: Pick the suit, then pick the seven of that suit, then pick the six of not of that suit.) What are the odds on getting such a hand?
4. How many hands are there with all four Aces? (Idea: How many choices for the other nine cards?) What are the odds of being dealt all four Aces?
5. What are the odds of being dealt the $A\spadesuit$? (You could do this by counting all hands with the $A\spadesuit$ but there is an easier way!)

Indeed, if there really is some day discovered a formula for all our desires and caprices - that is, an explanation for what they depend upon, by what laws they arise, how they develop, what they are aiming at in one case and in another, that is, a real mathematical formula - then, most likely, man will at once cease to feel desire, indeed, he will be certain to.
– Dostoyevsky, Notes from Underground