

MATH 120 In-class Activity

Day 7

Question 1. A club has 40 members: 24 women and 16 men.

- (a) In how many ways can you choose ten of the club members to wear silly hats?

- (b) In how many ways can the club choose one person to be the president and then three other members to be vice-presidents?

- (c) In how many ways can the club choose six people to be on the electoral action committee which requires the same number of men as women?

Question 2.

- (a) Write out all the ways to rearrange the letters in the word BOX. How many are there?

- (b) Write out all the ways to rearrange the letters in the word BOO. How many are there?

- (c) How are the answers to part (a) and part (b) related and why?

- (d) In how many ways can you rearrange the letters in the word MISSISSIPPI?
[Hint: First decide the positions where the P's will be located.]

Question 3. How many lattice paths from $(-5, -7)$ to $(3, 4)$ avoid the origin?

Question 4. A deck of cards has fifty-two cards, made up of four suits (Hearts, Diamonds, Spades, and Clubs) each with thirteen denominations (Ace, King, Queen, Jack, 10, 9, 8, 7, 6, 5, 4, 3, 2). The cards King, Queen and Jack are considered to be the “Face Cards”. The Hearts and Diamonds are the “red cards” and the Spades and Clubs are the “black cards”.

Hearts: $A♥ K♥ Q♥ J♥ 10♥ 9♥ 8♥ 7♥ 6♥ 5♥ 4♥ 3♥ 2♥$
 Diamonds: $A♦ K♦ Q♦ J♦ 10♦ 9♦ 8♦ 7♦ 6♦ 5♦ 4♦ 3♦ 2♦$
 Spades: $A♠ K♠ Q♠ J♠ 10♠ 9♠ 8♠ 7♠ 6♠ 5♠ 4♠ 3♠ 2♠$
 Clubs: $A♣ K♣ Q♣ J♣ 10♣ 9♣ 8♣ 7♣ 6♣ 5♣ 4♣ 3♣ 2♣$

In the game of poker, you get five cards. The process of giving out cards is called “dealing” and the cards you get is called your “hand”. Certain combinations of cards appear less frequently than others and are therefore considered to be better.

Determine the number of ways in which you can be dealt each of the following types of hands. Leave your answer as binomial coefficients or products thereof.

- (a) Any hand of five cards.
- (b) A flush (all five cards your hand are of the same suit)
- (c) A full house (three cards of one denomination and two cards of another)
- (d) One pair (two cards of the same denomination and three other cards, none of whose denominations match)
- (e) Two pairs (two cards of the same denomination, two cards of a second denomination, and a fifth card whose denomination is not the same as the others)