Math 17C
Kouba
Discussion Sheet 8

1.) It's time for Krispy Kreme doughnuts. If you go to the store and buy 6 doughnuts, how many ways can you select them if you get to choose from only chocolate and glazed doughnuts ?

2.) How many distinct factors does each integer have ?

   a.) 5   b.) 20   c.) 200   d.) 3960

3.) How many distinct permutations are there using all the letters in each word ?

   a.) BIRD   b.) CONSIDERABLE   c.) ECLECTIC   d.) MISSISSIPPI

4.) It's time for Krispy Kreme doughnuts again. If you go to the store and buy 12 doughnuts, how many ways can you select them

   a.) if you get to choose from chocolate, caramel, maple (my favorite), and coconut doughnuts ?
   b.) if you get to choose from chocolate, caramel, maple, and coconut doughnuts and you must choose at least 2 caramel ?

5.) A bag holds 5 green, 4 blue, and 3 blacks softballs. In how many ways can you select

   a.) 6 balls ?
   b.) 6 balls, if none can be green ?
   c.) 6 balls, if there must be exactly 2 blue balls ?
   d.) 6 balls, if there must be 2 green, 1 black, and 3 blue balls ?
   e.) 6 balls, if there must be at least 1 blue ball ?
   f.) 6 balls, if there must be at most 1 green ball ?

6.) A bag holds 20 yellow and 15 pink tennis balls. In how many ways can you select 10 balls if there must be at least 1 of each color ?

7.) (Challenging) A bag holds 25 green, 20 red, and 15 white tennis balls. In how many ways can you select 10 balls if there must be at least 1 of each color?

8.) Consider 365 possible birthdays in a year.

   a.) How many different birthday possibilities are there for a group of 10 people ?
   b.) How many different birthday possibilities are there for a group of 10 people, if no two people have the same birthday ?
   c.) How many different birthday possibilities are there for a group of 10 people, if at least 2 people have the same birthday ?

9.) Consider a standard deck of 52 playing cards consisting of 13 face values (A, 2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K) and 4 suits (hearts, diamonds, spades, and clubs). If you are dealt

a poker hand (5 cards), in how many ways can you have

    a.) a club straight (all clubs, 5 consecutive cards (including 10,J,Q,K,A)) ?

    b.) a heart flush (all hearts, but not consecutive) ?

    c.) a flush of any suit (all same suit, but not consecutive) ?

    d.) three of a kind (3 cards of one face value and two other cards of different face values) ?

    e.) 1 pair only (2 cards of the same face value and 3 other cards all of different face values) ?

    f.) 2 pairs (2 pairs of different face values and the 5th card of a third face value) ?

10.) A wildlife biologist releases 500 smallmouth bass, 50 of which are tagged, into a small reservoir. Several months later 15 smallmouth bass are caught.

    a.) How many ways can 15 bass be caught ?

How many ways can 15 bass be caught if

    b.) exactly 4 are tagged ?

    c.) none are tagged ?

    d.) at least 1 is tagged ?

    e.) at least 1 is tagged and at least 1 is untagged ?

11.) How many different ways can 5 (identical) yellow and 3 (identical) orange golf balls be arranged in a row of 8 slots ?

12.) Consider a group of 5 (distinct) Kappa Alpha Theta women and 3 (distinct) Sigma Tau Gamma men ?

    a.) How many ways can the Theta women and Sig Tau men be arranged in a row of 8 chairs ?

    b.) How many ways can the Theta women and Sig Tau men be arranged in a row of 8 chairs if the Theta women must sit together ?

    c.) How many ways can the Theta women and Sig Tau men be arranged in a row of 8 chairs if the Sig Tau men cannot sit next to each other ?

    d.) How many ways can the Theta women and Sig Tau men be arranged in a row of 12 chairs ?

    e.) How many ways can the Theta women and Sig Tau men be arranged in a row of 12 chairs if the Sig Tau men cannot sit next to each other ?

    f.) How many ways can the Theta women and Sig Tau men be arranged in a row of 12 chairs if the Theta women cannot sit next to each other ?

    g.) How many ways can the Theta women and Sig Tau men be arranged in a row of 12 chairs if all of the Sig Tau men must sit next to each other ?

    h.) How many ways can the Theta women and Sig Tau men be arranged in a row of 12 chairs if all of the Theta women must sit next to each other ?

13.) Let's go to Dunkin' Donuts. We will select doughnuts from among chocolate, blueberry, sprinkles, maple and caramel.

    . a.) How many ways can we select 18 doughnuts ?

b.) How many ways can we select 18 doughnuts and have
  i.) at least 4 chocolate doughnuts ?
  ii.) at least 3 caramel and at least 2 sprinkles doughnuts ?
  iii.) exactly 6 blueberry doughnuts ?
  iv.) exactly 2 maple and 5 caramel doughnuts ?
  v.) at most 2 chocolate doughnuts ?
  vi.) at most 15 maple doughnuts ?

14.) A committee of 8 people will be chosen from 20 people composed of 13 women and 7 men.
  a.) How many 8-person committees are possible ?
  b.) How many 8-person committees have exactly 5 women and 3 men ?
  c.) How many 8-person committees have at least 6 women ?
  d.) How many 8-person committees have at most 6 men ?
  e.) How many 8-person committees are possible if Sam (man) and Susie (woman) must serve together on the committee ?
  f.) How many 8-person committees are possible if neither Sam (man) nor Susie (woman) will serve on the committee ?
  g.) How many 8-person committees are possible if Sam (man) and Susie (woman) will NOT serve together on the committee ?

15.) Lebron James goes to Big 5 Sporting Goods to buy 10 basketballs. He can buy black, orange, white, green, or red basketballs. How many different color outcomes are possible for Lebron's purchase ?

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"All those who believe in psychokinesis raise my hand." – comedian, Steven Wright