

Worksheet 2.2

Practice with Permutations and Combinations

1 Calculations

Calculate each of the following:

a) ${}_{10}P_2$

b) ${}_7P_7$

c) ${}_5P_3$

d) ${}_{12}P_5$

e) ${}_3P_1$

f) $\binom{10}{2}$

g) $\binom{6}{2}$

h) $\binom{6}{4}$

i) $\binom{1200}{1200}$

j) $\binom{17}{18}$

2 Permutations

1) 10 students are to be lined up for lunch. How many different lines can we form?

2) 128 tennis players are entered in a tournament. If the top 32 players are seeded, how many ways could we assign the seeds to 32 different players?

3) 100 Senators are being considered to chair the 17 committees in the US senate. How many different ways could the chairpeople be selected, assuming that no one chairs more than 1 committee?

4) 8 friends go to the movies and Mike insists on being third in line to get tickets. If his wife always stands in front of him in line, how many ways can the 8 friends line up at the ticket window?

5) The same 10 students wish to go to lunch. How many ways could we line up 5 of them, send them to lunch and then line up the remaining 5?

6) A bookshelf contains 3 math, 3 science and 3 social studies textbooks. If all of the books are the different, how many ways can the books be arranged on the shelf?

6b) How many ways can the books be arranged such that the books of the same type are together?

3 Permutations and Combinations

1) A baseball team has 25 players on its roster. How many ways are there to pick nine starters?

2) The local bank branch has a pool of 8 tellers and 8 customer service reps (CSRs). How many ways can the manager select 4 tellers and 2 CSRs to work on a given day?

3) Ping-pong balls labeled 1-15 are placed in a bag. How many ways can I reach into the bag and pull out either four or six balls?

4) How many ways are there to select a committee of 6 people from a group of 12 and also select a committee president and secretary?

5) There are 10 people at a party, and each pair of people shakes hands exactly once. How many handshakes were there?

6) How many subsets of a 15-element set have either four or six elements?