Please make your answers mathematical expressions involving exponents and factorials. I'd prefer that you not simplify them or multiply them out.

Question 1: I am a salesman whose route covers 12 cities. In how many different orders can I visit all 12 cities, if I'm not allowed to visit a city twice?

Question 2: On the planet vowelopia, everyone's name has to contain exactly 10 characters, which can only be vowels (A, E, I, O, U). How many distinct names are there?

Question 3: My basketball team has 12 players. At any one time, there can only be 5 players on the court. How many different combinations of players can there be on the court?

Question 4: How many subsets are there of the set { 34, 52, 22, 66, 43, 1 }

Question 5: If I have 15 different colored balls, how many ways are there to put them into 15 numbered boxes?

Question 6: If I have 5 identical white balls and 18 identical black balls, how many ways are there to put them into 23 numbered boxes?

The number in parens is how many students got this right when it was given on the 2017 midterm.

- **Question 1**: (92.2%) The answer is the number of permutations of the cities: 12!
- **Question 2**: (68.8%) The number of 10-character strings from a 5-character alphabet: 5^{10}.
- **Question 3**: (81.8%) "12 choose 5", which is equal to "12 choose 7": (12!) / ((5!) (7!))
- **Question 4**: (48.1%) That's a power set enumeration: 2^6.
- **Question 5**: (66.2%) This is the number permutations of the 15 balls: 15!
- **Question 6**: (40.3%) This is the number of ways to choose 5 elements from 23 elements: "23 choose 5", which is equal to "23 choose 18": (23!) / ((5!) (18!))