Counting Using Permutations, Combinations, And the Fundamental Counting Principle

Answer the following questions. Show all work.

1. If the NCAA has applications from 12 universities for hosting its intercollegiate tennis championships in 2013 and 2014, how many ways may they select the hosts for these championships…

a) if they are not both to be held at the same university?   132 ways
b) if they may both be held at the same university?   144 ways

2. There are five finalists in the Gradman pageant. In how many ways may the judges choose a winner and a first runner-up? 20 ways

3. In a primary election, there are four candidates for mayor, five candidates for city treasurer, and two candidates for county attorney. In how many ways may voters mark their ballots if they vote in all three of the races?   40 ways

4. A multiple-choice test consists of 15 questions, each permitting a choice of 4 alternatives. In how many ways may a student fill in the answers if they answer each question?   1,073,741,824

5. A television director is scheduling a certain sponsor's commercials for an upcoming broadcast. There are six slots available for commercials. In how many ways may the director schedule the commercials? 720

6. In how many ways may can five persons line up to get on a bus? 120
6. In how many ways may 8 people form a circle for a folk dance? 40,320

7. You would like to invite 5 of your 25 Twitter followers to dinner. How many ways can you do this? 53,130

8. 39 students try out to be extras for the school musical "Aida". How many ways can the director choose 6 extras? 3,262,623

9. How many ways can you create a code that contains 4 digits, the first being even, and digits cannot repeat? 2520

10. How many ways can the junior class select a prom queen and her runner up out of 10 contestants? 90