

Counting

- 1) A Student wants some books from the library. He has to choose from 4 different comic books, 5 different fiction books, and 4 different medical books: **(5*2 = 10 points)**
 - a) In how many ways can a student choose one of each kind of book? Explain your answer.
 - b) In how many ways can a student just choose one of the books? Explain your answer.
- 2) There are 7 red and 9 black marbles. Each marble is unique. There should be 10 of the marbles placed in a box. How many different combinations can there be in one box if: **(5*4 = 20 points)**
 - a) There must be equal number of both color of marbles.
 - b) There must be at least 6 red marbles in a box.
 - c) All the red marbles should be used.
 - d) All the black marbles should be used.
- 3) There are 5 buses between Sac State and 65th Street, and 4 train lines between 65th Street and Folsom. Find the number of ways that a man can travel by bus: (a) from Sac State to Folsom by way of 65th Street; (b) roundtrip from Sac State to Folsom by the way of 65th Street; (c) roundtrip from Sac State to Folsom by way of 65th Street but without using a transportation mode more than once (Do not use the same bus or train again). **(5*3 = 15 points)**
- 4) a. How many distinguishable ways can the letters of the word MISSISSIPPI be arranged in order?
b. How many distinguishable orderings of the letters of MISSISSIPPI begin with M and end with I? **(5*2 = 10 points)**
- 5) A team is selected with 12 players including the captain **(5*3 = 15 points)**
 - a) How many different combinations of 3 can be chosen?
 - b) How many of these combinations include captain?
 - c) How many do not include captain?
- 6) A computer programing team of 5 should be formed from 9 employees. Two of the employees are managers. However, to avoid dispute problems, the 2 managers cannot both be chosen. Find the number of teams that can be formed? **(6 points)**
- 7) A photo has to be captured with 8 different celebrities. There are also some chairs available. So, they have the option to either sit on the chair or stand while taking picture. How many different photos are possible? **(6 points)**
- 8) I have to create one computer password. A password is of length 5 characters, first two of which are distinct numbers, next character can be any upper-case letter, and the remaining 2 characters can be any digit or letter (upper- or lower-case)? How many combinations are allowed? Note: Repetition of characters are not allowed. **(6 points)**
- 9) **You have 3 red pens and 7 blue pens. If you line up all the 10 pens one pen per day for 10 days, where the pens are indistinguishable by color, how many weeks (plus days) will it take to complete all combinations? (NOTE THIS IS NEW CORRECTED PROBLEM) (6 points)**
- 10) There are 4 entry and exit points (A single point can be used either for entry or exit). In how many ways can a person enter and leave a space if the he or she has to use different points? What if the person can use same points? **(6 points)**