

Counting part I - Ice Cream Cones¹

Below is the Menu's for Jen's Ice Cream Parlor:

Small (1 scoop)	.75
Medium (2 scoops)	.95
Large (3 scoops)	1.35
Jumbo (4 scoops)	2.00
Cones: Sugar, Waffle, Regular	
Flavors: Vanilla, Chocolate, Peach, Strawberry, Pistachio, Motor Oil	

1. How many different ice cream cones can be made if you don't mix flavors? Include different sorts of cones and different flavors, but only one flavor for a given cone. Explain your solution. Illustrate your solution with a diagram.
2. How many different ice cream cones can be made if you allow scoops of different flavors of ice cream on the same cone? Explain (i.e. show all necessary work).
3. How many different ice cream cones can be made if when multiple scoops are made, the flavors of ice cream *must* be different? Explain.

¹Adapted from notes developed by Kribs-Zaleta, et al.

Counting part II - Photographs²

1. How many ways can you line up four people for a photograph if all four will be in the picture? (Note: (a) They must be lined up horizontally. (b) We will consider Ann, Bob, Cat, Dan a different photo than Dan, Bob, Ann, Cat.)
2. How many ways can you line up ten people for a photograph?
3. If there are 4 people, how many can you take in which 3 people appear? in which 2 people appear? 1 person? people?
4. If there are 10 people, how many can you take in which 9 people appear? in which 8 ... 1 people appear? 0 people?
5. How many ways can you line up r people out of a group of n for a picture? Explain.

²Adapted from notes developed by Kribs-Zaleta, et al.

Counting part III - Committees ³

1. How many 4-member committees can you make from a group of 4 people? (Note that a committee with Ann, Bob, Cat and Dan is the same committee as one with Bob, Cat, Dan and Ann).
2. How many 3-member committees can you make from a group of 4? How many 2-member committees? 1-member committees? 0-member committees?
3. Suppose that another person, Ernie, joins your group. Now how many committees with, respectively, 5, 4, 3, 2, 1 and 0 members can you make?
4. Suppose that 5 more people join your group, for a total of 10 people. Now how many committees with, respectively, 10, 9, 8, ... , 1 and 0 members can you make?
5. How many committees with r members can be made from n people?

³Adapted from notes developed by Kribs-Zaleta, et al.

Below are some groupings of the letters A, B, C and D taken 3 at a time.

ABC ABD ACD BCD
ACB ADB ADC BDC
BAC BAD CAD CBD
BCA BDA CDA CDB
CAB DAB DAC DBC
CBA DBA DCA DCB

Below are some groupings of the letters A, B, C and D taken 2 at a time.

AB BA CA DA
AC BC CB DB
AD BD CD DC

OR

AB AC AD BC BD CD
BA CA DA CB DB DC

Other Assignment 1: Individual Write Up for the Counting Group Assignments.

Your answers to these questions should be *typed* and well thought out (you may had write out mathematical symbols or complicated diagrams). Points will be deducted if poor grammar is used. This assignment will be worth 10 points toward the Writing Assignments portion of your grade.

1. What general rule did you determine for counting in the Ice Cream Cones assignment? Describe a diagram that can be used to illustrate this rule and explain how the rule and diagram relate.
2. What general rule did you determine for counting in the Photographs assignment? Be sure to *define* any variables that you use.
3. What general rule did you determine for counting in the Committees assignment? Be sure to *define* any variables that you use.