

Counting Handout 3  
by Joe Kahlig, Spring 2005

*In the following exercise, use any appropriate technique that has been presented to obtain the count requested.*

**Video solutions located at:**

<http://www.math.tamu.edu/~kahlig/166-extra-info.html>

- Your class is having a 13-question multiple choice exam. The prof, in an effort to reward good attendance, has indicated that 3 questions have the answer A, 2 questions have the answer B, 1 question has the answer C, 3 questions have the answer D, and 4 questions have the answer E. Using this information, how many ways can a student answer the exam?
- Your CD collection consists of the following CDs: 4 from Brian White, 7 from George Strait, 2 from Savage Garden, and 3 from The Coors. Assume that there are no duplicate CDs.
  - If you place all of the CDs on a shelf, how many ways is this possible if the CDs by the same artist are grouped together?
  - If you grab 6 of these CDs, how many ways can you get exactly three of George Strait's CDs or exactly three of Brian White's CDs?
- In how many ways can you get a license plate consisting of four letters and two digits in any order with no digit or letter repeated?
- How many distinct rearrangements of the letters in the word **Reference** are there?
- A box contains 6 red balls, 8 green balls, 10 purple balls, and 5 white balls. If a sample of 8 balls is taken from the box, in how many ways can we get
  - exactly 4 green balls and exactly 2 white balls?
  - exactly 3 green balls or exactly 5 red balls?
  - at least 7 purple balls?
- There are 5 faculty members who advise math majors in setting up their degree plans. In how many ways can 15 math majors be directed to the 5 faculty members if each faculty member advises the same number of students?
- The Student Senate is creating a committee to study the issue of professors parking in the student lots. This committee will consist of 7 senators with one designated the chairperson and another designated the assistant chairperson. Currently 12 senators want to be on the committee. How many committees are possible?
- Billy Joe Jim Bob went fishing. He took all of the fish that he caught to Barbara Anne, who works at the vet school, so that she could tell him what kind of fish he caught. She identified the fish as: 4 catfish, 5 gar, 3 bass, and 2 sharks. If a sample of three fish is taken from the catch. In how many ways can the sample contain only one catfish or only two bass?
- How many 4 digit numbers have
  - no sevens?
  - at least one seven?
- An exam consists of 6 true/false questions and 5 multiple choice questions, each with 4 possible answers. How many ways can the exam be worked if each question is answered?
- How many 6 card hands have exactly 3 diamonds or exactly 3 black cards?
- Phredd is an engineering student. On his birthday, his mom sent him 12 blocks: 3 red, 4 blue, and 5 black. These blocks are brand new and as such have no marks, scratches, or dents in them.
  - How many ways can Phredd place them in a row?
  - How many ways can he place them in a row if he groups the same colors together?
  - How many ways can the blocks be placed in a row and the red blocks are not next to another red block. (Hint: think of part a of this problem and problem 19 on counting handout #2).
- When ordering you Aggie Ring you have five options:<sup>1</sup>
  - (Weight of Ring): Male Weight for guys or Female Weight for girls
  - (Type of Gold): 10K, 14K, or White Gold
  - (Finish): Dark, Rose, or natural (\*\*If white gold is chosen, then the dark finish is the only option.\*\*)
  - (Diamond or No Diamond): Men have 4 diamonds to choose from; Women have 3 diamonds to choose from
  - (Engraving Style): Your ring **MUST** be engraved either with (First Name, Middle Initial, Last Name) or (First Initial, Middle Name, Last Name)
    - Disregarding size options, how many different rings are possible for a woman?
    - Disregarding size options, how many different rings are possible for a man?
- A photographer only wants to line 5 people in a row for a picture. If there are 7 guys and 5 girls, how many different photos can be taken with exactly 3 or exactly 4 guys in the picture?
- How many ways can 8 people(3 boys and 5 girls) line up in a row for a picture where no boy is next to another boy?

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<sup>1</sup>contributed by Kathryn Bollinger

1. 3,603,600
2. (a) 34836480  
(b) 3680
3. 484,380,000
4. 15,120
5. (a) 84,000  
(b) 1,149,834  
(c) 2,325
6. 168,168,000
7. 33,264
8. 201
9. (a) 5,832  
(b) 3,168
10. 65,536
11. 8,630,154
12. (a) 27,720  
(b) 6  
(c) 15120
13. (a) 56  
(b) 70
14. 63000
15. 14400