3.1 1, 2-20 even
3.2
3.4 4-12, and 4
3.3 2-6

Homework 6

3.1 1. $_{26}P_2 + {_{10}P_2}$

2. $_5P_5$

4. $4 \times 5 \times 3 \times 2 = 120$

6. a $2^3 = 8$

b $2^7 = 128$

8. a $_4P_4 = \frac{4!}{(4-4)!} = 4! = 24$

b $_6P_5 = \frac{6!}{(6-5)!} = 6! = 720$

c $_7P_2 = \frac{7!}{(7-2)!} = \frac{7!}{5!}$

10. $4! = 24$

12. $6! = 720$

14. $_7P_3 = \frac{7!}{4!}$

16. $\{0,1,2,3\} = 4! = 24$

18. $5! = 120$

20. $6! = 720$

22. $8!$

24. $7!$

3.2 1. a $\frac{n!}{r!(n-r)!} = \frac{7!}{7!} = 1$

b $\frac{7!}{4! \cdot 3!}$

c $\frac{16!}{11! \cdot 5!}$

2. a $\frac{n!}{(n-1)!} = n$

b $\frac{n!}{(n-2)!(2)!} = \frac{n \cdot (n-1)!}{2}$

c $\frac{(n+1)!}{(n-1)!(2)!} = \frac{(n+1)\cdot(n)}{2} = \frac{n^2+n}{2}$

4. $_7C_3 \cdot {_8C_2}$

6. $_{12}C_7 \cdot {_{15}C_7}$

8. $_8C_5$

10. a $_8C_5 \cdot {_7C_0} = {_8C_5}$
b $_7C_5 \cdot {_8C_0} = {_7C_5}$

12. $_5C_0 + {_5C_1} + {_5C_2} + {_5C_3}$

14. because the 1's can be anywhere in the string, but only 4 can be present, the other values must be 0's. Only these values count toward the combination.

16. $_{10}C_6$

18. $_5C_3$

20. a $_{10}C_8$
b $_{10}C_5$

22. a 6^3
b 25
c 5

24. a 6^n
b $6^n - 6^{n-1} - 1$
c $6^{n-1} - 1$

3.4 4. { dddd, gdddd, ggdddd, ... gdddgd, gdddggd ... }
Each element must have 4 d, and the g's are optional, but can be placed anywhere except after the 4th d. Also, no element can be less than 4 or greater than 12.

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Homework 6

8. The card is a black ace.

12. a $\frac{16}{52}$

b $\frac{5}{52}$

c $\frac{21}{52}$

16. $E \cup F = \frac{5}{6}$

$E \cap F = \frac{1}{6}$

$\overline{F} = \frac{4}{6}$

20. a $\frac{1}{10^4}$

b 1

24. a $\frac{5}{7}$

b $\frac{4}{7}$

28. a $\frac{5}{6}$

b $\frac{1}{6}$

32. $\frac{x}{{}_{52}C_4}$

3.3 4. $n=8$, $m=7$, so $n > m$

2 $n=7$, $m=6$

7 pigeons or numbers, and 6 holes because it is possible to not add up to 13 with 6 holes, but not 7.

3. $n=5$, $m=4$,

5 points can be placed, and to get maximum distance, 3 points can be placed at vertices, however, the 4th will go into the center, which is barely over 0.5 units, but the fifth will be close to another dot

5. $n=8$, $m=7$
50 bicycles painted 7 different colors will paint at least 49 bicycles (7 each) different colors but the next bicycle painted will be 8 for one color

6. ${}_{10}C_3 = \frac{10!}{3! \cdot 7!} = \frac{10 \cdot 9 \cdot 8}{3!} = \frac{720}{6} = 120$
If 120 slips are put into ten different hats, then because $120/10 = 12$, then at least one hat always has to have at least 12 slips