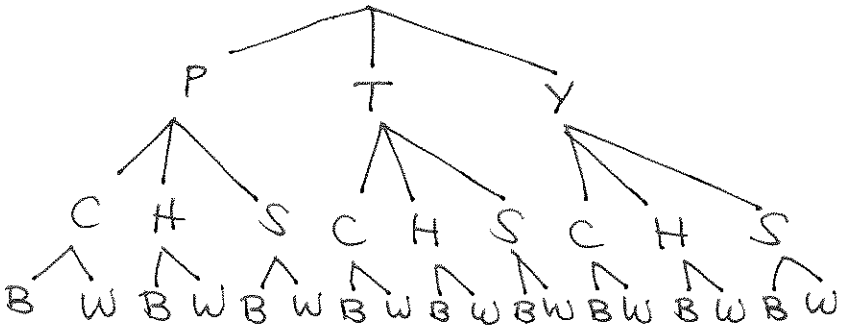
Foundations 12 Name: _____

Ch. 4 Review

1. Chelsea is planning on making me a necklace. She has 3 colours of beads (purple, turquoise and yellow), 3 shapes of each (circle, heart and star) and 2 colours of string (black and white). Draw a tree diagram and determine the number of necklace combinations she could make.



$3 \times 3 \times 2 = 18$

2. License plates are created so that the first 3 characters have to be a letter and the last 3 characters have to be a digit (0-9). You can not use the letters O or I.

   a) How many license plates are possible?

$\underset{L}{24} \times \underset{L}{24} \times \underset{L}{24} \times \underset{D}{10} \times \underset{D}{10} \times \underset{D}{10} = 13824000$

   b) Suppose each character can be used only once. How many possibilities are there?

$\underset{L}{24} \times \underset{L}{23} \times \underset{L}{22} \times \underset{D}{10} \times \underset{D}{9} \times \underset{D}{8} = 8743680$

3. There are 10 toppings available at a Sundae ice cream bar. How many ways can you choose 3 toppings?

$_{10}C_3 = 120$

4. Ten students apply for student council. How many possible ways are there for the president, vice-president and secretary to be chosen?

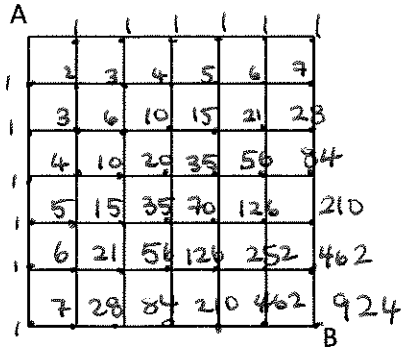
$_{10}P_3 = 720$

5. How many permutations are there of all the letters in BANANA?

1 B
3 A
2 N

$\frac{6!}{3!2!} = 60$

6. How many different ways are there to move from point A to point B if you can only move east and south?



924

7. A muffin shop offers 11 varieties of muffins. Suppose a customer orders half a dozen assorted muffins. How many different combinations are there?

$$_{11}C_6 = \boxed{462}$$

8. A volleyball team has 12 members.

   a) In how many ways can the coach choose the starting line-up of 6 players?

$$_{12}C_6 = \boxed{924}$$

   b) In how many ways can the coach position the 6 starting players?

$$_6P_6 = 6! = \boxed{720}$$

9. From a deck of 52 cards, how many different 5-card hands can be formed in each case?

   a) with exactly 3 Kings 3 K · 2 other

$$= {}_4C_3 \cdot {}_{48}C_2 = \boxed{4512}$$

   b) with fewer than (less) 3 Kings

$$\left.\begin{array}{lll} 2\,K = {}_4C_2 \cdot {}_{48}C_3 = 103776 \\ 1\,K = {}_4C_1 \cdot {}_{48}C_4 = 778320 \\ 0\,K = {}_4C_0 \cdot {}_{48}C_5 = 1712304 \end{array}\right\} + = \boxed{2594400}$$

   c) with more than 3 Kings

$$4K = {}_4C_4 \cdot {}_{48}C_1 = \boxed{48}$$

10. A committee of 4 people is to be chosen from a group of 10 people- 6 men and 4 women. In how many ways can the committee be chosen so as to include

   a) exactly 3 women? $3W \cdot 1M = {}_4C_3 \cdot {}_6C_1 = \boxed{24}$

   b) at most (max) 2 men?

$$\left.\begin{array}{lll} 2M \cdot 2W = {}_6C_2 \cdot {}_4C_2 = 90 \\ 1M \cdot 3W = {}_6C_1 \cdot {}_4C_3 = 24 \\ 0M \cdot 4W = {}_6C_0 \cdot {}_4C_4 = 1 \end{array}\right\} \boxed{115}$$

Answers: 1) 18 2a) 13 824 000 b) 8 743 680 3) 120 4) 720 5) 60 6) 924 7) 462
8a) 924 b) 720 9a) 4512 b) 2 594 400 c) 48 10a) 24 b) 115