7.3 Exercise Set

1. For each of the following problems, tell whether permutation or combination should be used to solve the problem.

a) How many 5-digit code numbers are possible if no digit is repeated?

b) A sample of 5 marbles is selected from a bag of 15 marbles. How many different samples are possible?

c) A combination lock consists of 3 selected numbers from a choice of 60 numbers. From any 3 sets of numbers, how many combinations are possible?

d) In a hockey tournament of 6 teams, each team must play each other once. How many games are played?

e) Selecting 3 people out of a class of 30.

f) Selecting a president, vice-president and treasurer out of a class of 30.

2. Solve ${}_nC_3 = 7n$ using algebra.

3. How many ways can a committee of 3 people be chosen from 20 people in the Environment Club?

4. A sample of 5 people is selected from 3 smokers and 12 non-smokers. In how many ways can the 5 people be selected?

5. You have a penny, nickel, dime, quarter, loonie, and toonie in your pocket. If you pull out 3 coins, how many different sums are possible?

6. Ten college students, including a married couple, are eligible to attend a national conference. Four students can attend, and the married couple will only go as a pair. How many different possibilities are possible?

7. From a regular 52-card deck, how many 5-card hands have exactly 3 hearts and 2 clubs?

8. Ten distinct points are marked on the circumference of a circle.

a) How many chords can be drawn using the points marked on the circumference?

b) How many triangles can be drawn using the marked points as vertices?

c) How many quadrilaterals can be drawn using the marked points as vertices?

d) What is the general formula used for n distinct points and r vertices?

9. Twelve students, consisting of 5 men and 7 women, apply for a job. In how many ways can 4 jobs be awarded amongst the students if:

a) there is no restriction on awarding the job?

b) 2 men and 2 women must be hired?

c) at least 2 jobs must go to women?

10. A box of 30 flashbulbs contain 5 defective bulbs. In how many ways can 6 bulbs be selected if:

a) there is no restriction on what bulb is selected?

b) only non-defective bulbs can be selected?

c) the selection must consist of 2 defective bulbs?

11. Calculate the number of all different 5-card poker hands.

Note: A 52-card deck consists of 4 "suits" of 13 cards called hearts, diamonds, clubs and spades, numbered 1 (Ace), 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King. The 1 (Ace) can be low (e.g., 1, 2, 3) or high (e.g., Q, K, 1). The hearts and diamonds are red, and the clubs and spades are black.

a) straight flush (including 10, J, Q, K, 1) – 5 cards in a row, all of the same suit.

b) four of a kind.

c) full house – 3 of a kind plus a pair e.g., 4 4 4 9 9.

d) flush – 5 cards all of the same suit, e.g. 5 hearts, but not including a 5-card straight flush.

e) straight – 5 cards in a row, e.g., 7 8 9 10 J (including 10, J, Q, K, 1), but not all of the same suit.

f) three of a kind.

g) two pairs.

h) one pair.

i) high card.

j) show that the sum of card hands from straight flush to high card hand equals the number of 5-card hands.