4

3.) 5 red apples
+
3 green apples
8

a) Probability that you will select two red apples.

$$P(R) = \frac{5C_2}{8C_2} = \frac{10}{28} = \frac{5}{14}$$

$$P(R) = 5/14.$$

b). You will not select two green apples.

$$P(G') = \frac{6C_2}{8C_2} = \frac{15}{28}$$

$$P(G') = 15/28.$$

4)

$$n(S) = {}_7P_2 = \frac{7!}{5!} = 42.$$

The possibility of the two brothers starting beside each other can happen in six ways.

$$\therefore P(B) = 6/42 = 1/7$$

$$P(B) = 1/7$$

5) Determine the probability that;

a) The committee is comprised entirely of runners.

Number of long distance runners = 8.

Total possibilities = 8 + 4 + 6 = 18

$$P(R) = \frac{{}_8C_3}{{}_{18}C_3} = \frac{56}{816} = \frac{7}{102}.$$

$$P(R) = 7/102.$$

b) The committee is represented by each of the three types of athletes.

6 gymansts

4 Weight Lifters.

8 Long-distance runners.

$$P(C) = \frac{{}_6C_1 \times {}_4C_1 \times {}_8C_1}{{}_{18}C_3} = \frac{192}{816} = \frac{4}{17}$$

$$P(C) = 4/17$$

6. 3 black socks.

5 blue socks

8 while socks.

$3 + 5 + 8 = 16.$

$$P(W) = 8/16 \times 7/15 = 7/30$$

$$P(W) = 7/30.$$

$$P(W) = \frac{{}_8C_2}{{}_{16}C_2} = \frac{28}{120} = \frac{7}{30}$$

$$P(W) = 7/30.$$

8.a) Using counting techniques;

Total number of girls = 3

Total number of people going to the party = 5

$$P(GG) = \frac{{}^{3}C_{2}}{{}^{5}C_{2}} = \frac{3}{10}$$

$$P(GG) = 3/10$$

8.b) $P(A) = \frac{n(A)}{n(S)}$

$$n(S) = {}^{5}P_{5} = \frac{5!}{0!} = 120$$

$n(A) = 1$ that is there is only one way in which we can arrange them in ~~desc~~ ascending age.

$$\therefore P(A) = 1/120 = 0.0083$$

8.c)

Assumptions made in part ~~e~~(a)

i) Laura, Monique and Sarah are all girls.

Assumptions made in part (b)

i) No two people are of the same age.

ii) Laura is the youngest and Sarah is the oldest.

9. A hockey team has;

- 2 goalies
- 6 defenders.
- 8 wingers
- 4 centres.

$2+6+8+4 = 20$.

a) What is the likelihood that the four players selected for the charity function

a) are all wingers.

$$P(W) = \frac{{}^{8}C_4}{{}^{20}C_4} = {}^{14}70/4845\ 969$$

$$P(W) = 14/969$$

9.b) No goalies or centres are selected.

$$P(G'C') = \frac{{}^{14}C_4}{{}^{20}C_4} = \frac{1001}{4845} = 0.2066.$$

$$P(G'C') = 0.2066.$$

10. 10 grand prizes to be awarded and sells 5400000 tickets

a) Probability of winning a grand prize if you buy;

a)i) 1 ticket

$$P(1) = {}^{10}/_{5\,400000} = {}^{1}/_{540000}.$$

ii) 10 tickets.

$$P(10) = \frac{(10 \times 10)}{5400000} = {}^{1}/_{54000}.$$

iii) 100 tickets

$$P(100) = \frac{(100 \times 10)}{5\,400\,000} = {}^{1}/_{5400}.$$

b).

10%

Let x be the number of tickets.

$$\frac{10X}{5{,}400{,}000} = 0.05$$

$$10X = 0.05 \times 5\,400\,000$$

$$\frac{10X}{10} = \frac{270000}{10}$$

$$X = 27000 \text{ tickets.}$$

This strategy is not sensible and is a waste of people's money

10.

c) X = Number of tickets bought

$$\frac{10X}{5400000} = 0.5$$

$$10X = 0.5 \times 5400000$$

$$\frac{10X}{10} = \frac{2700000}{10}$$

$$X = 270{,}000 \text{ tickets}$$

c

ii) Suki is one of the volunteers in a group of 5.
2 volunteers ~~are~~ are selected from Suki's class.

$$P(\text{Suki is chosen}) = \frac{{}^4C_1}{{}^5C_2} = 4/10 = 2/5.$$

Leo is one of the four volunteers in His class.
2 volunteers are selected from Leo's class.

$$P(\text{Leo is chosen}) = \frac{{}^3C_1}{{}^4C_2} = 3/6 = 1/2$$

$$P(SL) = 2/5 \times 1/2 = 1/5$$