Exercise 7.5

For the following experiments, find the probability in each case:

1. Experiment:
   From a box containing orange-flavoured sweets, Bilal takes out one sweet without looking.
   Events Happening:
   i) the sweet is orange-flavoured
   ii) the sweet is lemon-flavoured.
2. Experiment:
   Pakistan and India play a cricket match. The result is:
   Events Happening: i) Pakistan wins ii) India does not lose.
3. Experiment:
   There are 5 green and 3 red balls in a box, one ball is taken out.
   Events Happening: i) the ball is green ii) the ball is red.

Exercise 7.4

1. Evaluate the following:
   i) ${}^{6}C_{3}$ ii) ${}^{8}C_{5}$ iii) ${}^{n}C_{n}$
2. Find the value of n, when
   i) ${}^{n}C_{5} = {}^{n}C_{4}$ ii) ${}^{n}C_{8} = \frac{12 \times 11}{2!}$ iii) ${}^{n}C_{12} = {}^{n}C_{1}$
3. Find the values of n and r, when
   i) ${}^{n}C_{r} = 35$ and ${}^{n}P_{r} = 210$
   ii) ${}^{n}C_{r-1} : {}^{n}C_{r} : {}^{n}C_{r+1} = 3 : 6 : 11$
4. How many (a) diagonals and (b) triangles can be formed by joining the vertices of the polygon having:
   i) 5 sides ii) 8 sides iii) 12 sides?
5. The members of a club are 12 boys and 8 girls. In how many ways can a committee of 3 boys and 2 girls be formed?
6. How many committees of 5 members can be chosen from a group of 8 persons when each committee must include 2 particular persons?
7. In how many ways can a hockey team of 11 players be selected out of 15 players? How many of them will include a particular player?
8. Show that: ${}^{n}C_{r-1} + {}^{n}C_{r} = {}^{n+1}C_{r}$
9. There are 8 men and 10 women members of a club. How many committees of can be formed, having:
   i) 4 women ii) at the most 4 women iii) atleast 4 women?
10. Prove that: ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$

4. Insert four harmonic means between the following given numbers.

   i) $\frac{1}{3}$ and $\frac{3}{21}$ ii) $\frac{2}{3}$ and $\frac{2}{11}$ iii) 4 and 20

5. If the 7th and 10th terms of an H.P. are $\frac{1}{3}$ and $\frac{3}{21}$ respectively, find its 14th term.

6. The first term of an H.P. is $\frac{1}{3}$ and the fifth term is $\frac{1}{5}$. Find its 9th term.

7. If 5 is the harmonic mean between 2 and b, find b.

8. If the numbers $\frac{1}{4}, \frac{1}{2k+1}$ and $\frac{1}{4k-1}$ are in harmonic sequence, find k.

9. Find n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be H.M. between a and b.

10. If a^2, b^2 and c^2 are in A.P. show that $a+b, c+a$ and $b+c$ are in H.P.

11. The sum of the first and fifth term of the harmonic sequence is $\frac{5}{7}$, if the first term is $\frac{1}{2}$, find the sequence.

12. If A, G and H are the arithmetic, geometric and harmonic means between a and b respectively, show that $G^2 = AH$.

13. Find A, G, H and show that $G^2 = AH$, if

   i) $a=-2, b=6$ ii) $a=7, b=\frac{1}{7}$ iii) $a=9, b=4$

14. Find A, G, H and verify that $A > G > H (G > 0)$, if

   i) $a=2, b=8$ ii) $a=\frac{2}{5}, b=\frac{8}{5}$

15. Find A, G, H and verify that $A < G < H (G < 0)$, if

   i) $a=-3, b=-6$ ii) $a=\frac{-2}{5}, b=\frac{-8}{5}$

16. If the H.M and A.M between two numbers are 4 and $\frac{9}{2}$ respectively, find the numbers.