*When an item is chosen from a group and it is NOT REPLACED before the next item is chosen, there is ONE LESS item in TOTAL and also one less OF THAT ITEM/COLOR. Form a fraction for the probability of the first choice and then **multiply** by the fraction for the probability of the second choice. Ensure that the DENOMINATOR of the second fraction is **one less** than the first. When a third item is taken without replacement, the total decreases again by one, and so on.*

*Eg. There are 5 red, 10 blue and 15 green marbles in a jar. What is the probability that, if two marbles are chosen at random WITHOUT replacement, that they will be: **green then blue?***

There are 5 + 10 + 15 = 30 marbles in total.

- Before a green is chosen, there are 15 green in the jar out of a total of 30. *Form that fraction.*
- After a green is chosen, there are still 10 blue in the jar but only 29 marbles in **total**. *Form the second fraction.* Multiply the two fractions.

$$\text{P(green, blue)} = \frac{green}{total} \times \frac{blue}{total-1} \ = \ \frac{15}{30} \times \frac{10}{29} \ = \frac{5}{29} = 0.17$$

1. A jar consists of 20 candies. 12 are red and 8 are blue. David picked two sweets at random without replacement.

i) _____ both are blue

ii) _____ the first is blue and the second is red

iii) _____ both are red

iv) _____ the first is green and the second is red

v) _____ both are not blue

vi) _____ neither are red

2. If I have a bag with 8 toffees, 4 white chocolates and 6 caramels and I pick two at random without replacement, what is the probability I will pick:

i) _____ A toffee, then a caramel

ii) _____ Two toffees

iii) _____ A white chocolate, then a caramel

iv) _____ Two of the same item

3. There are 2 bags, one ball is picked from each bag: In bag 1 there are 2 blue balls, 3 pink balls, 4 orange balls and 1 green ball. In bag 2 there are 9 yellow balls, 1 red ball, 2 purple balls and 3 brown balls. What is the probability that you pick:

i) _____ A blue ball and a yellow ball

ii) _____ An orange ball and a red ball

iii) _____ A pink ball and a purple ball

iv) _____ A blue ball and a brown ball

v) _____ A green ball and a yellow ball

4. A small box of chocolates contains 3 hard centres, 8 soft centres and 7 chewy centres. What is the probability of picking:

i) _____ Two hard centres

ii) _____ A hard then soft centre

iii) _____A soft then chewy centre

iv) _____ A hard and chewy centre

v) _____Not a soft centre for both

vi) _____ Not a soft or hard centre

5. A playing card is drawn from the pack of 52 cards. It isn't replaced, the pack shuffled and another card selected. What is the probability that:

i) _____ The two cards are both red cards

ii) _____ The two cards are red

iii) _____ The two cards are both Kings

iv) _____The two cards are both black Aces

v) _____ A red card then a King were chosen

vi) _____The two cards are not Queens