Question

An urn contains 4 white balls and 7 red balls, four balls are selected. In how many ways can the 4 balls be drawn from the total of 11 balls:

(a) If 3 balls are white and 1 is red?

Solution

To find how many ways the 3 white balls can be drawn from the total 4 white balls we need to find the number of combinations without repetition:

$$C_4^3 = \frac{4!}{3!(4-3)!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1 \cdot 1} = 4.$$

To find how many ways the 1 red ball can be drawn from the total 7 red balls we need to find the number of combinations without repetition:

$$C_7^1 = \frac{7!}{1!(7-1)!} = \frac{7!}{6!} = 7.$$

So the total number of combinations:

$$N = C_4^3 \cdot C_7^1 = 4 \cdot 7 = 28.$$

Answer: 28.

Question

An urn contains 4 white balls and 7 red balls four balls are selected. In how many ways can the 4 balls be drawn from the total of 11 balls:

(b) If all 4 balls are white?

Solution:

To find how many ways the 4 white balls can be drawn from the total 4 white balls we need to find the number of combinations without repetition:

$$C_4^4 = \frac{4!}{4!} = 1.$$

Answer: 1.

Question

An urn contains 4 white balls and 7 red balls four balls are selected. In how many ways can the 4 balls be drawn from the total of 11 balls:

(c) If all 4 balls are red?

Solution

To find how many ways the 4 red balls can be drawn from the total 7 red balls we need to find the number of combinations without repetition:

$$C_7^4 = \frac{7!}{4!(7-4)!} = \frac{7!}{4! \cdot 3!} = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2}{4 \cdot 3 \cdot 2 \cdot 4 \cdot 3 \cdot 2} = 7 \cdot 5 = 35.$$

Answer: 35.