1.– A person has three shirts, four trousers, and six pairs of shoes. In how many different ways can he get dressed if he wears one item of each type?

2.– Consider a Spanish-style "quiniela" (football pool) with 15 matches and three possible bets 1,X,2 on each one. How many ways are there of filling it?

3.– Using the digits $9, 7, 5, 3, 1$, how many different three-digit numbers can be formed?

4.– In how many different ways can eight people sit on a row of seats?

5.– In how many different ways can the letters of PARALLELEPIPED be rearranged?

6.– Compute:
$$\binom{6}{2}, \quad \binom{7}{3}, \quad \binom{222}{0}, \quad \binom{200}{199}.$$

7.– Expand $(x + 1)^7$.

8.– In how many different ways can a committee of five people be chosen from a group of 20?

9.– In a winery there are five different types of bottles. In how many ways can four bottles be chosen?

Solutions.

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1. $3 \cdot 4 \cdot 6 = 72$

2. $VR_{3,15} = 3^{15} = 14348907$.

3. $V_{5,3} = \dfrac{5!}{(5-3)!} = 5 \cdot 4 \cdot 3 = 60$.

4. $P_8 = 8! = 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 40320$.

5. $PR_{14;3,3,3,2} = \dfrac{14!}{3!3!3!2!} = 201801600$.

6. $\binom{6}{2} = \dfrac{6 \cdot 5}{1 \cdot 2} = 15$.

$\binom{7}{3} = \dfrac{7 \cdot 6 \cdot 5}{1 \cdot 2 \cdot 3} = 35$.

$\binom{222}{0} = 1$.

$$\binom{200}{199} = \binom{200}{200-199} = \binom{200}{1} = 200.$$

7.
$$(x+1)^7 = \binom{7}{0}x^7 + \binom{7}{1}x^6 + \binom{7}{2}x^5 + \binom{7}{3}x^4 + \binom{7}{4}x^3 + \binom{7}{5}x^2 + \binom{7}{6}x + \binom{7}{7} =$$
$$= x^7 + 7x^6 + 21x^5 + 35x^4 + 35x^3 + 21x^2 + 7x + 1$$

8. $C_{20,5} = \binom{20}{5} = 15504.$

9. $CR_{5,4} = \binom{5+4-1}{4} = 70.$