Permutations

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Practice problems

1. How many ways can you arrange 2 letters chosen from a set of 10 distinct letters?
2. A bookshelf has 6 different novels. In how many different orders can all 6 novels be arranged?
3. A competition has 15 participants. How many ways can the first, second, and third place trophies be awarded?

Solutions

1. How many ways can you arrange 2 letters chosen from a set of 10 distinct letters?

   - Identify $n = 10$ and $r = 2$.
   - Use the permutation formula $P(10, 2) = \frac{10!}{(10-2)!}$.
   - Simplify to $\frac{10!}{8!} = 10 \times 9$.
   - Calculate $10 \times 9 = 90$.

   Answer: 90

2. A bookshelf has 6 different novels. In how many different orders can all 6 novels be arranged?

   - Since we are arranging all items in the set, $n = 6$ and $r = 6$.
   - The number of arrangements is 6!.
   - Calculate $6 \times 5 \times 4 \times 3 \times 2 \times 1$.
   - Step by step: $30 \times 4 = 120$, $120 \times 3 = 360$, $360 \times 2 = 720$.

   Answer: 720

3. A competition has 15 participants. How many ways can the first, second, and third place trophies be awarded?

   - Identify $n = 15$ and $r = 3$.
   - Use the permutation formula $P(15, 3) = \frac{15!}{(15-3)!}$.
   - Simplify to $\frac{15!}{12!} = 15 \times 14 \times 13$.
   - Calculate $15 \times 14 = 210$.
   - Calculate $210 \times 13 = 2730$.

   Answer: 2730
