

## Block Arrangements

A child has 18 blocks, of which 6 are black, 8 are red, 2 is white, and 2 is blue. (Blocks in each color are indistinguishable.)

If the child puts the blocks in a line, how many arrangements are possible?

Write only integer answer.

Answer=



Save & Grade

Save only

New variant

Solution

$$\binom{18}{6, 8, 2, 2} = \frac{18!}{6! 8! 2! 2!}$$

## Couple Seat

In how many ways can 6 people be seated in a row if there are 3 married couples and each couple must sit together? (Write answer in integer.)

Answer =



Save & Grade

Save only

New variant

Solution

linear ordering of couples =  $3!$

ordering for each couple =  $2!$

$$\Rightarrow 3! 2! 2! 2! = 48$$

## Friends and Party

A person has 11 friends, of whom 4 will be invited to a party.

How many choices are there if 2 of the friends are feuding and will not attend together?

Write only integer answer.

Answer=



Save & Grade

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New variant

Solution

$$\begin{aligned} \text{Total \# of ways} &= \binom{11}{4} \\ \text{2 of the friends are invited} &= \underbrace{1}_{\substack{\# \text{ of} \\ \text{ways} \\ \text{to invite} \\ \text{the two}}} \cdot \underbrace{\binom{9}{2}}_{\substack{\text{Choose} \\ \text{the rest} \\ \text{2 out of 9.}}} \\ \Rightarrow \binom{11}{4} - \binom{9}{2} \end{aligned}$$

## Friends and Party

A person has 7 friends, of whom 5 will be invited to a party.

How many choices are there if 2 of the friends will only attend together?

Write only integer answer.

Answer=



Save & Grade

Save only

New variant

Solution

$$\begin{aligned} \text{The two both invited} &= 1 \cdot \binom{5}{3} \\ \text{The two both not invited} &= \binom{5}{5} \\ \Rightarrow \binom{5}{3} + \binom{5}{5} &= 11. \end{aligned}$$

## Course Selection

To fulfill the requirements for a certain degree, a student can choose to take any 7 out of a list of 21 courses, with the constraint that at least 1 of the 7 courses must be a Mathematics course.

Suppose that 7 of the 21 courses are Mathematics courses.

How many choices are there for which 7 courses to take?

Answer =

[Save & Grade](#)[Save only](#)[New variant](#)

Solution

$$\text{Total \# of ways} = \binom{21}{7}$$

$$\text{not choose Math} = \binom{14}{7}$$

$$\Rightarrow \binom{21}{7} - \binom{14}{7}.$$