Counting

Addition and Multiplication Principle

Learn how to solve this *type* of problems, not just this problem.

Tip: Always write down intermediate steps.

(1) Restaurant MAS offers a set menu with 3 choices of appetizers, 5 choices of main dishes, and 2 choices of desserts. How many possible combinations can a customer have for one appetizer, one main dish, and one dessert?
(Ref: 2474)

(2) Eight chairs are arranged in two equal rows. Joe and Mary must sit in the front row. Jack must sit in the back row. How many different seating plans can they have?
(Ref: 2475)

(3) Two Britons, three Americans, and six Chinese form a line:

(a) How many different ways can the 11 individuals line up?

(b) If two people of the same nationality cannot stand next to each other, how many different ways can the 11 individuals line up?

(Ref: 2476)

(4) Use digits 1, 2, 3, 4, and 5 without repeating to create a number.

(a) How many 5-digit numbers can be formed?

(b) How many numbers will have the two even digits appearing between 1 and 5? (e.g.12345)

(Ref: 2477)

(5) Joe plans to put a red stone, a blue stone, and a black stone on a 10×10 grid. The red stone and the blue stone cannot be in the same column. The blue stone and the black stone cannot be in the same row. How many different ways can Joe arrange these three stones?
(Ref: 2478)

(6) How many different 6-digit numbers can be formed by using digits 1, 2, and 3, if no adjacent digits can be the same?

(7) How many different ways are there to arrange 3 black balls and 3 white balls in a circle? Two arrangements are considered the same if they are different just by rotating the balls.
(Ref: 2479)

(8) Joe wants to write 1 to n in a $1 \times n$ grid. The number 1 can be written in any grid, while the number 2 must be written next to 1 (can be at either side) so that these two numbers are together. The number 3 must be written next to this two-number block. This process goes on. Every new number written must stay next to the existing number block. How many different ways can Joe fill this $1 \times n$ grid?
(Ref: 2479)