

Organizing at Schools

Hint: For many of these problems "solving a simpler problem" is a good strategy. Making organized lists can be very helpful too! Look for patterns that you can extend to the bigger versions of the same problem.

I.

"I want to ride shotgun!" Do kids in your family shout that as you get ready to drive to school? Let's say there are three kids, one to sit in front, two in the back seat. (And all the kids are big enough to sit in front.) In how many different ways can they be arranged?

II.

The university housing office has to put six students in three dorm rooms. One's a triple, one's a double, and there's one single. In how many different ways can the students be arranged?

III.

Here's an imaginary conversation:

"Jane, you did a pretty good job setting up the older advisory groups, but not perfect. You should really go at it a different way."

"How?"

"Well, you should write down every possible arrangement of students into advisory groups, put each arrangement on a slip of paper, and look them over with the other teachers."

Is this a workable suggestion? Let's say there are 42 students in sixth to eighth grade, and they need to be assigned to three advisory groups of 14 students each. How many possible arrangements are there?

WARNING! This problem may lead to numbers that are a little bit on the large side. You may want to start by figuring out how many ways there are to divide six students among three advisors, two to each advisor. If you do solve the big problem, can you say how much storage space Jane would need for the slips of paper, and how long it would take to write them up or read them?

IV.

In Professor Krewell's math class the ten students were given assigned seats the first day in a semi-circle facing the blackboard. After class the students asked (politely, of course!) if they could choose their own seats. "Well," said the professor, "let me run through every possible arrangement of assigned seats, and then you can choose your own." How many days will the students have to wait till they can choose their own seats?

V.

At the beginning of the school year each student is asked to choose a six-character password for their computer account. They may use numbers or letters, and upper case is different from lower. How many possible passwords are there? This problem may also lead to numbers a bit on the big side. Is there a way to estimate the answer even if you can not find an exact answer?

VI.

Can you make up your own problem?

Have fun!