

MATHCOUNTS[®] Problem of the Week Archive

New School – August 22, 2022

Problems & Solutions

Chantel is going to a new school this year and will be in the 8th grade. She has learned that there are 11 7th graders and 13 8th graders (including herself) in her homeroom. If the desks in her homeroom are arranged in groups of four and student grouping is random, what is the probability that the group of four desks that she is sitting at includes only 8th graders? Express your answer as a common fraction.

Since Chantel will take one of the spots, that leaves 3 other spots to be filled by other 8th graders. Thus, the probability of the group being all 8th graders is $(12/23)(11/22)(10/21) = 1320/10,626 = \mathbf{20/161}$.

Chantel's band class is made up of different students than her regular class. If the ratio of 7th graders to 8th graders in the class is 8 to 5 and the number of students in the class is even, what is the minimum possible number of students in Chantel's band class?

Based on the ratio of 7th graders to 8th graders being 8 to 5, the minimum number of students would be $8 + 5 = 13$. However, 13 is not an even number, so the minimum number of students possible in band class is $13 \times 2 = \mathbf{26}$.

Chantel's school has a rotating class schedule. Each student takes 7 classes, but they only have 6 of them each day. The first day, they have classes 1, 2, 3, 4, 5 and 6; the second day, they have classes 7, 1, 2, 3, 4 and 5; the third day, they have classes 6, 7, 1, 2, 3 and 4; and so on. How many schooldays pass before a day's schedule is repeated?

*The first day doesn't include class 7. On day two, class 7 moves into position 1. On day three, class 7 moves into position 2, and so on. Thus, class 7 will be in the schedule for 6 days (after 1 day of not being on the schedule), and on the 8th day, class 7 will move back out of the schedule, creating a repeat of day 1's schedule. So, **7** schooldays pass before a day's schedule is repeated.*

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