Problem of the Week
Problem C and Solution
Playing with Blocks

Problem

Agnes, Evangelina, Isabela, Omar, and Yuri each made a tower using wooden blocks. Each person used a different number of blocks in their tower, and the mean (average) number of blocks in each tower was 25. Yuri used the most blocks in her tower, and Agnes used the fewest blocks in her tower. If Yuri used 32 blocks, determine the minimum possible number of blocks that Agnes could have used.

Solution

To calculate the mean (average) of a set of values, we first calculate the sum of the values in the set, and then divide that by the number of values in the set. It follows that the sum of the values in the set is equal to their average multiplied by the number of values in the set.

Since the average number of blocks in each tower was 25, and there were 5 towers, it follows that the total number of blocks used was $25 \times 5 = 125$. Yuri's tower used 32 blocks, so the remaining towers used a total of $125 - 32 = 93$ blocks.

To find the minimum possible number of blocks in Agnes' tower, we let the other three towers use the greatest possible number of blocks. We know Yuri's tower used the most blocks, and each tower used a different number of blocks. So the other three towers could have used at most 31, 30, and 29 blocks, in some order.

The minimum possible number of blocks that Agnes could have used is therefore $93 - 31 - 30 - 29 = 3$.

As a side note, if each person could have used the same number of blocks, then the minimum possible number of blocks that Agnes could have used would have been $93 - 32 - 32 - 32 = -3$. However it's not possible to use a negative number of blocks, so Agnes must have used at least 1 block. There would be a few different options for the number of blocks in each tower in order to make this possible. For example, the towers could contain 1, 28, 32, 32, and 32 blocks each, or 1, 30, 30, 32, and 32 blocks each.