

# MATHCOUNTS® Problem of the Week Archive

## Math Club Meetings – September 3, 2018

### Problems & Solutions

Ms. Cross leads The National Math Club at the middle school where she teaches. At the first club meeting of the school year, 60% of the students in attendance were boys. If there was one fewer girl than boy in attendance, how many students attended the first club meeting?

*Let  $b$  and  $g$  represent the number of boys and girls who attended the first club meeting, respectively. We know that  $b = g + 1$  and  $b = 0.6(b + g)$ . Solving for  $b$  in the second equation yields  $b = 0.6b + 0.6g \rightarrow 0.4b = 0.6g \rightarrow b = 1.5g$ . Substituting this value for  $b$  in the first equation, we get  $1.5g = g + 1 \rightarrow 0.5g = 1 \rightarrow g = 2$ . So, there were 2 girls and  $2 + 1 = 3$  boys in attendance at the first club meeting. Therefore, a total of  $2 + 3 = 5$  students attended the first club meeting.*

At the second club meeting of the school year, Ms. Cross noticed that among the students in attendance, there were equal numbers of girls and boys. Ms. Cross also noticed that all the students from the first club meeting were in attendance, along with some new students who weren't at the first club meeting. If twice as many new girls attended the second club meeting as new boys, how many new students attended the second club meeting?

*From the previous problem, we know that there were 3 boys and 2 girls in attendance at the first club meeting. It follows, then, from the information given, that if  $x$  new boys attended the second club meeting,  $2x$  new girls attended that meeting. Since the same number of girls and boys attended the second meeting, we can write  $3 + x = 2 + 2x$  and solve to get  $x = 1$ . That means 1 new boy and  $2 \times 1 = 2$  new girls attended the second meeting. Therefore, a total of  $1 + 2 = 3$  new students attended the second meeting.*

At the third meeting of The National Math Club, Ms. Cross noticed that 60% of the students in attendance were girls and that the total number of students in attendance was double that of the first club meeting. Ms. Cross was pleased to see that all the students who attended the second club meeting also attended the third club meeting. Of the students in attendance at the third club meeting who did not attend the first two club meetings, what is the absolute difference between the number of girls and the number of boys?

*From the first problem, we know that a total of 5 students attended the first club meeting. Based on the information provided, twice that number, or  $5 \times 2 = 10$  students attended the third club meeting. Since girls accounted for 60% of these 10 students, it follows that  $0.6 \times 10 = 6$  girls and  $10 - 6 = 4$  boys attended the third club meeting. Since 4 boys and 4 girls attended the second club meeting, there were  $4 - 4 = 0$  new boys and  $6 - 4 = 2$  new girls at the third club meeting. The absolute difference between these two quantities is  $2 - 0 = 2$ .*

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