

MATHCOUNTS® Problem of the Week Archive

Cookies – April 5, 2021

Problems & Solutions

Mrs. Smedema likes cookies. Each student in her 8th grade math class presented her with a cookie. One-third of the students each gave her an oatmeal cookie, one-sixth of the students each gave her a cinnamon cookie, one-fourth of the students each gave her a chocolate chip cookie, and the remaining 9 students each gave her a peanut butter cookie. How many students are in Mrs Smedema's 8th grade math class?

The fractional part of the students that gave Mrs. Smedema a cookie is $\frac{1}{3} + \frac{1}{6} + \frac{1}{4} = \frac{9}{12} = \frac{3}{4}$. The remaining 9 students, then, represent $\frac{1}{4}$ of the students. The number of students in Mrs. Smedema's 8th grade math class is $4 \times 9 = 36$.

There are twice as many girls as boys in Mr. Terpathi's 7th grade math class. Each of the girls gave him an oatmeal cookie, and each of the boys gave him a chocolate cookie. Mr Terpathi arranged the cookies in one row with a chocolate cookie farthest to the right. Which of the following must be true?

- A. The cookie farthest to the left is chocolate.
- B. The cookie farthest to the left is oatmeal.
- C. There are at least two chocolate cookies next to each other.
- D. There are at least two oatmeal cookies next to each other.
- E. Mr. Terpathi received more chocolate cookies than oatmeal cookies.

*We don't know how many students are in Mr. Terpathi's 7th grade math class. There are twice as many girls as boys, so Mr. Terpathi receives two oatmeal cookies for every chocolate cookie. He places a chocolate cookie farthest to the right. If there are 3 students in his class, we have OOC, and A is false. If there are 6 students in his class, we could have COOOOC, so B and C are false. The difference between the number of spaces between the oatmeal cookies and the number of chocolate cookies that can be placed in those spaces is the number of spaces between the oatmeal cookies that do not have a chocolate cookie, leaving two oatmeal cookies next to each other. Let C represent the number of chocolate cookies and 2C the number of oatmeal cookies. There are $2C - 1$ spaces between oatmeal cookies and $C - 1$ chocolate cookies to place between the oatmeal cookies so that two oatmeal cookies are not next to each other. So, $(2C - 1) - (C - 1) = C$. For $C \geq 1$, at least two oatmeal cookies must be next to each other, and thus **D** is true.*

The cookies the students brought to their teachers come in different weights. Four oatmeal cookies weigh the same as eight cinnamon cookies, two chocolate cookies weigh the same as three oatmeal cookies, and two peanut butter cookies weigh the same as one cinnamon cookie. How many cinnamon cookies weigh the same as one chocolate cookie?

*Since 4 oatmeal = 8 cinnamon, then 1 oatmeal = 2 cinnamon. Since 3 oatmeal = 2 chocolate, then 6 cinnamon = 3 oatmeal = 2 chocolate. Thus, **3** cinnamon cookies weigh the same as 1 chocolate cookie.*

The students in Mrs. Sneed's 6th grade class each gave her one circular oatmeal cookie. The cookies were all the same size. They placed the cookies in a rectangular array so that the number of cookies on the longer side was twice the number of cookies on the shorter side. The number of students in her class is greater than 19 but less than 49. How many students are in Mrs. Sneed's 6th grade class?

*If the array is $4 \times 2 = 8$ or $6 \times 3 = 18$, there are not enough students given the provided condition. If the array is $8 \times 4 = 32$, there are enough students. If the array is $10 \times 5 = 50$, there are too many students. Therefore, there are **32** students in Mrs. Sneed's 6th grade class.*

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