

## 2021 AMC 10A Problems/Problem 5

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### Problem

The quiz scores of a class with  $k > 12$  students have a mean of 8. The mean of a collection of 12 of these quiz scores is 14. What is the mean of the remaining quiz scores in terms of  $k$ ?

(A)  $\frac{14 - 8}{k - 12}$     (B)  $\frac{8k - 168}{k - 12}$     (C)  $\frac{14}{12} - \frac{8}{k}$     (D)  $\frac{14(k - 12)}{k^2}$     (E)  $\frac{14(k - 12)}{8k}$

### Solution 1 (Generalized Value of $k$ )

The total score of the class is  $8k$ , and the total score of the 12 quizzes is  $12 \cdot 14 = 168$ . Therefore, for the remaining quizzes ( $k - 12$  of them), the total score is  $8k - 168$ . Their mean score is

$$\boxed{\text{(B)} \frac{8k - 168}{k - 12}}$$

~MRENTHUSIASM

### Solution 2 (Specified Values of $k$ )

Set  $k = 13$ . The answer is the same as the last student's quiz score, which is  $8 \cdot 13 - 14 \cdot 12 < 0$ . From the answer

choices, only  $\boxed{\text{(B)} \frac{8k - 168}{k - 12}}$  is negative at  $k = 13$ .

~MRENTHUSIASM

### Solution 3

You know that the mean of the first 12 students is 14, so that means all of them combined had a score of  $12 \cdot 14 = 168$ . Set the mean of the remaining students (in other words the value you are trying to solve for), to  $a$ . The total number of remaining students in a class of size  $k$  can be written as  $k - 12$ . The total score  $k - 12$  students got combined can be written as  $a(k - 12)$ , and the total score all of the students in the class got was  $168 + a(k - 12)$  (the first twelve students, plus the

remaining students). The mean of the whole class can be written as  $\frac{168 + a(k - 12)}{k}$ . The mean of the class has already

been given as 8, so by just writing the equation  $\frac{168 + a(k - 12)}{k} = 8$ , and solving for  $a$  (the mean of  $k - 12$  students)

will give you the answer in terms of  $k$ , which is  $(B) \frac{8k - 168}{k - 12}$ .

~Ankitamc (Solution)

~MRENTHUSIASM (LATEX Adjustments)

## Video Solution (Simple and Quick)

<https://youtu.be/STPoBU6A3yU>

~ Education, the Study of Everything

## Video Solution

<https://www.youtube.com/watch?v=S4q1ji013JQ&list=PLexHyfQ8DMuKqItG3cHT7Di4jhVI6L4YJ&index=5>

~ North America Math Contest Go Go Go

## Video Solution (Using Average Formula)

<https://youtu.be/jocfZVNGU3o>

~ pi\_is\_3.14

## Video Solution

<https://youtu.be/wacb0roj20A>

~savannahsolver

## Video Solution by TheBeautyofMath

<https://youtu.be/50CThrk3RcM/t=399>

~IceMatrix

## Video Solution by The Learning Royal

<https://youtu.be/sIVBYmcDMOI>

## See Also

2021 AMC 10A (Problems • Answer Key • Resources ( <a href="http://www.artofproblemsolving.com/community/c13">http://www.artofproblemsolving.com/community/c13</a> ))	
Preceded by <b>Problem 4</b>	Followed by <b>Problem 6</b>
1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • 10 • 11 • 12 • 13 • 14 • 15 • 16 • 17 • 18 • 19 • 20 • 21 • 22 • 23 • 24 • 25	
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