

## How To Find Average and Using Average To Find Unknowns (I)



The main aim of this math revision note is to help your child become better at visualising word problems that involve averages with unknowns. With a clearer visualisation and hence better understanding of the question, your child can become more proficient in solving this kind of challenging average questions.

First, let's do a recap on how to find the average.

$$\text{Average} = \frac{\text{Total Sum of Data}}{\text{Number of Data}}$$

### Question

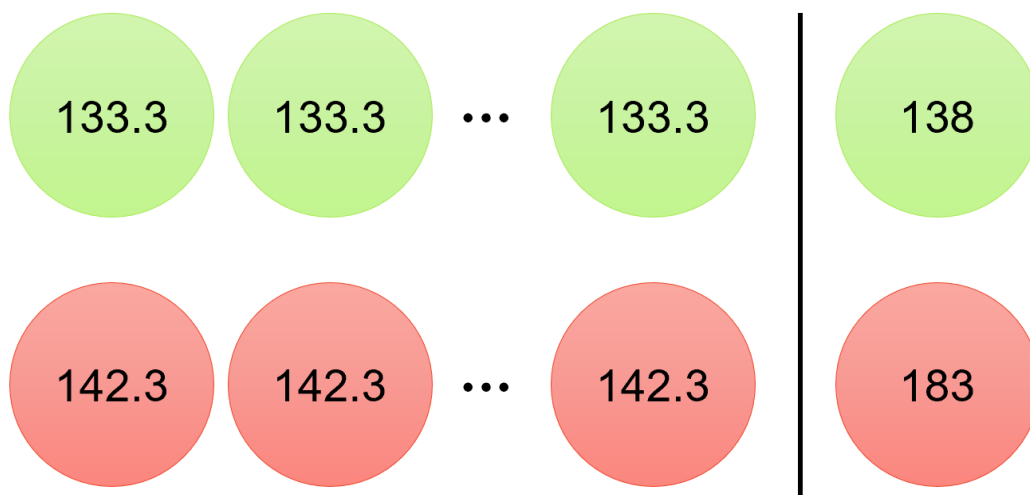
The average height of a group of children was 133.3 cm.

When Mr Wong measured and recorded the height of these children, he mistakenly recorded one child's height as 183 cm when it should have been 138 cm. As a result, Mr Wong calculated the average height as 142.3 cm.

How many children were there in the group?



Before starting to solve the question, we can lay out all the elements of the questions in the following manner:

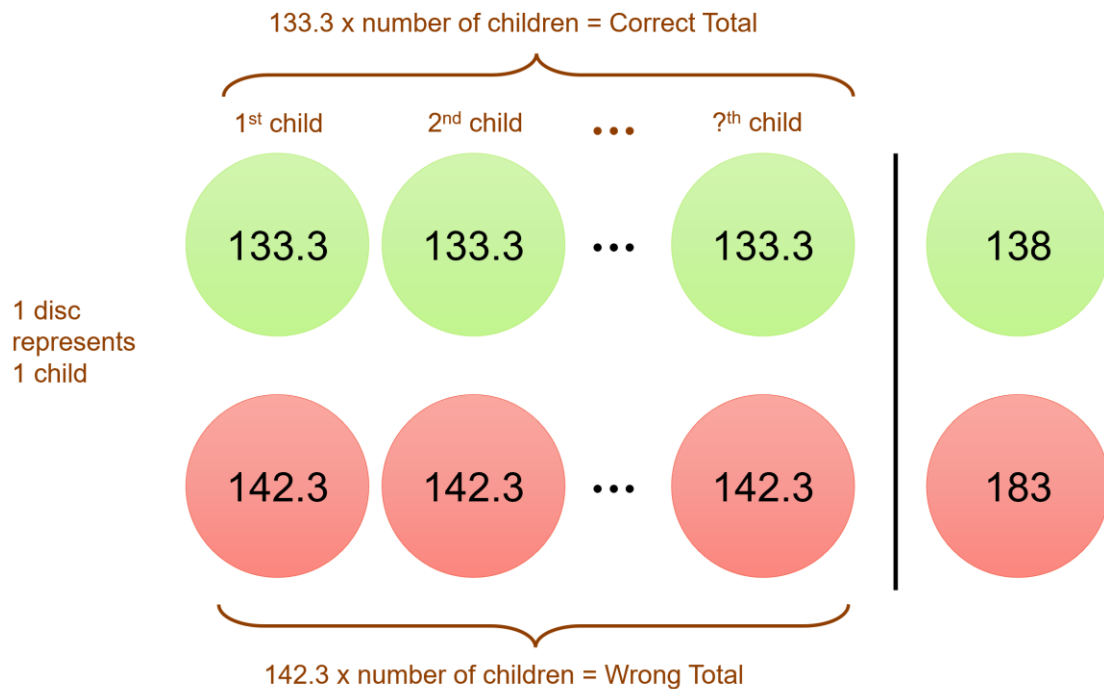


The top row of number discs represents the correct values while the bottom row of discs represents the wrong values.

On the left side of the black line, we see the averages – with the top row being the correct averages while the bottom row being the wrong averages.

The number of discs on the left in each row represents the number of children in the group. This graphic on the left in each row essentially is showing us the following equation:

Average height x the number of children in the group = Total height



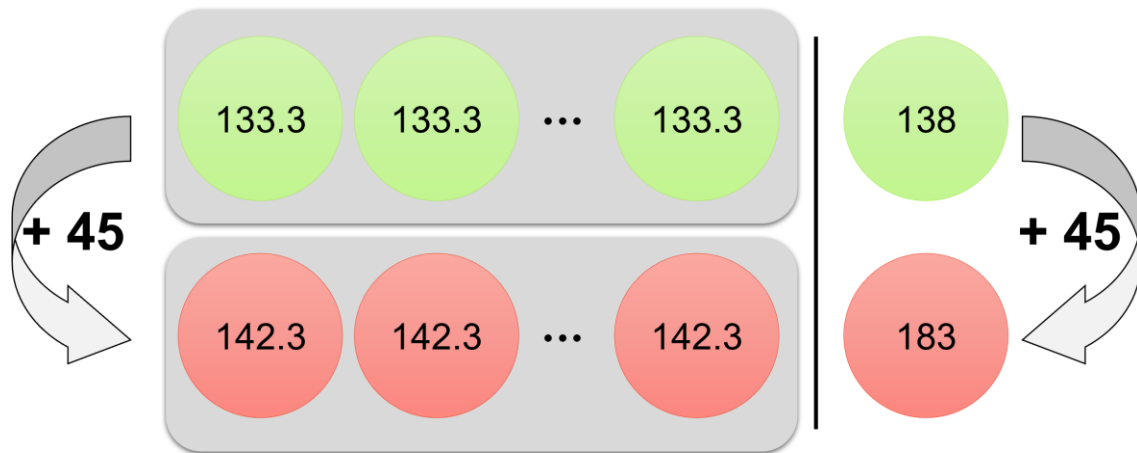
On the right side of the black line, we can isolate the height of the particular child with the top number disc being the correct height while the bottom disc being the wrong height.

The height that Mr Wong recorded for the child is more than the actual height. Since a larger value was recorded, it makes sense that the wrong average calculated is larger than the actual average.

$$183 \text{ cm} - 138 \text{ cm} = 45 \text{ cm}$$

The height that Mr Wong recorded is 45 cm more than the actual height.

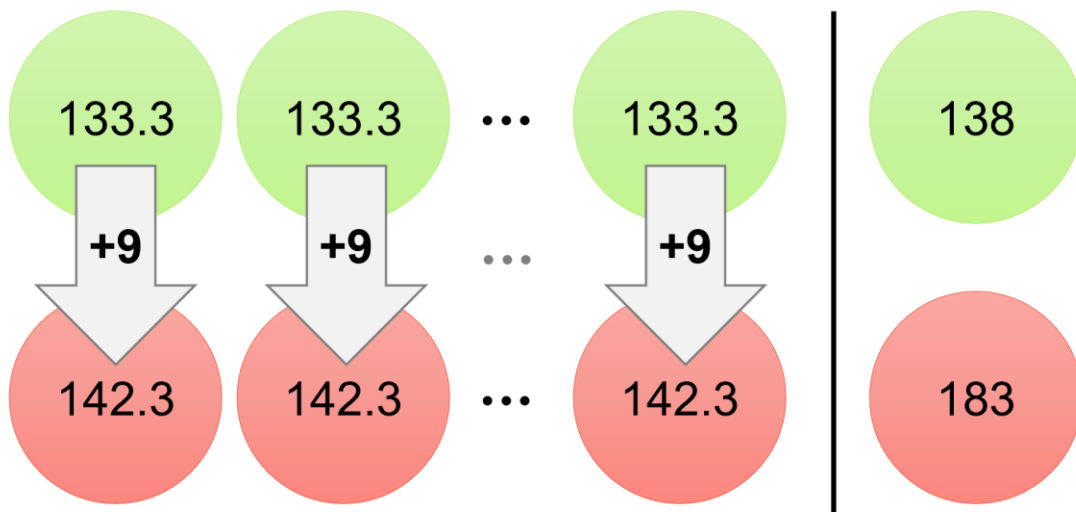
This 45 cm increase will contribute to the increase in the total height.



This increase in total height will be split among the individual increases in each set of averages. We can find this individual increase by the averages given in the question.

$$142.3 \text{ cm} - 133.3 \text{ cm} = 9 \text{ cm}$$

Each average increased by 9 cm.



Each individual increase = 9

All these individual increases (as shown in the +9 arrows) will collectively become a total increase of 45.

To find out how many increases/arrows, we simply take 45 divided by 9.

$$\begin{aligned} 45 \text{ cm} \div 9 \text{ cm} &= 5 \text{ arrows/increases} \\ &= 5 \text{ children} \end{aligned}$$

This number of increases/arrows also represents the number of children there are in the group.

To Your Child's Success,



Ms Nelly Ke  
Math Specialist  
Jimmy Maths and Grade Solution Learning Centre

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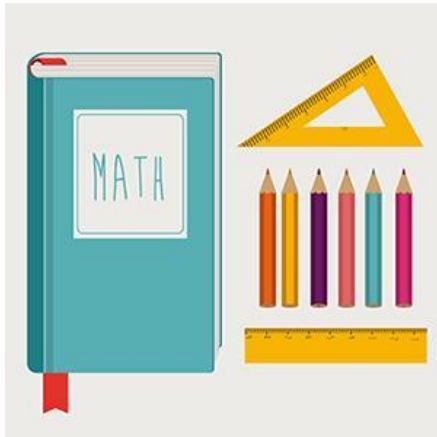
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