Math Diversion 1091

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The number of things in this world that you take
for granted is a measure of your lack
of respect to your Creator.
— The Author

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Source:  Khan Academy YouTube video
Title:  Advanced Ratio Problem
 Presenter: Patrick
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1 Problem

In a group of 57 children the ratio of girls to boys is 4 : 15. How many boys must leave the group so that the resulting ratio of girls to boys is 4 : 11?

2 Solution

We've been given two kinds of algebraic information, This first is that the total number of students in the group is 57, which we set equal to the sum of its parts, B the number of boys and G the number of girls. We are also given a proportion, the stated equality of two ratios.

We start off with the following equations:

$$B + G = 57\,, \tag{1a}$$

and

$$\frac{G}{B} = \frac{4}{15}\,. \tag{1b}$$

After removing x number of boys, we get

$$(B - x) + G = 57 - x\,, \tag{2a}$$

and

$$\frac{G}{B - x} = \frac{4}{11}\,. \tag{2b}$$

Solving (1a) and (1b) together, we find that $B = 45$ and $G = 12$. On substituting those values into (2b) and solving for x, we get

$$x = 12\,. \tag{3}$$

Thus twelve boys must be removed from the group so that the remaining ratio of girls to boys is $4 : 11$.