



## Problem of the Week

### Problem D and Solution

#### Let's Hit the Pool

#### Problem

In Wei's family, there are four children and three adults. Every weekend they all go swimming together. To use the public swimming pool, each person needs a ticket.

Wei's parents buy their tickets in bulk and keep them in a box. At the beginning of the year the ratio of adult to child tickets in the box was 11 : 14.

Wei's family used the tickets every weekend to go swimming until they no longer had enough tickets for everyone in their family. At that point, there were no child tickets left in the box and 3 adult tickets left in the box. How many tickets were in the box at the beginning of the year?

#### Solution

Let  $n$  represent the number of times Wei's family used the tickets to go swimming. Since they used 4 child tickets and 3 adult tickets each time, then they used  $4n$  child tickets and  $3n$  adult tickets in total. After they had used all the child tickets, there were 3 adult tickets left in the box. That means there were  $3n + 3$  adult tickets and  $4n$  child tickets in the box at the beginning of the year.

The ratio of adult to child tickets at the beginning of the year was 11 : 14. We can use this to write and solve the following equation.

$$\begin{aligned}\frac{11}{14} &= \frac{3n + 3}{4n} \\ (11)(4n) &= (14)(3n + 3) \\ 44n &= 42n + 42 \\ 2n &= 42 \\ n &= 21\end{aligned}$$

Thus, Wei's family used the tickets to go swimming 21 times.

The total number of tickets in the box at the beginning of the year was  $4n + 3n + 3 = 7n + 3$ . Since  $n = 21$ , the total number of tickets was  $7(21) + 3 = 150$ .