Problem of the Week
Problem D and Solution
Full of Beans

Problem

Canada celebrates its birthday every July 1st on Canada Day. The colours red and white, the colours on the Canadian flag, are seen everywhere. In honour of Canada Day, a company produced a jumbo bag of candy containing only red and white jelly beans in the ratio 14:11 respectively. Khan Di loves jelly beans and purchased one of the special packages of candy. He decided to make the candy last as long as possible by eating exactly four red jelly beans and three white jelly beans each day. Finally one day he ate the last four red jelly beans along with three white jelly beans leaving three white jelly beans in the bag. How many candies were in the original bag of red and white jelly beans?

Solution

Let d represent the number of days Khan ate four red jelly beans and three white jelly beans. Since he ate four red jelly beans each day for d days, he ate $4d$ red jelly beans. Since he ate three white jelly beans each day for d days, he ate $3d$ white jelly beans. But there were three white jelly beans left so Khan had a total of $3d + 3$ white jelly beans.

The ratio of red jelly beans to white jelly beans was 14:11.

$$\therefore \frac{4d}{3d+3} = \frac{14}{11}$$

"Cross-multiplying" to simplify we obtain:

$$\begin{aligned} 44d &= 42d + 42 \\ 2d &= 42 \\ d &= 21 \end{aligned}$$

Therefore Khan was able to follow his pattern for 21 days.

Since $d = 21$, $4d = 4(21) = 84$ and he had 84 red jelly beans. Also $3d + 3 = 3(21) + 3 = 66$ so Khan had 66 white jelly beans. The bag contained $84 + 66 = 150$ jelly beans.

$\therefore$ the special bag of candy contained 150 jelly beans. The number 150 is significant because that is how old Canada will be on July 1, 2017. The company is getting a jump start on Canada's Sesquicentennial celebrations! That is, on July 1, 2017 Canada celebrates its 150th birthday.