



Problem of the Week

Grade 9 and 10

Full of Beans Solution

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 7:11 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 two red jelly beans and three white jelly beans each day. Finally one day he ate the last two red jelly beans along with three white jelly beans leaving four 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 two red jelly beans and three white jelly beans. Since he ate two red jelly beans each day for d days, he ate $2d$ red jelly beans. Since he ate three white jelly beans each day for d days, he ate $3d$ white jelly beans. But there were 4 white jelly beans left so Khan had a total of $3d + 4$ white jelly beans.

The ratio of red jelly beans to white jelly beans is 7:11.

$$\therefore \frac{2d}{3d + 4} = \frac{7}{11}$$

“Cross-multiplying” to simplify we obtain:

$$22d = 21d + 28$$
$$d = 28$$

Therefore Khan was able to follow his pattern for 28 days.

Since $d = 28$, $2d = 2(28) = 56$ and he had 56 red jelly beans. Also $3d + 4 = 3(28) + 4 = 88$ so Khan had 88 white jelly beans. The bag contained $56 + 88 = 144$ jelly beans.

\therefore the special bag of candy contained 144 jelly beans. The number 144 is significant because that is how old Canada was on July 1, 2011.

