



## Problem of the Week

### Problem E

### Yes We Can!

A local food bank has created a unique 100-day plan for collecting canned food donations.

**Day 1 Goal:** Collect 50 cans of food.

**Day 2 Goal:** Collect 3 more cans of food than the current day number plus the same number of cans collected on day 1.

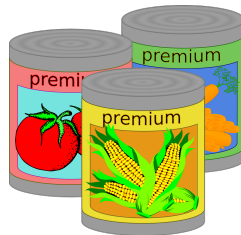
**Day 3 Goal:** Collect 3 more cans of food than the current day number plus the same number of cans collected on day 2.

**Day 4 Goal:** Collect 3 more cans of food than the day number plus the same number of cans collected on day 3.

⋮

**Day 100 Goal:** Collect 3 more cans of food than the day number plus the same number of cans collected on day 99.

How many cans of food will the food bank collect on the 100<sup>th</sup> day?



Did you know that the sum of the positive integers from 1 to  $n$  can be determined using the formula  $\frac{n(n+1)}{2}$ ? For example, the sum of the integers  $1 + 2 + 3 + 4 = \frac{4(5)}{2} = 10$ . This result can be verified by simply adding the 4 numbers. You can also easily verify that the sum of the first 5 positive integers is  $\frac{5(6)}{2} = 15$ .

Depending on your approach to the problem, this formula may be useful. As a challenge, one may wish to prove this formula holds for any positive integer  $n$ .

**Extension:** Assuming their target is met each day of the 100-day campaign, how many cans of food will they collect in total?

