Epidemiology Problem

Problem Description

People who study epidemiology use models to analyze the spread of disease. In this problem, we use a simple model. When a person has a disease, they infect exactly R other people **but only on the very next day.** No person is infected more than once. We want to determine when a total of more than P people have had the disease.

I hope that including this problem at this time highlights the important roles that computer science and mathematics play in solving real-world problems.

Input Specification (virus.txt)

There are three lines of input. Each line contains one positive integer. The first line contains the value of P. The second line contains N, the number of people who have the disease on Day 0. The third line contains the value of R.

Output Specification

Output the number of the first day on which the total number of people who have had the disease is greater than P.

Sample Input
750
1
5
10
2
1

Output for Sample Input
4
5

Explanation of Output for Sample Input 1

The 1 person on Day 0 with the disease infects 5 people on Day 1. On Day 2, exactly 25 people are infected. On Day 3, exactly 125 people are infected. A total of 1 + 5 + 25 + 125 + 625 = 781 people have had the disease by the end of Day 4 and 781 > 750.

Explanation of Output for Sample Input 2

There are 2 people on Day 0 with the disease. On each other day, exactly 2 people are infected. By the end of Day 4, a total of exactly 10 people have had the disease and by the end of Day 5, more than 10 people have had the disease.