Probability Distribution 1

In probability theory, the ***exponential distribution*** is the probability distribution that describes the time between events in a Poisson process.

The probability density function of the exponential distribution is:

$$f(x;\lambda) = \begin{cases} \lambda e^{-\lambda x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

where λ is the parameter of the distribution, which is given to you.

With the probability density function, we can calculate the probability of x being less than or equal to X (the cumulative density function), like this:

$$F(X;\lambda) = P(x \leq X) = \int_{-\infty}^{X} f(x;\lambda)\,dx = \left[-e^{-\lambda x}\right]_{-\infty}^{X} = 1 - e^{-\lambda X}$$

In this problem, you are given the value of λ and v. Please write a program that calculates the value of $f(v;\lambda)$ and $F(v;\lambda)$.

Input

Your input consists of an arbitrary number of lines, but no more than 1,000.

Each line consists of λ $(0 < \lambda \leq 1)$ and v $(0 \leq v \leq 10)$. These numbers are *not guaranteed to be an integer*. It is guaranteed that you can store these values just by reading these in a double-type variable.

The end of input is indicated by a line containing only the value -1.

Output

For each input line, print a line that contains the value of $f(v;\lambda)$ and $F(v;\lambda)$, separated by a space. Print 6 digits after the decimal point. (you may round your output or not, we rounded our output)

Your output will be considered correct if $|(your\ answer) - (our\ answer)| \leq 10^{-6}$.

Example

Standard input	Standard output
0.393 5.121 0.594 10 0.9583 8.2341922 -1	0.052523 0.866353 0.001563 0.997368 0.000359 0.999626

Time Limit

1 second.