

Question 1:

Write a function that finds m^n according to the given m and n values.

input	output
2 0	1
-3 5	-243

Question 2:

Given the radius of a circle, write a function that finds the circumference and area of the circle.
(Assume $\pi=3$)

input	output
1	6 3
3	18 27

Question 3:

Write a function that finds the sum of the digits of a given positive integer number.

input	output
12423553	25
3312	9

Question 4:

$$f(x) = \begin{cases} x^2 - x + 2 & x > 0 \\ x^2 - 2 & x \leq 0 \end{cases}$$

Write a function that corresponds to the function $f(x)$ above.

input	output
2	4
-1	-1

Question 5:

If a number consists of only 4's and 7's, this number is called the lucky number. If the sum of all positive divisors of a number including itself, is a lucky number, this number is called an ultra lucky number. Write a program that finds out whether the given n numbers are ultra lucky numbers or not. First n will be given, then n numbers will be given. Print 1 if the number is ultra lucky, 0 if not.

input	output
4	1
410485630	0
2	0
1	1
3	

Question 6:

You are given a string of lowercase letters of $n < 1000$ length. Find out how many times the letters in this string are written, and write a program that multiplies these numbers. For example, if the string is abababc, the result will be $3 \times 3 \times 1 = 9$.

input	output
abababc	9
ali	1

Question 7:

$$g(n) = \begin{cases} 0 & n \leq 1 \\ g(\frac{n}{2}) + \frac{n}{2} & n \text{ çift ise} \\ g(\frac{n-1}{2}) + \frac{n-1}{2} & n \text{ tek ise} \end{cases}$$

Given a number n, code the recursive function whose mathematical definition is given above.

input	output
3	1
5	3

Question 8:

$$h(n) = \begin{cases} n & n \leq 1 \\ h(\frac{n}{2}) & n \text{ çift ise} \\ h(\frac{n-1}{2}) + h(\frac{n+1}{2}) & n \text{ tek ise} \end{cases}$$

Given a number n, code the recursive function whose mathematical definition is given above.

input	output
1	1
5	3

Question 9:

$$Ack(m, n) = \begin{cases} n + 1 & m = 0 \\ Ack(m - 1, 1) & m > 0 \text{ ve } n = 0 \\ Ack(m - 1, Ack(m, n - 1)) & m, n > 0 \end{cases}$$

Find the result of the function according to the non-negative m and n values entered for the Ackermann function given above.

input	output
2 1	5
3 2	29

Question 10:

Given m and n (both >0), write a recursive function that finds the multiplication of the two numbers.

input	output
3 2	6
7 4	28

Question 11:

$$C_n(m) = \begin{cases} 1 & n = 0 \\ 2 & n = 1 \\ 2 \cdot m \cdot C_{n-1}(m) - C_{n-2}(m) & n > 1 \end{cases}$$

$$H_n(m) = \begin{cases} 1 & n = 0 \\ 2 \cdot m & n = 1 \\ 2 \cdot m \cdot H_{n-1}(m) - 2 \cdot (n-1) \cdot H_{n-2}(m) & n > 1 \end{cases}$$

$$L_n(m) = \begin{cases} 1 & n = 0 \\ m & n = 1 \\ \frac{(2n-1) \cdot L_{n-1}(m) - (n-1) \cdot L_{n-2}(m)}{n} & n > 1 \end{cases}$$

Chebyshev, Hermite and Legendre polynomials are defined above, respectively. Given the non-negative values of n and m, respectively, and which polynomial result you want to learn, write the program that finds the desired result.

input	output
2 0 L	-0.500000
2 1 C	3

Question 12:

Given a number n>1, write a recursive program that finds 1+2+3+4+5+...+n

input	output
3	6
10	55

Question 13:

Given a number n>1, write a program that writes the numbers up to n in reverse, recursively.

input	output
5	5 4 3 2 1
3	3 2 1

Question 14:

Given m and n (both >0), write a recursive function that corresponds to m^n .

input	output
3 2	9
7 4	2401

Question 15:

Given n, and a list of n numbers. Write a recursive function that outputs the list in reverse.

input	output
3 1 2 3	3 2 1
4 2 4 1 3	3 1 4 2

Question 16:

Hakan has n candy bars. Het puts either 1 candy or 3 candies in his mouth each time. Accordingly, write a recursive function that finds how many different ways Hakan can eat the candies.

input	output
3	2
5	4

Question 17:

$$1 + \frac{1}{3 + \frac{1}{5 + \frac{1}{\ddots + \frac{1}{n + \frac{1}{n+1}}}}}$$

For a given number n, write a recursive function that finds the result of the expression above.

input	output
3	1.307692
101	1.313035