In each exercise make your source code and output readable.

Exercise 1. Define a function *hypotenuse* that calculates the hypotenuse of a right triangle when the other two sides are given. The function should take two double arguments and return the hypotenuse as a double. Test the function in a suitable main program.
Extension: Define a function that returns the value indicating whether two doubles given as parameters can be the lengths of the sides of the right triangle. Test the function in a suitable main program.

Exercise 2. Define a function *gcd* (the greatest common divisor) that calculates the greatest common divisor of two positive integers. The greatest common divisor is the largest integer that evenly divides each of the numbers. Define a function *lcm* (the least common multiple) of two positive integers. The least common multiple is the smallest positive integer that is divisible by both integers. Test the function in a suitable main program.
Extension: Define a function *input_integers* that inputs two integers and returns the value indicating whether two integers are positive. Test the function in a suitable main program.

Exercise 3. Define a function that displays at the left margin of the screen a solid rectangle of asterisks whose width and height are specified in integer parameters. For example if width is 10 and height is 3 the function displays the following:
```
**********
**********
**********
```
Modification: Modify the function to form the rectangular out of whatever characters passed to the function. For example, if width is 6, height is 2 and character #, then the function should print the following:
```
######
######
```

Exercise 4. In a program define
- a function that returns the value indicating whether three integers given as parameters can be the lengths of the sides of the triangle.
- a function that returns the circumference of a triangle when the lengths of the sides of the triangle are given
- a function that returns the area of a triangle when the lengths of the sides of the triangle are given
- a function that returns both the area and the circumference of a triangle

Test functions in a suitable main program.
For example: for triangle with sides 3,4,5; area equals 6; circumference equals 12

Exercise 5. Write program segments that accomplish each of the following:
(a) Calculate the integer part of the quotient when integer a is divided by integer b.
(b) Calculate the integer remainder when integer a is divided by integer b.
(c) Use the program pieces developed in (a) and (b) to write a function that inputs an integer between 1 and 32767 and prints it as a series of digits, each pair of which is separated by two spaces. For example, the integer 4562 should be printed in the following form 4 5 6 2.

Exercise 6. The world is taxed. We must, for example, pay money to the government that is based on the cost of goods or services we have bought. For example in Poland the most popular rates of sales tax are 23% 8% 5% 0%. Write a function that computes the value of tax when the price after tax (the Gross price) and the tax rate are given. Test the function in a suitable main program.
For example: for the Gross price 284,90 and tax at a rate 23%; the tax is 53,27
for the Gross price 51,96 and tax at a rate 5%; the tax is 2,47
Extension 1: Write a function that computes the Gross price when the price before tax (the Net price) and the tax rate are given. Test the function in a suitable main program.
Extension 2: Write a function that computes the tax rate when the price before tax (the Net price) and the price after tax (the Gross price) are given. Test the function in a suitable main program.

Exercise 7. Define a function that computes the annual consumption of electrical appliance. Test the function in a suitable main program.

To calculate the consumption of an electrical appliance in kWh, you have to take into account three factors: the capacity of your electrical appliance, expressed in watt, the number of hours that the appliance is in use in one day; the number of days per year when the appliance is in use.
The calculation is as follows:

[number of hours' use] x [number of days' use]
x ([capacity of appliance expressed in watt] / 1000) = number of kWh

The capacity should be divided by 1000 to convert the number of watts into the number of kilowatts. This finally gives us the number of kWh (kilowatt hours).

Examples: A radio alarm is on all the time and therefore uses energy continuously.
hours/day: 24 hours days/year: 365 Capacity of radio alarm: 10 watts
Annual energy consumption of radio alarm: **87.6 kWh**
The vacuum cleaner is used for two hours once a week.
hours/day: 2 hours days/year: 52 days Capacity of vacuum cleaner: 2000 watts
Annual energy consumption of vacuum cleaner: **208 kWh**
Capacity of some appliances to test: LCD TV On (90 to 250 W); LCD TV In sleep mode (3 W); LED TV On 20 to (60 W); LED TV In sleep mode (0.3 W); Low-energy light bulbs (12 W); Mobile phone charger (5 W)
Extension. Assuming that the cost of 1 kWh is 0,55 Polish zloty, write a program that computes the annual value to pay for electricity.

Exercise 8. Define a function "print_pyramid" which takes a single integer argument "height" and displays a "pyramid" of this height made up of "*" characters on the screen. Test the function with a simple main program, which should be able to reproduce the following example output:

```
This program prints a 'pyramid' shape of
a specified height on the screen.

how high would you like the pyramid?: 37
Pick another height (must be between 1 and 30): 6


                **
               ****
              ******
             ********
            **********
           ************
```

Exercise 9. (Complex) Write a function that returns the value indicating whether a positive integer is a perfect number. A number is perfect when the sum of its divisors (except the number itself) equals the given number. For example 6 is a perfect number since 6=1+2+3.
Test the function in a suitable main program.
Extension. Write a program that finds the four smallest perfect numbers