Purwadhika Data Science JC Fundamental Exam

1. **Year of Investment (20 Points)**

Mr. Scrooge has a sum of money (**Principal**) that he wants to invest, and he wants to know how many years this sum has to be kept in the bank in order for this sum of money to amount that he wants (**desired**).

The sum is kept for years in the bank where **interest** is paid yearly, and the new sum is re-invested yearly after paying **tax**.

NOTE: The principal is not taxed but only the year's accrued **interest.** For example:

Principal = 1000.00
Interest = 0.05
Tax = 0.18
Desired= 1100.00

After 1st Year --> P = 1041.00
After 2nd Year --> P = 1083.86
After 3rd Year --> P = 1128.30
Thus Mr. Scrooge has to wait for 3 years for the initial principal for the amount to the desired sum.

Create the function to return the number of the years required from principal to the desired sum.
FOR EXAMPLE:

```
def calculate_years(principal, interest, tax, desired):
    #Build your code here
```

calculate_years(1000.00, 0.05, 0.18, 1100.00); // Should return 3

calculate_years(1200.00, 0.17, 0.05, 2000.00); // Should return 4

calculate_years(1500.00, 0.07, 0.6, 5000.00); // Should return 44

NOTE: If the Desired is equal to Principal this should return to 0 Years.

2. **Number in Expanded Form (40 Points)**

You would be given a number and you would need to create a function that return the number as a string in the expanded form.

FOR EXAMPLE:

```
def expandedForm(num):
    #Build your code here
```

expandedForm(12); // Should return '10 + 2'

expandedForm(42); // Should return '40 + 2'

expandedForm(70304); // Should return '70000 + 300 + 4'

NOTE: All numbers will be whole numbers greater than 0

3. **Build Tower (40 Points)**

Create a function to build a Tower by the following given arguments:

- number of floors (integer and always greater than 0)
- block size (width, height) (integer pair and always greater than (0, 0))

Tower block unit is represented as *

FOR EXAMPLE:

```
def tower_builder(n_floors, block_size):
    w, h = block_size
    # build here
```

A tower of 3 floors with block size = (2, 3) looks like below:

tower_builder(3, (2,3)); // Should return

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

and a tower of 6 floors with block size = (2, 1) looks like below:

tower_builder(6, (2,1)); // Should return

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