For the following questions use Python.

**Question 1**

**Question 1 (a)**

Iteration can be used to calculate the square root of a number using the following steps.

1. Start with the number whose square root is requested.
2. Divide this by an approximate root of .
3. Take the mean of the quotient and the approximate root.
   1. The formula would be .
4. The result of this becomes the new approximate value.
5. Repeat step 2. If the quotient is equal to approximate value used, then you have found the square root.

For example, to find the square root of 159.

* Divide 159 by 12 giving 13.25.
* Add 12 and 13.25 together and divide by 2 which is 12.625.
* Again divide 159 by 12.625 to get 12.59406.
* Add 12.625 and 12.59406 together and divide by 2 which is 12.60953.
* Repeat this process until same result is returned to get the square root.
* The final answer is 12.60952021.

Write a simple function in Python that **carries out the above iteration**. When doing the comparison round to 6 decimal places to prevent long execution. It is important to follow the steps above.

**Question 1 (b)**

Create a list with 159, 3400, 67, 598 and 8999. Write some code to create a new list of square roots using this list as input. You can use your function from Question 1 (a).

**Question 1 (c)**

Using the list, 159, 3400, 67, 598 and 8999 create a list of tuples. Each tuple should have the value and its square root. If possible, use named tuples as bonus.

**Question 2**

**Question 2 (a)**

Create the simple class below, using your function above. Following the example for Question 1 value will be 159, approx.\_value will be 12. The function calculate\_square\_root will be your function returning the square root.



**Question 2 (b)**

Write a simple program that uses your class above.

**Question 3**

**It is important to carry out the below steps so that your answers can be assessed.**

**Question 3 (a)**

Create a personal code repository with public access and upload your answers to this repository. This can be any Git repository. An example is <https://github.com/> where it is free to create public repositories.

**Question 3 (b)**

Email your repository details so that your answers can be cloned and checked. Please take note that any code that is emailed directly to us will be flagged and removed.