Calculator Project Documentation

CSC 414 Software Design

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Section 1.0 - Introduction

Section 1.1 - Identification

The program will be referred to as the CSC 414 calculator. As of currently the planned release version will be version 1.0.

Section 1.2 - System Overview

CSC 414 calculator is a high-level program that will perform a series of simple to more complex mathematical equations. Its purpose is to be an aid to development with other projects. Instead of having to do the equations on paper or pulling out a calculator, a simple alt tab to another window and enter in on average two numbers to be quicker.

Section 1.3 - Document Overview

The purpose of this document is to provide a detailed overview of how the software is implemented and tested. The next section (2.0) will be an overview of references used in the construction of the program. Section 3.0 will be the requirements that this program hopes to meet. Next, section 4.0 will be how the design of the program satisfies the requirements stated in section 3.0. Finally, in section 5.0 there will be a layout of how tests planned to be carried out on the program, and the results will be stored in the appendices at the end of this document.

Section 2.0 - References

https://www.tutorialspoint.com/c_standard_library/math_h.htm - Website that explains what the functions in the math.h library are and how to use them. Reference for the more complicated functions.

Section 3.0 - Requirements

The purpose of this program is to make a simple and quick calculator. This calculator will be able to perform simple math function such as addition and subtraction but also more complex math functions such as those involving sine or cosine. To ensure a quick and light design that could be added onto into the future, the program will use a simple menu to access the proper math function. The functions should be able to return and print a correct answer, the same one that would be reached if done by hand or another calculator.

The decision to use a menu-based system is so that it saves development time by not having to bother with a UI and keeps the design of the system lightweight. Each math function has been chosen by their frequency of use. For rather self-evident reasons, this is the basic four functions of math which are addition, subtraction, multiplication, and division. The trigonometry functions are used often in calculus problems which can be useful to be able to perform quickly. For the rest of the functions, these are lesser used functions that can be slightly tricky to calculate.

Section 4.0 - Design

For resolving the requirements, it is best to split the program into two classes. One class, dubbed menu, oversees user interactions. In this a menu will be printed to the screen with corresponding numbers the user is to input. The input will then be handled by a switch statement. In each statement the user will then be prompted to input the numbers they wish to use the mathematical function for.

The second class, dubbed calc, is where all equations will be handled. Each equation is given its own function dedicated to solving the problem and then outputting the answer in a readable format. To retrieve the input from the user, two setter functions will be used, and they are meant to be called just before each math function is accessed.

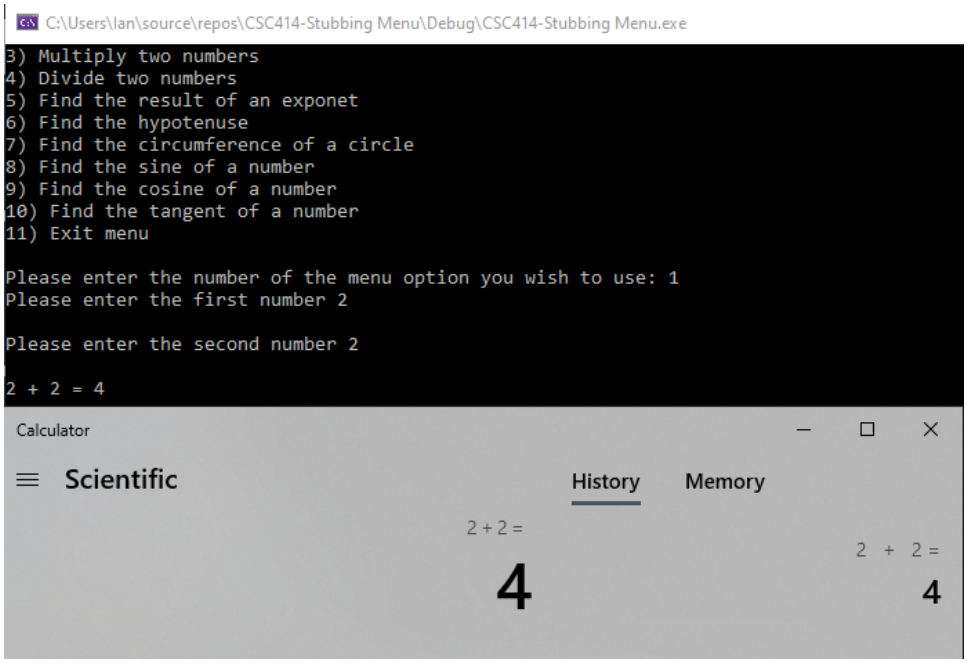
Section 5.0 - Test Design

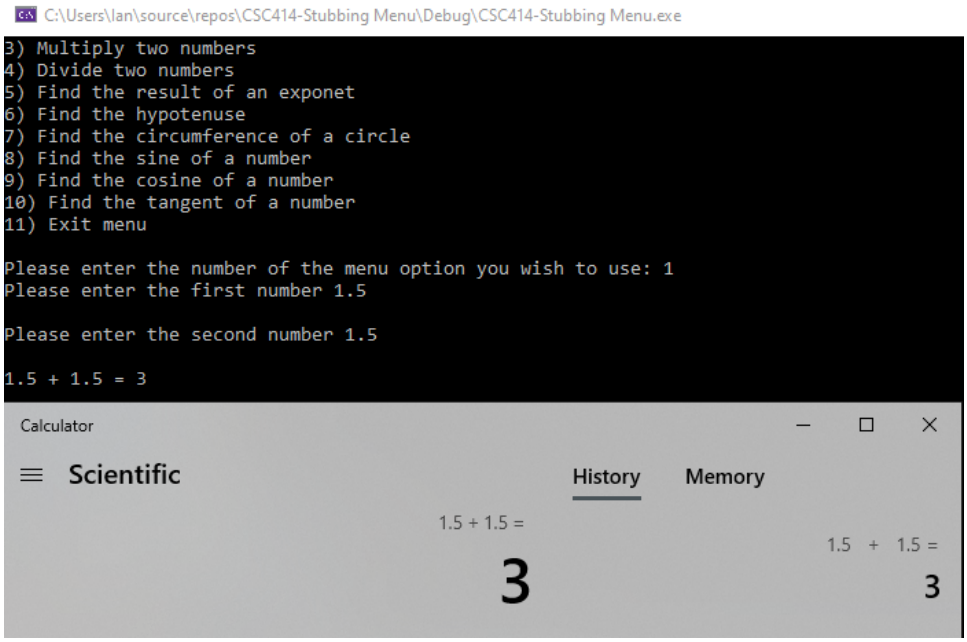
Before describing the tests, it is best to state what they are supposed to accomplish. The first, and most obvious one, is that the program simply runs from its start to intended finish. Secondly, it should show that each function not only does the intended feature but does it right.

The first series of tests will be to run each function with only integers. A second test will be conducted using only floats, like how the first is to input only with integers. Next, once the previous tests are completed, each function will be tested with negative inputs. Further, when testing for working functionality, a calculator will be put on screen next to the console to act as a validator for proper test results.

Appendix

A.1 - Addition Test Results

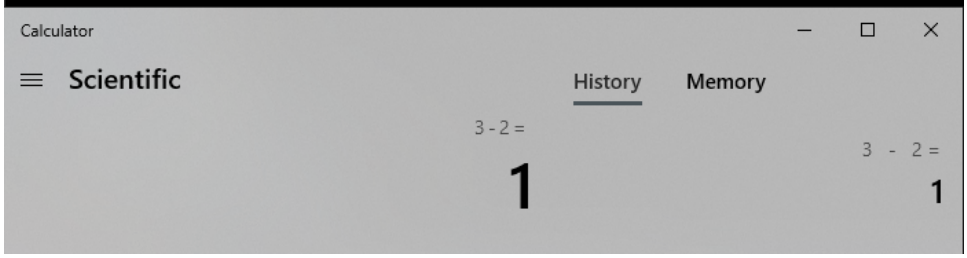


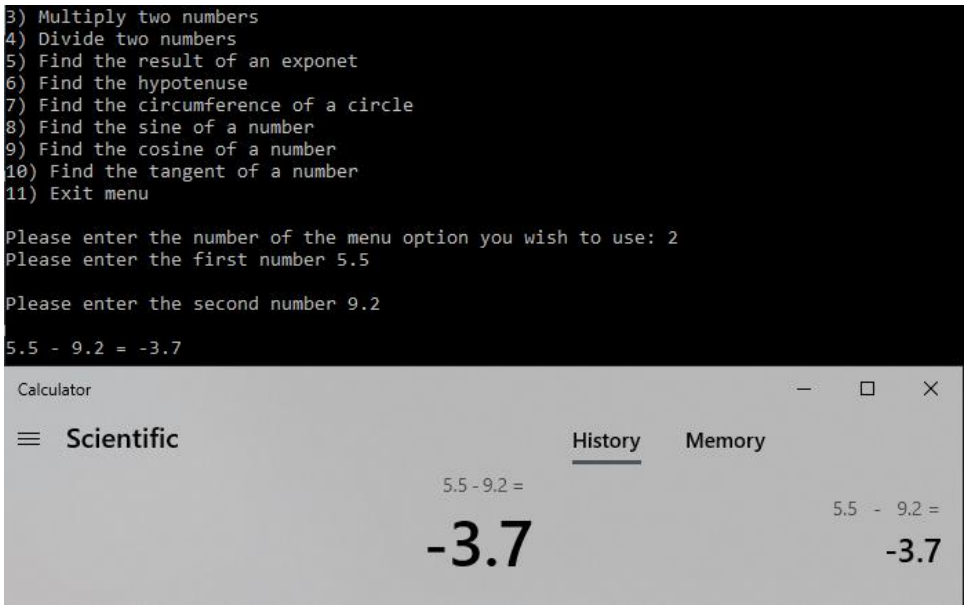


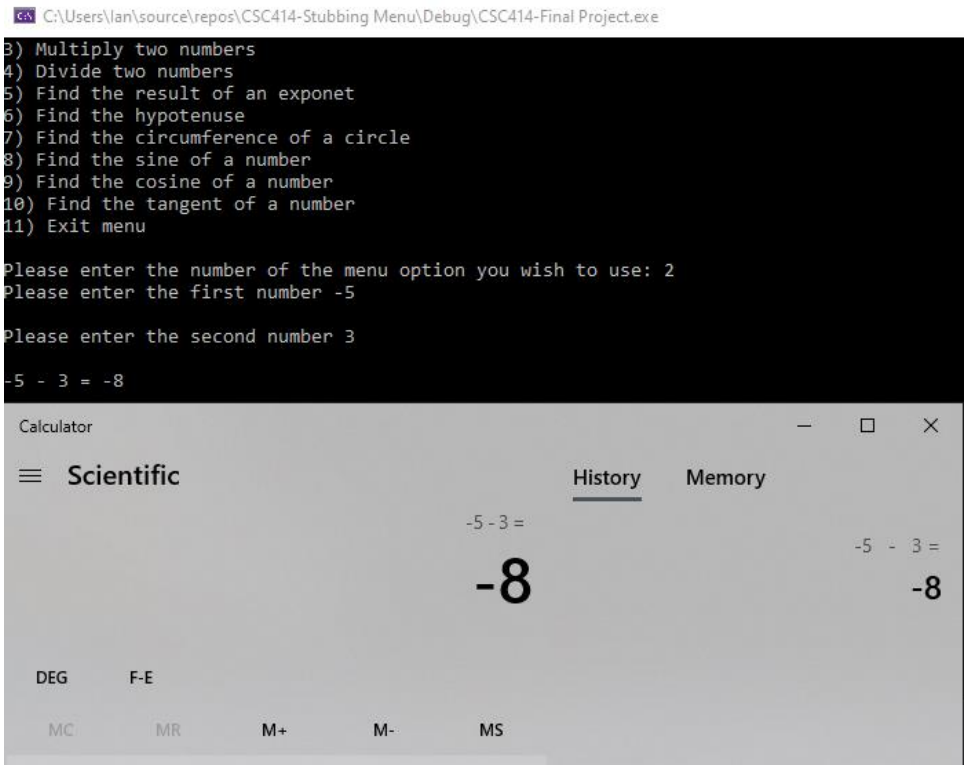
```
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 1
Please enter the first number -3

Please enter the second number 1

-3 + 1 = -2
```

A.2 Subtraction Test Results

```
C:\Users\lan\source\repos\CSC414-Stubbing Menu\Debug\CSC414-Stubbing Menu.exe
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 2
Please enter the first number 3

Please enter the second number 2

3 - 2 = 1
```

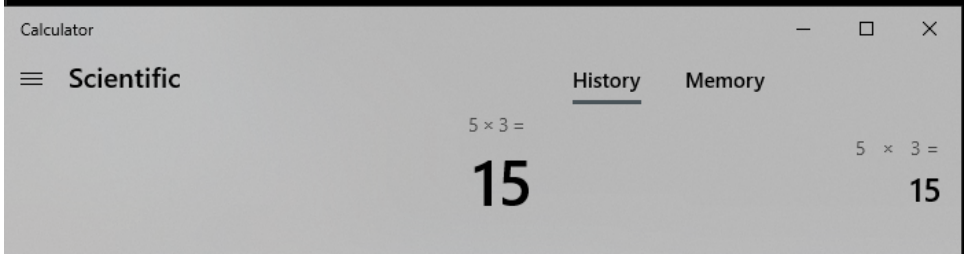




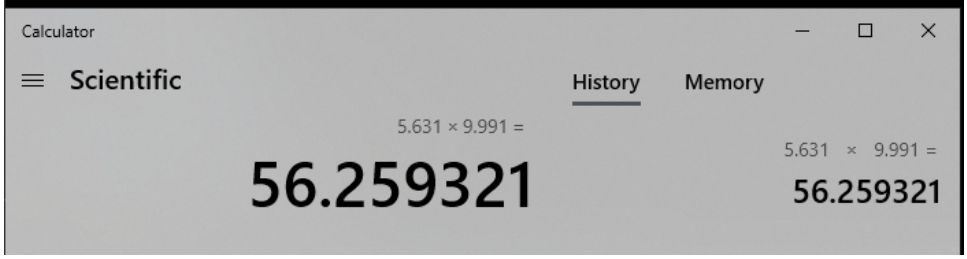


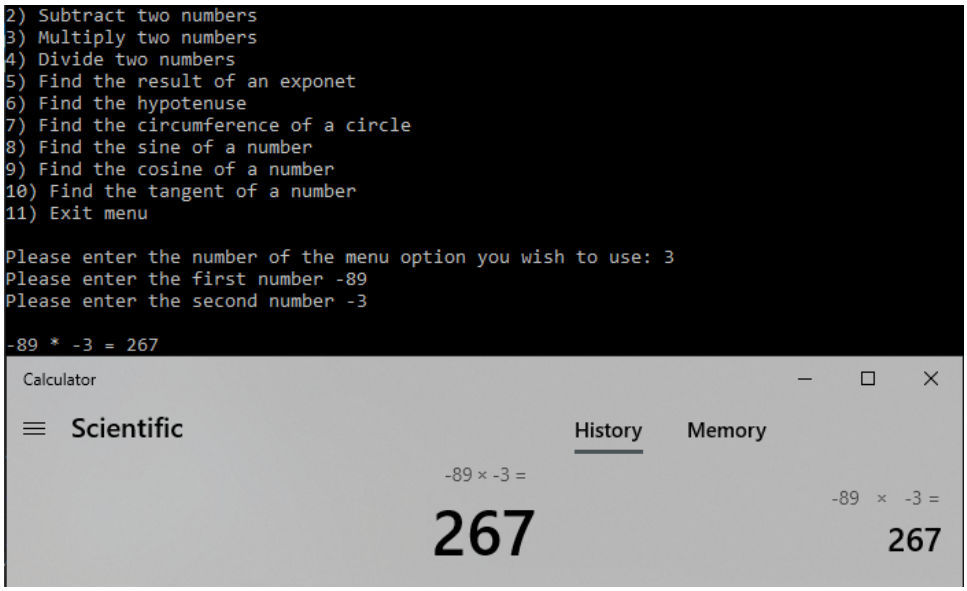
A.3 - Multiplication Test Results

```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 3
Please enter the first number 5
Please enter the second number 3

5 * 3 = 15
```

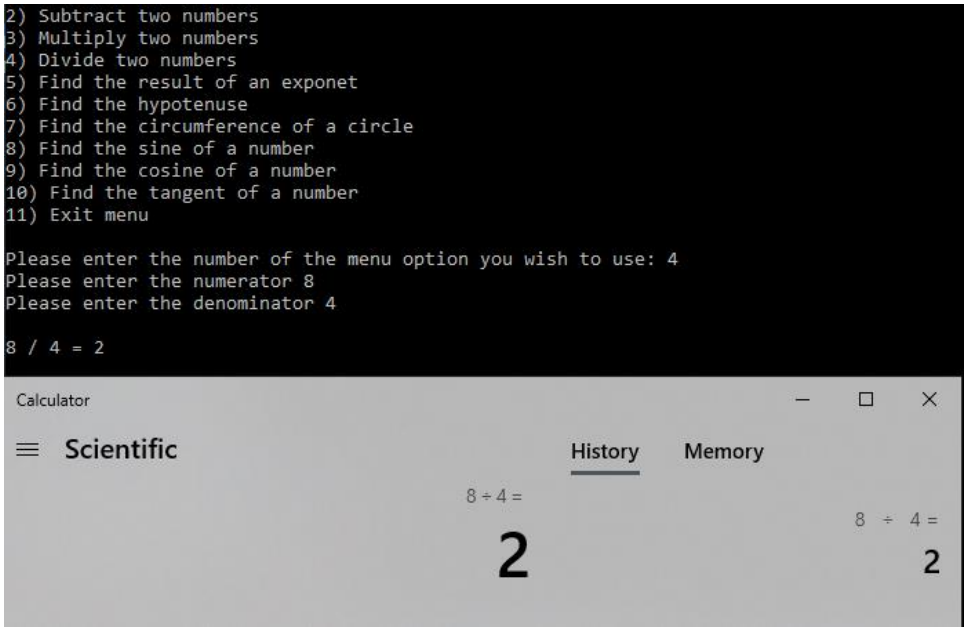



```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 3
Please enter the first number 5.631
Please enter the second number 9.991

5.631 * 9.991 = 56.2593
```

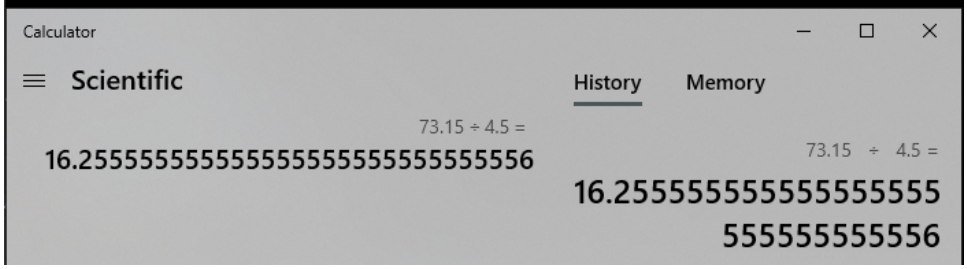




A.4 - Division Test Results



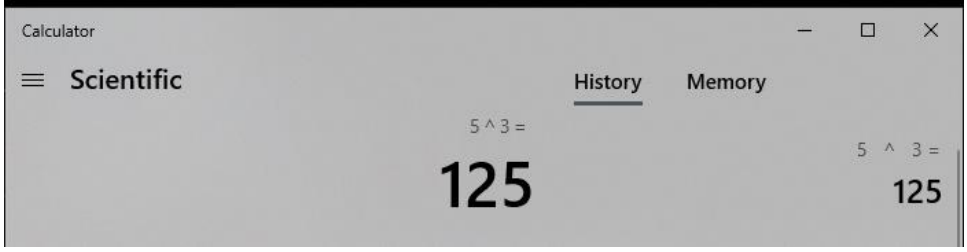
```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 4
Please enter the numerator 73.15
Please enter the denominator 4.5

73.15 / 4.5 = 16.2556
```



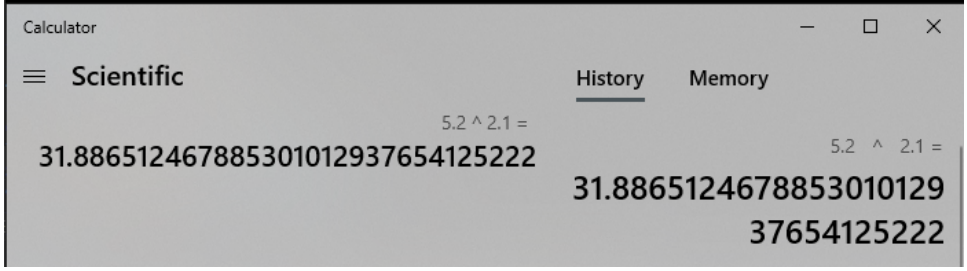

```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 4
Please enter the numerator -50
Please enter the denominator -5

-50 / -5 = 10
```

A.5 - Exponent Test Results

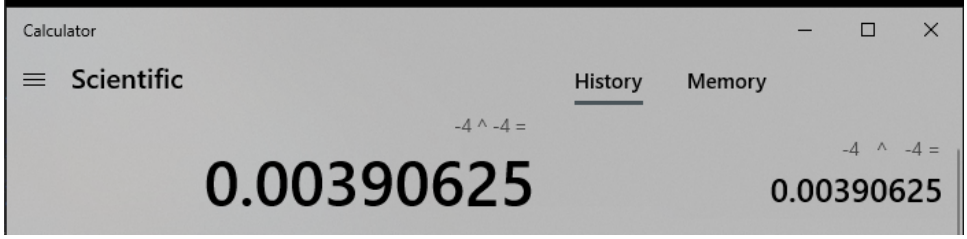
```
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 5
Please enter the base number 5

Please enter the power 3

5 ^ 3 = 125
```




```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 5
Please enter the base number 5.2
Please enter the power 2.1

5.2 ^ 2.1 = 31.8865
```

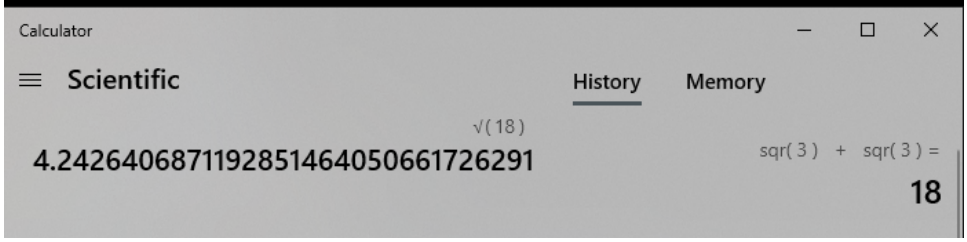


```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 5
Please enter the base number -4
Please enter the power -4

-4 ^ -4 = 0.00390625
```



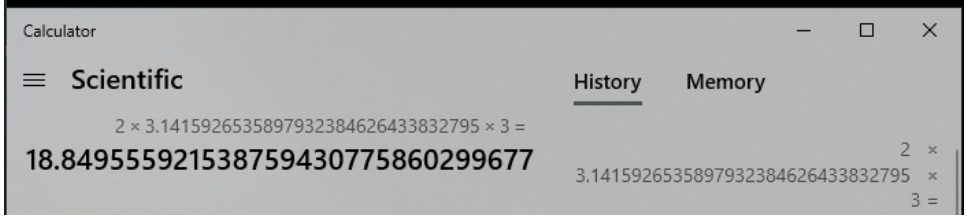
A.6 - Hypotenuse Test Results

```
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 6
Please enter the first number 3
Please enter the second number 3

The hypotnouse is 4.24264
```

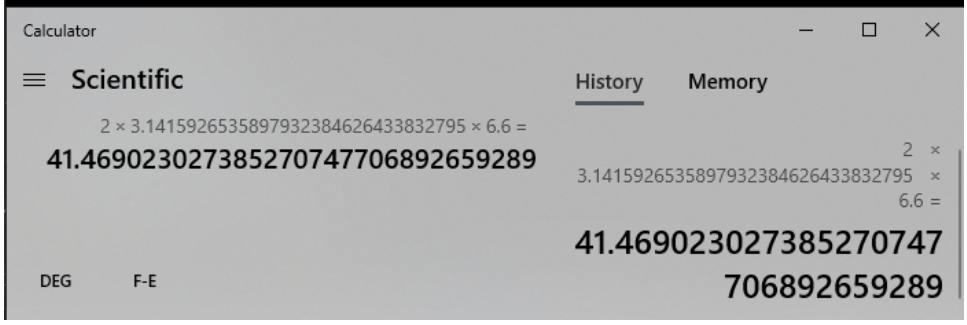


A.7 - Circumference Test Results

```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponet
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 7
Please enter the radius 3

The circumfrence is 18.8496
```

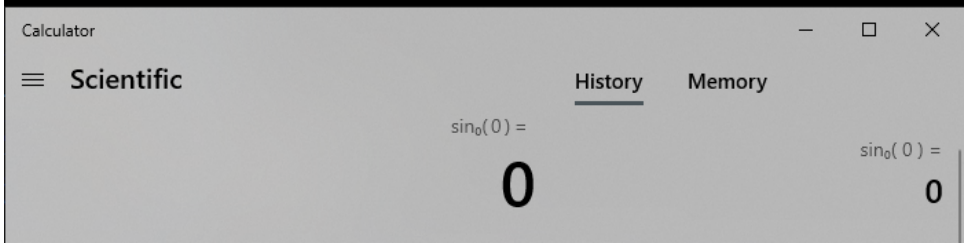



```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 7
Please enter the radius 6.6

The circumfrence is 41.469
```

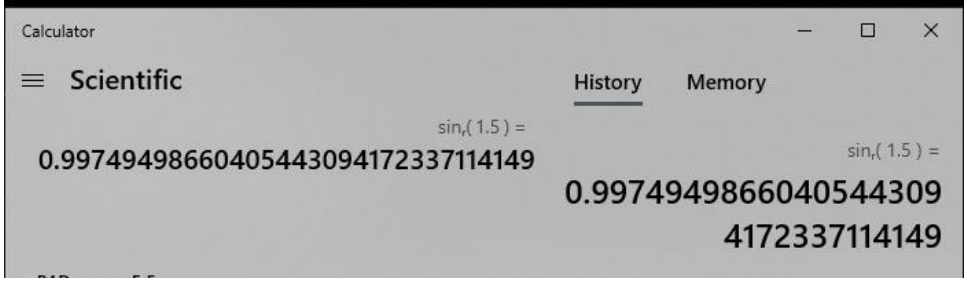


A.8 - Sine Test Results

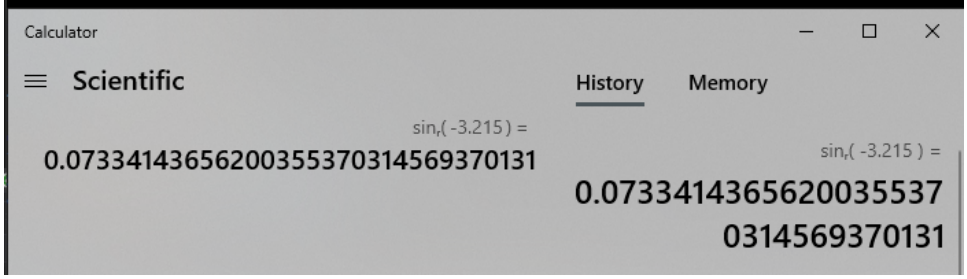
```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 8
Please enter the number for sine 0

Sin(0) is 0
```




```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 8
Please enter the number for sine 1.5

Sin(1.5) is 0.997495
```

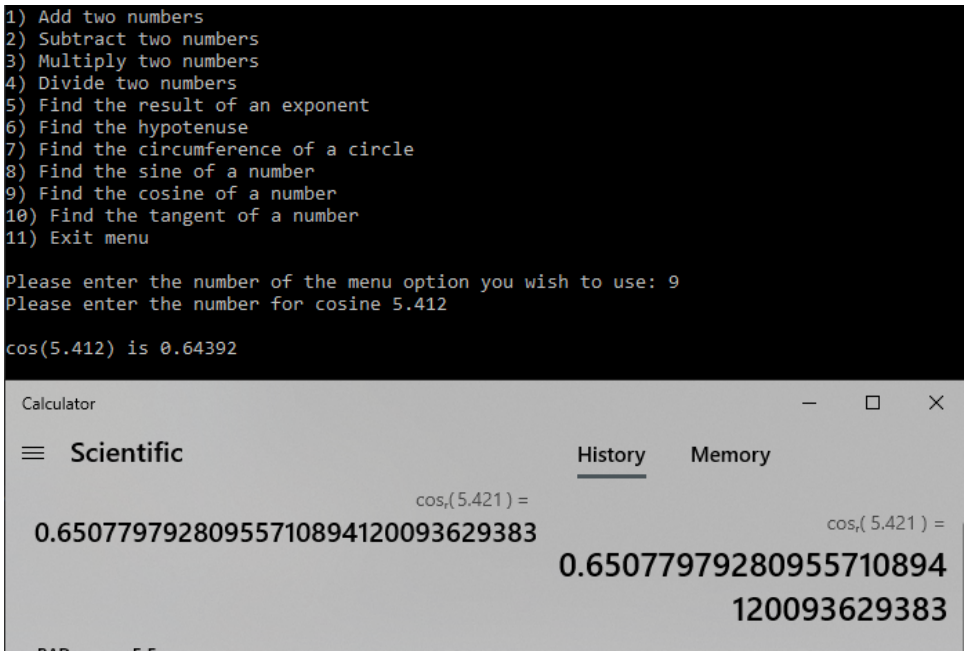


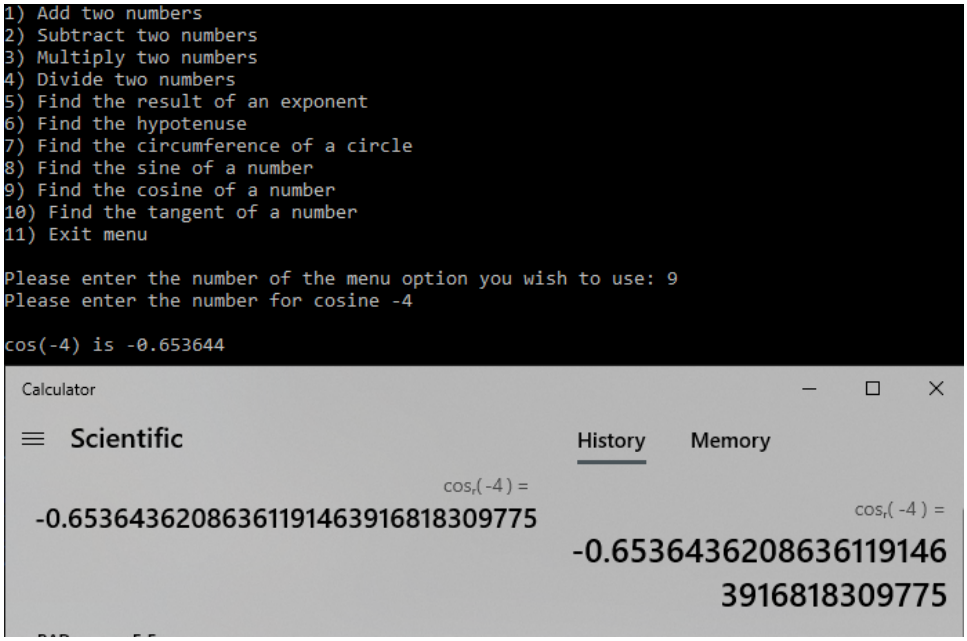
```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 8
Please enter the number for sine -3.215

Sin(-3.215) is 0.0733413
```



A.9 - Cosine Test Results

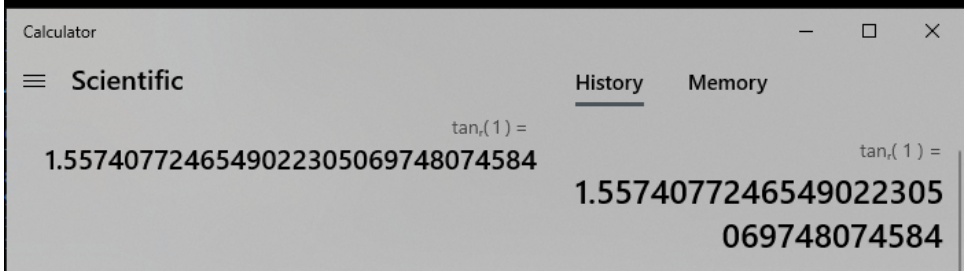
```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 9
Please enter the number for cosine 0

cos(0) is 1
```



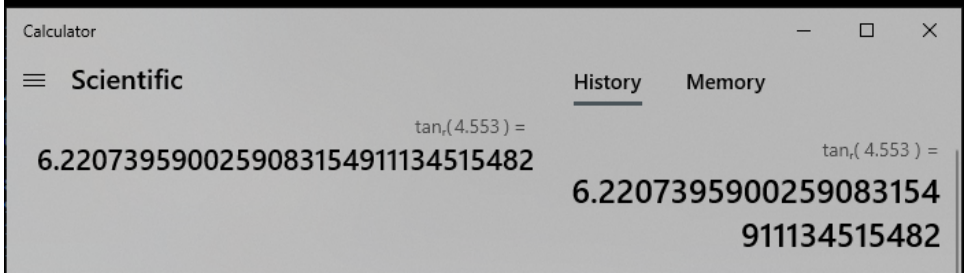


A.10 - Tangent Test Result

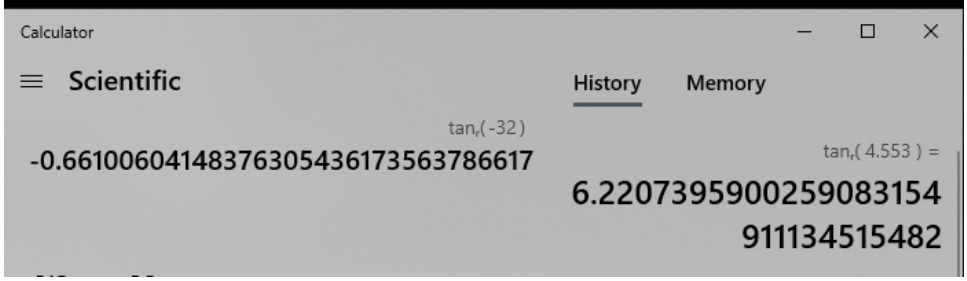
```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 10
Please enter the number for tangent 1

tan(1) is 1.55741
```




```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 10
Please enter the number for tangent 4.553

tan(4.553) is 6.22074
```



```
1) Add two numbers
2) Subtract two numbers
3) Multiply two numbers
4) Divide two numbers
5) Find the result of an exponent
6) Find the hypotenuse
7) Find the circumference of a circle
8) Find the sine of a number
9) Find the cosine of a number
10) Find the tangent of a number
11) Exit menu

Please enter the number of the menu option you wish to use: 10
Please enter the number for tangent -32

tan(-32) is -0.661006
```



A.11 - Exit Test Result

```
Please enter the number of the menu option you wish to use: 11
Exiting now
```