You may use one previously prepared 8.5×11 inch sheet of paper. Show all of your work clearly in the space provided or on the additional page at the end of the exam. If the additional page is used, be sure to clearly label the content for each problem. Be sure to *read each problem carefully*. You should answer all 5 questions. Note: The exam is double-sided.

1. (10 points) Describe the difference between the declaration (prototype) and definition of a function. When are each useful?

2.

a) (10 points) Briefly describe how the `static` keyword in the following function affects the string object called phrase.

```
string question1(const string& word)
{
  static string phrase = word;
  phrase += "␣H";
  return phrase;
}
```

b) (10 points) Indicate what will be displayed by the following program (assume all of the appropriate include/using statements have been done):

```
int main()
{
  for(unsigned int i=5; i<8; ++i) {
    string letters;
    for(unsigned int j=0; j<i; ++j) {
      letters += "Rr";
    }
    cout << question1(letters) << endl;
  }
  return 0;
}
```

3. (15 points) Write a function, called getFilename, that asks the user for a filename and returns a string containing the filename that was entered.

4. (25 points) Write a function, called rootIt, that reads floating point numbers from an input file stream and writes the square root of the number to an output file stream. The file streams should be passed to the function and the sum of all the numbers in the input file should be returned when the function is done.

5. (30 points) Write a program that asks the user to enter two filenames, one for input and one for output. The program should verify that the input file was openned successfully. If not, the user should be asked again to enter name of the input file. The program should then create an output file that consists of the square root of all the numbers in the input file and display the sum of the numbers in the input file.

Be sure to include all of the appropriate include/using directives. You may assume that the source code for the functions written in the previous two questions are in a file called funcs.cpp (with the appropriate include/using statements) that is part of your project and that there is a file called funcs.h that includes the function prototypes for the previous two questions.

Additional work area for any problem. Clearly identify to which problem the work on this page is related.