CS 115 Exam 1, Spring 2010

Your name: ____________________________________________________________

Rules

• You may use one handwritten 8.5 x 11” cheat sheet (front and back). This is the only resource you may consult during this exam.

• Explain/show work if you want to receive partial credit for wrong answers.

• All snippets of code can be assumed to be enclosed within int main(). You can assume that the iostream and cmath libraries have been included at the beginning of the program.

• To write a snippet of code, you may also assume that your code is enclosed within int main() and that any necessary libraries have been included. In a snippet of code, DO NOT use return statements to end the program!

• To write a complete program, you must write the #include statements, the int main(), etc. in your solution to receive full credit.

• A line consisting solely of “…” represents one or more C++ statements, some of which may change the values of program variables.

Grade (instructor use only)

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Problem 1: 24 points.
What will print to the screen when each of the following snippets of code is executed?

(a)
```
cout << (pow(2, 3))/2 << endl;
```

(b)
```
int x = 4;
cout << x << endl;
```

(c)
```
int a = 17;
int b = 5;
cout << a % b << endl;
```
(d)

```cpp
int x;
cin >> x;
while (x > 0) {
    x--;
}
while (x < 0) {
    x++;  
}
cout << x << endl;
```

(e)

```cpp
int a = 2;
if (a > 0) {
    a = -1 * a;
}
else if (a < 0) {
    a = 3;
}
cout << a << endl;
```

(f)

```cpp
for (int i=3; i > 0; i--) {
    cout << i << " ";
}
```
Problem 2: 16 points.
State whether each snippet of code is valid C++, meaning that it will compile. If it is valid, write “valid.” If it is invalid, write “invalid” and make a small change so that it will compile.

(a)
```cpp
int a;
cin >> a >> endl;
cout << a << endl;
```

(b)
```cpp
int i = 5;
do while {
    cout << i << endl;
} (i > 7);
```

(c)
```cpp
int q = 2;
cout << (2*q)++ << endl;
```

(d)
```cpp
for (int i=1; i < 0; i++) {
    cout << "Howdy!\n";
}
```
Problem 3: 30 points.

Write short snippets of code to accomplish the following tasks:

(a) Assume:
   - An integer variable \( N \) has already been declared and defined.
   Your task:
   - Print the square root of every number between 1 and \( N \), inclusive. If \( N \) is less than 1, do not print anything.

(b) Assume:
   - Float variables \( A \), \( B \), and \( C \) have already been declared and defined.
   Your task: Print the mode of this data. That is:
   - If two or more of the variables’ values are equal to each other, print their value exactly once.
   - If all 3 values are different, print No mode.
(c) Your task:
  o Prompt the user to type their name.
  o If they type “none”, do not greet them by name and do not print anything else.
  o If they type anything else, greet them by name and repeat these steps.
  o Do not use a return statement in this snippet of code!

(d) Assume:
  o The float variable s has already been declared and defined.

Your task:
  o Compute and print the area of a square whose side length is s
    (remember that area is the square of the side length).
  o Format your answer EXACTLY this way:
The area of a square with side length _____ is ______.
Problem 4: 30 points.
For this problem, you must write a **complete program** that does the following:

- Prompts the user to enter 1000 integers.
- If the user enters something that cannot be read as an integer, the program should print an error message and exit immediately.
- Otherwise, after the user has entered all 1000 integers, the program should print the number of the user’s integers that are less than 10.
- Duplicates still count – that is, if the user enters the integer 8 three times, that counts as 3 integers that are less than 10.