

Open book and notes. For partial credit, 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 that the exam is double sided.

1. (15 points) Identify at least three errors in the following program that would cause a compiler error.

```
1 // Name: Convenience store owner (conva.cpp)
2 // Version: 1.1 (ANSI C++ version)
3 // Purpose: Convert the price of an item in U.S. pennies per
4 //           pound to Canadian dollars per kilogram.
5
6 #include <iostream>
7
8 std::using cout;
9
10 int main()
11 {
12     double theOutput;           // Answer displayed to the user
13     float dollarsPerKg;         // Item's cost in Canadian $ per kilogram
14     int theInput;              // Input entered by the user
15     int penniesPerLb;          // Price in U.S. pennies per lb of an item
16
17     // Get the input
18     cout << "Enter item's price per pound" std::endl;
19     cin >> theInput;
20
21     penniesPerLb = theInput;
22
23     const float LbPerKg = 2.2000;           // No. of lbs in a kilogram
24     float dollarsCanPerUS = 1.48;         // No. of Canadian $ per
25                                           // U.S. $ (exchange rate
26                                           // as of Noon EST 12-14-99)
27     const int penniesPerDollar = 100;     // No. of pennies per U.S. $
28
29     dollarsPerKg = (penniesPerLb*LbPerKg;
30                   * dollarsCanPerUS)/penniesPerDollar;
31
32     theOutput = dollarsPerKg;
33
34     // Display the answer
35     cout << theOutput << std::endl;
36 }
```

2. (15 points) Given the algebraic expression:  $y = ax^3 + 7$ , which of the following, if any, are correct C++ statements for this equation?

- a) `y = a * x * x * x + 7;`
- b) `y = a * x * x * (x + 7);`
- c) `y = (a * x) * x * (x + 7);`
- d) `y = (a * x) * x * x + 7;`
- e) `y = a * x * (x * x) + 7;`
- f) `y = (((((a * x) * (x * x)) * 1)) + 7);`

3. (15 points) What does the following program display?

```
#include <iostream>
2
using std::cout;
4 using std::endl;

6 int main()
{
8   int y;
   int x=1;
10  int total=0;
   while(x<=10) {
12    y=x*x;
       cout << y << endl;
14    total+=y;
       x=++y;
16  }
   cout << total << endl;
18  return 0;
}
```



4. (30 points) Write a program that asks the user for an integer. As long as the number they enter is not 0, the program should continue asking the user for another integer. Once 0 is entered, the program should display (clearly labelled) the number of positive numbers and the number of negative numbers entered by the user.



5. (25 points) Write a program that asks the user to enter a sentence and displays the number of times each vowel appears in the sentence.



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



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