This exam will be in two parts. The first part is written and you may use your books and/or your notes but you may not use a computer. The second part, to be completed after turning in the first part, is done on computer and is similar to the daily computer problems in class.

1. Variables of type int are 32 bits long in C#. What is the range of the int variables?

2. What is wrong with the following code segment?

```csharp
int i = 2, j = 4;
if(i = j)
    Console.WriteLine("Variables are equal");
else
    Console.WriteLine("Variables are not equal");
```

3. How many lines of print do each of the following produce? Assume all variables have been declared and are of type int.

<table>
<thead>
<tr>
<th>A)</th>
<th>B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i = 0;</td>
<td>i = 9;</td>
</tr>
<tr>
<td>while (i &lt; 100)</td>
<td>while (i &gt;= 0)</td>
</tr>
<tr>
<td>{j = 0;</td>
<td>{j = -3;</td>
</tr>
<tr>
<td>(while j &lt; 10)</td>
<td>while (j &lt; 3)</td>
</tr>
<tr>
<td>{Console.WriteLine(&quot;Hello&quot;);</td>
<td>{Console.WriteLine(&quot;Hello&quot;);</td>
</tr>
<tr>
<td>j++;</td>
<td>j++;</td>
</tr>
<tr>
<td>i += 2;</td>
<td>i--;</td>
</tr>
<tr>
<td>Lines of Print</td>
<td>Lines of Print</td>
</tr>
</tbody>
</table>

4. Show what is printed as a result of each of the following: (all variables have been declared to be of type int.

<table>
<thead>
<tr>
<th>A)</th>
<th>B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a = 7;</td>
<td>a = 12;</td>
</tr>
<tr>
<td>b = 3;</td>
<td>b = 3;</td>
</tr>
<tr>
<td>Console.WriteLine(a/b);</td>
<td>c = a/b*2;</td>
</tr>
<tr>
<td></td>
<td>Console.WriteLine(c);</td>
</tr>
</tbody>
</table>

Printed Result_________  Printed Result_________

5. Explain the difference between a console application and a windows application.
private void MyMethod()
{
    string outNum = "";
    int i, j, n, fact;
    n = Convert.ToInt32(Console.ReadLine());
    i = 1;
    while(i <= n)
    {
        fact = 1;
        j = i;
        while(j > 1)
        {
            fact *= j;
            j--;
        }
        i++;
        outNum = Convert.ToString(fact);
        Console.WriteLine(outNum);
    }
}

Answer the following questions about this program:
A) If the input is 10 how many lines will the program produce in the output window when the program runs?.
B) What does the line fact *= j; do?
C) Why is the variable fact initialized to 1 instead of 0?

8. Write a program to evaluate the equation \( y = x^3 - 4x^2 + 3x + 1 \) for successive values of \( x \) beginning at 0 and ending when \( y \) is greater than 1000. Use step of 0.1 for the \( x \) increment. Print all values of \( y \).

9. Write a program to input a single digit from the keyboard. Print that number plus all of the other digits up to the number 100. Print each number on a new line. For example, your program's output might look like the following:
Enter an integer... 96
96
97
98
99
100
Push any key to continue...

10. Write a C# console program implementation to input a sequence of positive integers from the keyboard and print their average. The number of integers to be entered is unknown but the last integer will be a 0. Your program should prompt the user to enter an integer. If the integer is nonzero it should be part of the average but nothing should be printed except a prompt for another integer. This procedure should continue until the user enters a zero at which time your program should print the average of the numbers with the appropriate message.