1) (6 points) Write a code segment that prompts the user to enter an integer and then assigns that integer to an `int` variable `x`.

2) (5 points) Write a code segment that prints the value of $\sqrt{2}$.
3) (6 points) Declare an array that can hold 4 integer values and initialize all of the entries to 17.

4) (6 points) Write a code segment that prints the values of the elements of the integer array, \( a \), one per line in reverse order.
5) (5 points) Write a code segment that generates a random integer between 1 and 10 (inclusive) and prints it out.

6) (12 points) Write a code segment that generates three random integers between 1 and 10 (inclusive) and prints out only the largest one.
7) (12 points) Write a program segment for each of the following:
   a) Print an appropriate message indicating whether or not the double variable \( x \) is in the interval \([10, 20]\). (This interval contains both end points.)
   
   b) Print an appropriate message only when the double variable \( x \) is in the interval \([10, 20]\).

   b) Print an appropriate message only when the double variable \( x \) is not the interval \([10, 20]\).

8) (6 points) Write a program segment that prints the average of the elements of the integer array \( a \).
   Handle the case of an empty array in a reasonable way.
9) (12 points) Suppose we have:

```csharp
int x = 13;
int y = 3;
double z = 19.0;
double w = 5.0;
```

Evaluate each of the following expressions. Write your answer in a simplified form. Do not use fractions. Use two decimal places for numbers with a fractional part.

**Show how you got your answer.**

a) \( \frac{x}{y} \)

b) \( \frac{x}{w} \)

c) \( \frac{x + z}{y} \)

d) \( \frac{x}{y} + \frac{z}{y} \)

e) \( x \% y \)

f) \( \frac{x}{y+2} + \frac{z}{y+2} \)
10) (15 points)
The table at the right gives the cost of light bulbs by wattage. Write a method that takes an integer parameter that represents the wattage of a light bulb and returns the cost of that light bulb based on this table.

<table>
<thead>
<tr>
<th>wattage</th>
<th>cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 40</td>
<td>$1.35</td>
</tr>
<tr>
<td>at least 40 and less than 60</td>
<td>$0.85</td>
</tr>
<tr>
<td>at least 60 and at most 100</td>
<td>$1.50</td>
</tr>
<tr>
<td>greater than 100</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

11) (5 points) Explain in words what the following method does:

```java
public static int mystery(int[] a) {
    int x = 0;
    if (a.length == 0)
        return -1;
    for (int i=1; i<a.length; i++)
        if (a[i] < a[x])
            x = i;
    return x;
}
```
12) (10 points)
   a) Write a method that reads integers from the keyboard until a negative value is entered, and returns the last non-negative number entered. Return -1 if no non-negative numbers are entered. Assume that only integers will be entered. This method does no prompting.

   b) Explain in words what your solution to part a) would do if a non-integer value were entered. Also describe how you could fix this problem.
<table>
<thead>
<tr>
<th>Seat number</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>