CSCI 261J
1st Midterm Exam
February 21, 2014 **Name:** ____________________

Question:	1	2	3	Total
Points:	20	14	16	50
Score:				

Question 1 . . . . (20 points)

(a) Specify (by writing either `true` or `false` alongside each statement) the values of four `int` and four `boolean` variables computed as follows:

```
int i1 = 5;
int i2 = i1/5*6;
int i3 = i1/6*5;
int i4 = i1*5/6;
boolean b1 = i1!=5 && i1<10;
boolean b2 = i1!=5 || i1<10;
boolean b3 = i1==5 && i1>10;
boolean b4 = i1==5 || i1>10;
```

(b) What is printed by the following program fragment?

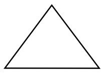
```
int n = 8;
while (n>0) {
  int m = n%3;
  System.out.println("m="+m+" n="+n);
  n -= 2;
}
```

(c) Rewrite the fragment above using `for` instead of `while`.

Question 2 . . . . (14 points)

Complete the Java methods described below.

(a) Uses the specified `Graphics g` to draw an isosceles triangle like this one:



The horizontal base has length equal to the panel width `w` and height equal to the panel height `h`, with apex centered at the top of the panel.

```
public static void drawTriangle(int w, int h, Graphics g) {








}
```

(b) Returns (without printing) the largest of the values in the specified array.

```
public static float max(float[] a) {








}
```

(c) Returns the index of the first negative value in the specified array; or, if all values are non-negative, returns -1.

```
public static int indexOfNegative(float[] a) {








}
```

(d) Uses the previous method `indexOfNegative` *in only one statement* to return `true` if the specified array has at least one negative value; `false`, otherwise.

```
public static boolean hasNegative(float[] a) {


}
```

Question 3 .... (16 points)

Consider a Java class that represents a 2D vector with components (x, y).

(a) Complete the following implementation of this class.

```
import static java.lang.Math.*;
public class Vector {

  /** Constructs a vector with specified components. */
  public Vector(double x, double y) {



  }

  /** Returns the length (magnitude) of this vector. */
  public double length() {



  }

  /** Scales components of this vector by the specified factor s. */
  public void scale(double s) {



  }

  /** Returns true iff this vector equals the specified vector v. */
  public boolean equals(Vector v) {



  }

  /** Returns a text string that represents this vector.
  public String toString() {



  }

  // private fields



}
```

(b) Complete the following Java program, which might be used to test your implementation of the class `Vector`.

```
public class VectorTest {
  public static void main(String[] args) {

    // Construct two vectors, v1 and v2, not equal, but with equal lengths.




    // Compare v1 and v2 to confirm (print) that they are not equal.




    // Compare v1 and v2 to confirm (print) that their lengths are equal.




    // Scale the vector v2 so that its length is half that of v1.




    // Print vectors v1 and v2.




  }
}
```