CST8110 – Introduction to Computing
Midterm Test VERSION A

Name: _____

Short Answer Questions (mark for each question is indicated – total 23 marks)

1. Given the following code:

```
public class  Point2D {
        private int x;
        private int y;

        public Point2D ( ) {
                x = 0;   y = 0;
        }
        public Point2D (int X, int Y ) {
                x = X;   y = Y;
        }
        public void setPoint2D ( int X, int Y) {
                x = X;   y = Y;
        }
        public void display ( ) {
                System.out.println ("x is " + x + " y is " + y);
        }
        public int returnSum ( ) {
                 return (x+ y);
        }
}
```

a) ***(3 marks)*** Indicate beside each statement anything that will display from the statements if they were written in another class in method main:

```
Point2D point1 = new Point2D();
Point2D point2 = new Point2D();

point1.display ( );          x is 0 y is 0

point1.setPoint2D(3, 0);
point1.display();            x is 3 y is 0

point2.setPoint2D(4,  6);
point2. display( );          x is 4 y is 6
```

b) ***(3 marks)*** Using the methods written in the class above, write the statement(s) in method main in another class that would display the sum of the x and y fields in object **point1**.

```
System.out.println ("Sum is " + point1.returnSum());
```

c) ***(3 marks)*** Using the methods written in the class above, write the statement(s) in another class in method main that would display the sum of the x and y fields in objects **point1** and **point2** added together.

```
int total = point1.returnSum() + point2.returnSum();
System.out.println ("Total is " + total);
```

d) ***(3 marks)*** Write a new method in **Point2D** class called **calcAndDisplayDifference()** which calculates the difference between the x and y fields AND displays the difference.

```
public void calcAndDisplayDifference() {
        System.out.println("Difference: " + (x-y));
}
```

Write a new method in **Point2D** class called **calcProduct()** which calculates the product (multiplication) of the x and y fields AND returns the product.

```
public int calcProduct() {
        return x*y;
}
```

e) ***(3 marks)*** Write a method in **Point2D** class called **displaySmallest()** which displays the smallest of the x and y fields or displays an equal message if they are equal.

```
public void displaySmallest() {
        if (x>y) {
                System.out.println ("x is smallest " + x);
        } else if (y > x) {
                System.out.println ("y is smallest " + y);
        } else {
                System.out.println ("x and y are equal " + x);
        }
}
```

2. ***(5 marks)*** Write a loop which displays the even numbers **between** 0 and 100 – each on their own line.

Sample output:
The even numbers are
2
4
6
...etc

```
System.out.println ("The even numbers are");
for (int num = 2; num < 100; n+=2)
        System.out.println (num);
```

Write a loop which displays the odd numbers **between** 0 and 100 – each on their own line.

Sample output:
The odd numbers are
1
3
5
…etc.

```
System.out.println ("The odd numbers are");
for (int num = 1; num < 100; n+=2)
        System.out.println (num);
```

3. ***(3 marks)*** What is the purpose of a constructor in a class?

To initialize the fields in an object of that class