2017F Java Test #2 A Name:_____

1. (30 points) Write a class Cubic to represent a 3rd order polynomial $p_3(x)=ax^3+bx^2+cx+d$ that makes the following main work:

```
public static void main(String[] a) {
  Cubic c1 = new Cubic(1, 2.5, -1.5, 3); // x^3+2.5x^2-1.5x+3
  Cubic c2 = new Cubic(3,-1.0,2.4); // 3x^2-x+2.4
  System.out.println(c2.eval(2)); // evaluate c2(2) = 3*2^2-2+2.4
  Cubic c3 = c1.add(c2); // add the two polynomials
  Cubic c4 = c1.neg(); //c4 = -c1
  System.out.println(c4); // print out -x^3-2.5x^2+1.5x-3.
}
```

2. (10 points) Complete the missing code and show the output of main.

```
public _____ A {
  public void g();
}
public _____ B _____ A{
  private int x;
  public B(int x) { _____}
  public void f() { System.out.println("B");
  public String toString() { // should print "B x=5" whatever x is


  }
}

public _____ C _____ B {
  private int x;
// you must initialize the parent x value!!!
  public C(int x, int y) { _____}
  public void f() { super.f(); System.out.println("C"); }
  public String toString() { // print "B x=1 C y=2"


  }
  public static void main(String[] a) {
    C c1 = new C(1,2);
    System.out.println(c1);
    c1.f();
  }                                    Show the output: _____
}
```

3. (30 points)Write the exact output of the following code

```
class A {
  private static int count = 0;
  public A() { System.out.print('a');}
  public void A() { System.out.println('b'); }
  public String toString() { return "c"; }
  public void f() { System.out.println('d'); }
  public static int getCount() { return count; }
  public void finalize() { System.out.println('e'); }
}

class B extends A {
  public B() { System.out.print('f'); }
  public B(int r) { this(); System.out.println('g');
System.out.println(getCount());  }
  public void B() { System.out.print('h'); super.A(); }
}

public class Test2_2017F {
  public static void f() {
    B b1 = new B(3);
    A a1 = new A();
    System.out.println("-" + a1 + "-");
  }
  public static void main(String[] args) {
    System.out.println(A.getCount());
    f();
    System.out.println(A.getCount());
    System.gc();
  }
}
```

4. (30 points) Write a class Circle which contains x,y,radius and implement so the following main works. You may assume that processing's PApplet has method ellipse(...)

```
public static void main(String[] args) {
  PApplet a = new Papplet() ;// just imagine you have a working
processing window here.
  Circle c1 = new Circle(300,200, 100);  // center at (300,200),
radius = 100
  System.out.println(c1);  // print out the circle
  c1.draw(a); // draw the circle on your PApplet window.
}
```