2017F Java Test #1 A Name:_____

1. (30 points)What is output by the following code fragments? Please include exact spaces and newlines. If any loop is infinite, please write the first 3 values printed followed by …

a.
```
for (int i = 5; i <= 12; i += 2) {
  System.out.print("A" +  i);
  System.out.print(i % 3 + i % 4);
}
System.out.println();
```

b.
```
for (int i = 1; i < 25; i += i) {
  System.out.print(i + "x");
  System.out.print(i / 3 + "y");
}
System.out.println();
```

c.
```
for (double x = 0; x < 10; x += 3 / 2 * 3)
  System.out.print(x);
System.out.println();
```

d.
```
for(int i = 4; i < 7; i++)
  System.out.println(i * 3 / 2.0 + " " + i * 2 / 3);
```

e.
```
for (int i = 100; i > 0; i /= 3 + 2)
  System.out.print(i*2);
System.out.println();
```

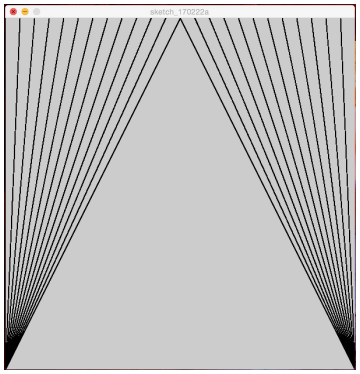
f.
```
for (int i = 100; i > 0; i = i / 3 - 2)
  System.out.print(i*2);
System.out.println();
```

2. (20 points) Complete the following program, writing a static function fact that computes n factorial using a loop, and a static function fact2 that computes n factorial using recursion.

```
public class Factorial {

  public static void main(String[] args) {
    System.out.println(fact(10));
    System.out.println(fact2(5));
  }
```

3. (20 points) Write processing code to draw the following figure using a loop:



4. (10 points) Implement the function to sum the squares of the elements in the array

```
public class A {
  public static double sumSquare(int[] a) {









  }
  public static void main(String[] args) {
    int[] a = {1, 5, 1, 6};     System.out.print(sumSquare(a));
  }
```

5. (10 points) Write a function cosine(x, n) to compute $\frac{x^0}{1!} + \frac{x^2}{2!} + \frac{x^4}{4!} + \ldots + \frac{x^n}{n!}$, for any even n (if n is odd, end with an even term.

6. (10 points)Given Newton's Gravitation Equation:

   $F = -G\frac{m_1 m_2}{r_{12}^2}$ where G is the universal gravitational constant G = 6.67408 × 10^{-11}. Write a function that computes the force between two bodies, for example:

   double massEarth = 5.6e24, massMoon = 7.34e22, dist = 384472282;

   System.out.println(force(massEarth, massMoon, dist));