Name:_____ ID:_____

This is a closed note, closed book exam. There are 12 questions worth a total of 100 points. Plan your time accordingly. If you are asked to write code, you must declare all variables that you use.

1. Assume the given declarations and fill in the value of the expression or *x* if it is illegal (20 points)

int a = 2, b = 4, c = 0;

expression	value	
a + b - c	**6**	*Grading:* 2 points each
a >= b	**false**	
b && c	**x**	
b % c	**x**	
a = ++c	**1** (give them 1 point for "a=1" or the equivalent)
a + b * c	**2**	
2*(c-3)	**-6**	
a/b	**0**	
b/a	**2**	
a - (b - 1)	**-1**	

2. Check the correct box (20 points). Grading: 1 point each

	Keyword	Identifier	Constant	Operator	Other
x		**x**			
"321"			**x**		**String**
3two1					**x**
4			**x**		
'a'			**x**		**char**
"20#$&"			**x**		**String**
double	**x**				
readInt		**x**			
sIlLyStRiNg		**x**			
*gaze					**x**
abc		**x**			
for	**x**				
String		**x**			
class	**x**				
*				**x**	
main		**x**			
%				**x**	
1stone					**x**
last1		**x**			
long	**x**				

3. What is the exact output of the following program? (5 points)

```java
class Foo {
  public static void main(String[] args) {
    String foo = "five";
    int bar = 4;

    System.out.println(foo + bar);
  }
}
```

Prints out: five4
Grading: 5 points for the correct answer, with partial credit at your discretion, but I can't think of any answer that would deserve it

4. Write a few lines of java code to declare three variables of type double called *a*, *b* and *c*, give *a* and *b* the values 2.5 and 3.7 respectively, then add them and store the result in *c*. (5 points)

double a, b, c;
a = 2.5;
b = 3.7;
c = a + b;

or

double a = 2.5, b = 3.7, c = a + b;

Grading:
  Declaration: 2 points
  Assignment: 2 points
  Addition: 1 point

I would deduct one point for the second answer on the grounds that it is awful code, but constant assignments in the declaration are generally ok.

5. What is printed by the following program fragment given an input of 37? (5 points)

```java
int x = Console.in.readInt();
if(x <= 37)
    System.out.println("foo");
else
    System.out.println("bar");
```

Grading: 5 points for the correct answer. I can't think of anything that would deserve partial credit, but you may give some if necessary

Answer: foo

6. What is printed by the following program fragment given an input of 13? (5 points)

```
int x = Console.in.readInt( );
while(x > 0) {
    System.out.print(x + " ");
    x = x / 2;
}
System.out.println( );
```

Answer: 13 6 3 1
Grading: 5 points for the correct answer
-1 for saying that the loop prints 1s forever after 13 6 3 1
-1 for forgetting how to do integer division (recall that 13/2 = 6, etc.)
-1 for each other problem of equivalent seriousness
-2 or more for serious problems (like not understanding that it will loop)

7. What is printed by the following program fragment for an input of 3? (5 points)

```
int x = Console.in.readInt();
if (x <= 5)
    System.out.println("one");
else if (x <= 3)
    System.out.println("two");
else
    System.out.println("three");
```

Answer: one
Grading: 5 points for the correct answer
1 point for saying that it prints out "two"
1 point for saying that it prints out "one" and "two"
0 points for saying it prints out "three"
0 points for saying it prints out nothing

8. What is printed by the following program fragment? Warning: this one is tricky. (5 points)

```
int x = 1, y = 2, z = 3;
if(x == y)
if(z > y)
    System.out.println("one");
else
    System.out.println("two");
```
Answer: it prints out nothing
Grading: 5 points for the correct answer

9. Write a while loop to repeatedly ask the user for two numbers and add them and print out the results until the user types a zero for one of the two numbers. (10 points)

int x=1, y=1;

```
while (x != 0 && y != 0) ) {
    System.out.println("Input two numbers");
    x = Console.in.readInt();
    y = Console.in.readInt();
    System.out.println(x + y);
}
```

Grading: 10 points total
1 point for variable declarations
2 points for constructing a correct while loop
2 points for a correct condition in the while loop
3 points for requesting and inputting the numbers correctly (ints or doubles)
1 point for calculating and outputting the result correctly

10. Write a for loop that prints out the odd numbers between 13 through 27 in reverse order, each on a different line. (10 points)

```
for(int i = 27; i >= 13; i -= 2) {
    System.out.println(i);
}
```

Grading: 10 points total
3 points for constructing the for loop correctly
1 point each for correct loop parts (init; condition; update) (3 points total)
3 points for printing out the right output
1 point for declaring the variable somewhere

11. What does this program do? Be specific. (10 points)

```
class Foo {
   public static void main(String[ ] args) {
      int i, j, t, n;

       System.out.print("Please enter a number: ");
       n = Console.in.readInt();

      for(i = 1, j = 1; i <= n; j = t + j)  {
         System.out.println(i);
          t = i;
          i = j;
      }
   }
}
```

Grading: 10 points total
10 points for saying it prints out the Fibonacci numbers up to n
8 points for just showing the sequence that it would print out without naming it
5 points for showing some sequence that is sort of like the Fibonacci sequence
2 points for any plausible but incorrect guess
0 points for nothing or essentially nothing