1.Use a decision structure to write an appropriate statement for each of the following:

A) Display Great Job! When grade is 90 or higher

```
if (grade >= 90) {
   System.out.println("Great Job!");
}
```

B) Display Error when number is less than 20 or greater than 50

```
if (number < 20 || number > 50) {
   System.out.println("Error");
}
```

C) Add 2 to the value of y when y is less than 100

```
if (y < 100) {
   y = y + 2;
}
```

2.Assume num1 and num2 contain integer values. Write an if-else if statement that displays one of the following messages as appropriate:

First number is larger.
Second number is larger.
Numbers are equal

```
if (num1 > num2) {
   System.out.println("num1 is greater than num2");
} else if (num2 > num1) {
   System.out.println("num2 is greater than num1");
} else {
   System.out.println("num1 and num2 are equal");
}
```

3. a) Which is the appropriate word, odd or even for the blanks below?

```
If (num % 2 == 0) {
    System.out println(“__number”);
} else {
     System.out println(“__number”);
}
```

1. Even
2. Odd

b) Rewrite the if-else as a switch statement.

```
switch (num % 2 ) {
  case 0:
    System.out println( " Even number");
    break;
  Case 1:
     System.out println(" Odd number");
}
```

4.Write statements that use Math.random() to generate random numbers for each of the following situations:

a) Generate a random integer between 1 and 50
```
int num = (int)(Math.random() * 50) + 1;
```

b) Generate a random integer between 20 and 100
```
int num = (int)(Math.random() * (100 - 20 + 1)) + 20;
```

c) Generate a random integer between 10 and 20
```
int num = (int)(Math.random() * 11) + 10;
```

5. Identify the logic errors in the statements below, which should display a single appropriate message for any value of age:
```
If (age < 18) {
   System.out.println("child");
} else if (age > 18 && age < 65) {
    System.out.println("adult");
} else if (age > 65) {
    System.out.prinln("senior")
```

6.Given the following assignments, determine if each of the following expressions evaluates to true or false:
Size = 100 weight =50 value 75

a) Size > 50 && weight == 50
   100 > 50 → true
   50 == 50 → true

b) Value < 100 && !(weight == 50)
   75 < 100 → true
   weight == 50 → true, so !(weight == 50) → false

c) Size >= 100 :: value >= 100
   size >= 100 → 100 >= 100 → true

value >= 100 → 75 >= 100 → false

d) Weight < 50 :: size >50
   50 < 50 → false
   100 > 50 → true

e) !(value < 75)
   value < 75 → 75 < 75 → false

f) !(size > 100 && weight <50 && value > 75)
   size > 100 → 100 > 100 → false
   weight < 50 → 50 < 50 → false
   value > 75 → 75 > 75 → false

g) (value < 125 :: weight <125 :: weight < 76) && size ==100
   value < 125 → 75 < 125 → true
   weight < 125 → 50 < 125 → true
   weight < 76 → 50 < 76 → true
   Left side (||) → true (since at least one is true)
   size == 100 → true

8. Determine if each of the following are true or false. If false, explain why

a) The condition of an if statement must be a boolean expression.
   True
   The if condition must evaluate to either true or false/boolean expression

b) A nested if statement If statement and an if-else if statement are the same.
   False
   Nested if: an if inside another if
   If–else if: multiple conditions checked in sequence

c) The expression in a switch statement must be a double
   False
   Switch cannot use double. only int, string and others

d) Numbers generated by a computer program are actually pseudorandom
   True
   Computer-generated random numbers use an algorithm, not randomness like pseudorandom

e) The (double) cast is needed to generate a random integer
   False
   You often need an int to generate a random integer not double

f) A compound Boolean expression can contain more than two Boolean expressions.
True
You can chain multiple Boolean expressions using && and ||

g) In a logical And expression, both operands must be true for the expression to evaluate to True
True
That's how && works

h) In logical expression, && is evaluated before !.
False
! always happens first

i) Thepow()method in the Math class is used for exponentiation.
True
Math.pow(base, exponent) performs exponentiation

j) The statement x= abs (3-); will return the value 3
False
The statement is syntactically incorrect, it's missing a number after the minus sign