1a)

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

1b)

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

1c)

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

2.

```
if (num1 > num2) {
    System.out.println("First number is larger.");
} else if (num1 < num2) {
    System.out.println("Second number is larger.");
} else {
    System.out.println("Numbers are equal.");
}
```

3a)

```
if (num % 2 == 0) {
    System.out.println("even number");
} else {
    System.out.println("odd number");
}
```

3b)

```
switch(num % 2) {
    case 0:
        System.out.println("even number");
        break;
    default:
        System.out.println("odd number");
}
```

4a)

```
(int)(Math.random() * 50) + 1;
```

4b)

```
(int)(Math.random() * 81) + 20;
```

4c)

```
(Math.random() * 10) + 10;
```

5.

The logic error is that people aged exactly 18 and exactly 65 don’t fit into any of the categories. Fix by using >= for the second condition and < for the last condition:

```
if (age < 18) {
   System.out.println("child");
} else if (age >= 18 && age < 65) {
   System.out.println("adult");
} else {
   System.out.println("senior");
}
```

6a) True
6b) True
6c) False
6d) False
6e) True
6f) True
6g) False

8a)
The condition of an if statement must evaluate to a boolean value, so yes.

8b)
False. A nested if statement and an if-else if statement are not the same; they are different in how conditions are evaluated.

8c)

False. The expression in a switch statement cannot evaluate a double; it can evaluate an integer, string, or enum.

8d)
True. Numbers generated by a computer program are semi-random because they are determined by an algorithm.

8e)
False. The (double) cast is not needed to generate a random integer. Casting is only needed if you want a floating-point result.

8f)
True. A compound Boolean expression can contain more than two Boolean expressions, such as a && b && c.

8g)
True. In a logical AND (&&) expression, both operands must be true for the expression to evaluate to true.

8h)
True. In logical expressions, && is evaluated before ||, and both are evaluated before !.

8i)
True. The pow() method in the Math class is used for exponentiation, such as Math.pow(base, exponent).

8j)
True. The statement x = abs(-3) will return the value 3, as the absolute value of -3 is 3.