

1-6 #8

1.

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; // or y += 2;  
}
```

2. Comparing Two Numbers

We want to compare num1 and num2 and display the correct message.

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

3. Odd or Even

a) Correct words to fill in:

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

b) Rewrite as a switch (using remainder % 2):

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

4. Random Numbers

We use `Random rand = new Random();`

a) Generate random integer between 1 and 50

```
int num = rand.nextInt(50) + 1;  
// 0-49 + 1 → 1-50
```

b) Generate random integer between 20 and 100

```
int num = rand.nextInt(81) + 20;  
// 0-80 + 20 → 20-100
```

c) Generate random double between 10 and 20, inclusive

```
double num = 10 + (rand.nextDouble() * 10);  
// 0-1 * 10 = 0-10, then +10 → 10-20
```

5. Logic Errors in Age Example

Original code:

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

Problems:

1. Age 18 is not covered (neither < 18, > 18 && < 65, nor > 65).
2. Age 65 is also not covered.
3. The > 18 and > 65 should be \geq to include boundary values.

Corrected version:

```
if (age < 18) {  
    System.out.println("child");  
} else if (age  $\geq$  18 && age  $\leq$  65) {  
    System.out.println("adult");  
} else {  
    System.out.println("senior");  
}
```