Critical Thinking Chapter 4

1.
a)
```
if (grade >= 90)
{
   System.out.println("Great job!");
}
```

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

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

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

```
}
```

b)

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

4.

a) int num = rand.nextInt(50 - 1 + 1) + 1;
b) int num = rand.nextInt(100 - 20 + 1) + 20;
c) double num = rand.nextDouble() * 10 + 10;

5.

Age 65 is included in both adult and senior
Conditions are not mutually exclusive

Corrected version:

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

6.

a) size > 50 && weight == 50 => true
b) value < 100 && (weight == 50) => true
c) size >= 100 || value >= 100 => true
d) weight < 50 || size > 50 => true
e) value < 75 => false
f) !(size > 100 && weight > 50 && value > 75) => true
g) (value < 125 || weight < 76) && size == 100 => true

8.

a) True
b) True
c) False – they are different structures
d) False – must evaluate to an integer or string
e) True
f) False – same seed gives the same sequence
g) True
h) True
i) True
j) True
k) True
l) True