Exercises 1

Exercise 1:

Given the following declarations: *long i; double d;*

What are the values of *i* and *d* after executing each of the following Java statements?

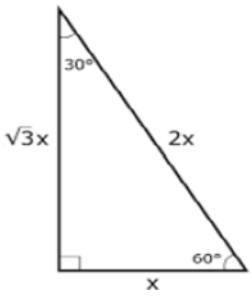
a) d = Math.abs(-3.5);
b) d = Math.ceil(3.5);
c) d = Math.ceil(-3.5);
d) d = Math.floor(3.5);
e) d = Math.floor(-3.5);
f) i = Math.round(3.5);
g) i = Math.round(3.45);
h) d = Math.max(-2.5, -3.5);
i) d = Math.pow(3, 2);
j) d = Math.sqrt(4);

Exercise 2:

Write a Java program that reads from the user a real number that represents the length of the side opposite the 30 degree angle in a 30-60-90 triangle.

The program then calculates and prints the area of this triangle (rounded to 2 decimal places) according to the following formula:

area = $\frac{1}{2}(\sqrt{3}\, x^2)$



Exercise 3:

Write a Java program that prompts the user to enter 2 positive integers (say x and y) and prints on the screen the result of the following mathematical function: (Try to write the result to the standard output without using any additional variables except x and y)

$$f(x, y) = \frac{\sqrt{|x^5 - y^5|} + xy}{x + y} + 2$$

Hints:

Use the methods of the class `Math.`

|x| = the absolute value of x

$\lceil x \rceil$ = the ceiling (ceil) value of x

Exercise 4:

Write a Java program that prompts the user to enter an integer and displays on the screen a message if this integer is positive or not.

Exercise 5:
Write a Java program that prompts the user to enter an integer and displays on the screen a message if this integer is odd or even. (Try negative integers)
Hint:
Use the % operator with the integer 2.

Exercise 6:
Write a Java program that prompts the user to enter 2 positive integers and displays on the screen a message if the first integer is a multiple of the second one or not.
Hint:
Use the % operator.

Exercise 7:
Write a Java program that prompts the user to enter a word and displays on the screen a message if this word starts with the letter 'A' or not.
Hint:
Use the `String` *method* `charAt()`

Exercise 8:
Write a Java program that prompts the user to enter 2 words and displays on the screen a message if the 2 words are identical or not.
Hint:
Use the `String` *method* `equals()`

Exercise 9:
Write a Java program that prompts the user to enter an integer and displays on the screen a message if this integer is positive, negative or zero.

Exercise 10:
Write a Java program that prompts the user to enter an integer and displays on the screen a message if this integer is divisible by both 2 and 3 or not.
Hint:
Use the % operator.

Exercise 11:
Write a Java program that prompts the user to enter 3 integers and print on the screen the largest of them.

Exercise 12:
The area of a triangle is computed using the following formula: area = $\frac{1}{2}\ bh$
Where *h* and *b* are the lengths of the base and the height of the triangle, respectively. Write a Java program that prompts the user to enter the lengths of the bases and the heights for two triangles (as integers). Then it should print a message indicates which triangle has a larger area or indicates if they have the same area.

Exercise 13:

Academic status of AOU students could be:

- "regular" if their GPA ≥ 2
- "warned" if their GPA < 2 and number of warnings they received < 5
- "dismissed" if their GPA < 2 and number of warnings they received = 5

Write a Java application that reads from user the GPA of a student as a real number and number of warnings he/she received, then prints the academic status of the student.

Exercise 14:

What is the exact output of the following piece of code?

```
int w = 7, z = 10;
if (w <= 7 && z != 10) System.out.println("ONE");
if (w <= 7 || z != 10) System.out.println("TWO");
if (w <= 7 ^ z == 10) System.out.println("THREE");
if (!(w <= 7 && z != 10)) System.out.println("FOUR");
if (w == 8); System.out.println("FIVE");
if (z == 10)
   System.out.println("YES");
else;
   System.out.println("OK");
if (w != 7)
   System.out.println("WWW");
   if (z % 5 == 0)
      System.out.println("ZZZ");
else
   System.out.println("AAA");
```

Exercise 15:

What is the exact output of the following piece of code?

```
int x = 9, y = 4, z;
switch (x + 1 % y) {
   case 1: System.out.println("1: " + x + y);
   case 2: System.out.println("2: " + x + y);
   case 10: System.out.println("10: " + x + y);
   default: System.out.printf("def: %d\n", x + y);
}

z = 7;
char c = (z == 6) ? 'Y' : 'N';
System.out.printf("c = %c\n", c);

String text = "TEXT";
if ( ! text.equals("text") && (x == 9.0) )
   System.out.println(text);

if (y > x);
   System.out.printf("%.0f\nOK\n", 99.7);
```

Exercise 16:

What is the exact output of the following piece of code?

```
int m = 4;
System.out.println("m = " + m++);
if (m != 5)
   m*=2;
else
   m/=2;
System.out.println("m = " + m);

int n = (m-- == 2 ? 50 : 100);
System.out.printf("m = %d and n = %d\n", m, ++n);
```

Exercise 17:

The following code includes 10 errors (an error per line).

a) Find the errors and classify them as compilation errors, fatal logical errors or nonfatal logical errors.

b) Correct the errors and give the exact output after correcting the code.

```
int x, y, my Num = 0;
double d = 10 + x; x = 3;
y = d + 2;
if (! x>5)
   System.out.println('Result1 = ' + x);
Else
   System.out.printIn("Result1 = " + y);
System.out.println("Result2 = %d" + myNum);
System.out.println("Result3 = " + x / myNum); myNum++;
System.out.printf("Result4 = %.0f\n" + d);
```