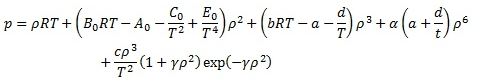
**ICS 102 Problem Set 01 – Arithmetic and String expressions**

**Question 01:**

By using the minimum number of parentheses, convert each of the following mathematical formulas to a Java statement:

4.



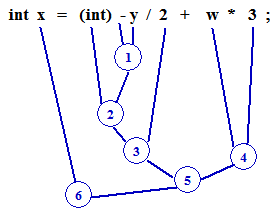
1. 

**Question 02**

The evaluation tree of the Java statement is a tree that shows the order in which the operators in the statement are evaluated. For example, the evaluation tree of the statement:

**int x = (int) – y / 2 + z \* 3 ;**

is:



Draw the evaluation tree of each of the following Java statements:

1. x = (50 - 5 \* 4 + (8 – 3)) / 10 – 7 \* 2;
2. z = k = 12 + -5 \* 2 + 6 / 3;
3. w = Math.pow(x + 2 \* y, 4) - Math.sin(z + 0.5);
4. a = a + b \* c - d \* f / e – g;
5. x = z = k = 12 \* 3 – 4 % 2;
6. double k = (double) -x / 2 + ++z - ++w;

**Question 03**

**String Expressions**: Provide the string value resulting from evaluation of each expression, or if the expression would result in a logic or run-time error, explain the error.

1. "this " + "string " + "has " + "spaces "

2. "this" + "string" + "has" + "no" + "spaces"

3. "the sum of " + 6 + " + " + 10 + " is " + (6 + 10)

4. "the sum of " + "6 + 10" + " is " + (6 + 10)

5. 6 + 10 + " equals " + (6 + 10)

6. "" + 6 + "+" + 10 + " equals " + 6 + 10

7. 12 + " – " + 4 + " = " + 12 – 4

**Question 04**

Identify the type (int, double or String) of the value that would result from evaluating each of the Java expressions below, or if the expression would result in an error, explain the error. If there is no error, provide the value of the expression as well as the type.

1. 7 / 2

2. 7.0 / 2

3. 7 / 2 - 7.0 / 2

4. "x = " + 6

5. 6 + " = x"

6. 6 \* 3 / 80 / (35 - 7 \* 2)

7. 1 / 2

8. (int) 8.5 / 2

9. 12 / 0

10. 8.0 / 0

11. int y = Math.pow(3, 2);

12. int m = Math.max(5, Math.max(-3, 8));

13. double value = Math.sqrt(-4.0);

14. 3+8+-2++4

15. 4\*\*2+3

16. int k = Integer.MAX\_VALUE + 12;

17. -5 % 2

18. 7.5 % 2

19. float z = 12.0 \* 2;

**Question 05**

What is the possible values for the following Java expression?

5 + (int)( 7 \* Math.random() )

**Question 06**

What is the output of each of the following Java program fragments?

1. int x = 3, y = 5, k;

k = x-- + 2 \* y++;

System.out.println("x = " + x + ", y = " + y + ", k = " + k);

1. double y = 6.5;

int w = (int) y / 2 + 3 % 4 + 8 % 3;

System.out.println("w = " + w + ", y = " + y);

**Question 07**

Write Java statements for each of the following arithmetic formulae. In these expressions, use variable names **radius** for radius, **width** for width, and **height** for height.

1. the **area** of a circle with radius **r**

2. the **circumference** of a circle with radius **r**

3. the **perimeter** of a rectangle with height **h** and width **w**

4. the **volume** of a cylinder with radius **r** and height **h**

5. the length of the **diagonal** of a rectangle with height **h** and width **w**

6. the area of a right triangle with height **h** and width **w**

**Question 08**

Write the analysis, pseudocode algorithm, and a complete Java program that computes and displays the number of hours, minutes, and seconds in 8000 seconds. The output of your program must be in the format:

**4000 seconds equals 2 hours, 13 minutes, and 20 seconds.**

Note:

* Your program must be general; it must work for any given valid initial value of seconds.
* Use meaningful variable names, Java naming conventions, and proper indentation.