Operator Related Problems

(Total 15 questions)

<table>
<tr><th>SL</th><th>Problem statement</th><th>Difficulty levels</th></tr>
<tr><td>1.</td><td>Program that will take two numbers X and Y as inputs, then calculate and print the values of their addition, subtraction, multiplication, division (quotient and reminder).

<table>
<tr><th>Sample input (X,Y)</th><th>Sample output</th></tr>
<tr><td>5 10</td><td>Addition: 15
Subtraction: -5
Multiplication: 50
Quotient : 0
Reminder: 5</td></tr>
<tr><td>-5 10.5</td><td>Addition: 5.5
Subtraction: -15.5
Multiplication: -52.5
Quotient: 0
Reminder: -48</td></tr>
</table>
-14 % 3 = -2
-14 % -3 = -2
14 % -3 = 2</td><td>*</td></tr>
<tr><td>2.</td><td>Program that will calculate the area of a circle having radius r.
Area, A = 2 * Pi * r

<table>
<tr><th>Sample input (r)</th><th>Sample output</th></tr>
<tr><td>5</td><td>Area: 31.4</td></tr>
<tr><td>10.5</td><td>Area: 65.94</td></tr>
</table></td><td>*</td></tr>
<tr><td>3.</td><td>Program that will take two numbers (a, b) as inputs and compute the value of the equation – (Without using math.h)

$X = (3.31 * a^2 + 2.01 * b^3) / (7.16 * b^2 + 2.01 * a^3)$

<table>
<tr><th>Sample input (a, b)</th><th>Sample output</th></tr>
<tr><td>5 10.5</td><td>X = 2.315475</td></tr>
<tr><td>100 -250</td><td>X = -12.766287</td></tr>
</table></td><td>*</td></tr>
</table>

Documentation by Samiha Samrose, Lecturer, CSE Dept, UIU, Dhaka, Bangladesh.

4. Program that will increment and decrement a number **X** by 1 inside the *printf* function. (Use ++ and - - operators) **

Sample input(X)	**Sample output**
5	X++ : 5 ++X : 6 X- - : 5 --X : 4
-5	X++ : -5 ++X : -4 X- - : -5 --X : -6

5. Program that will increment and decrement a number **X** by **Y**. (Use += and -= operators) *

Sample input(X,Y)	**Sample output**
5 10	Incremented Value: 10 Decremented Value: -5
-5 5	Incremented Value: 0 Decremented Value: -10

6. Program that will multiply and divide a number **X** by **Y**. (Use *= and /= operators) *

Sample input(X,Y)	**Sample output**
56 10	Multiplication: 560 Division: 5
-56 -10	Multiplication: 560 Division: 5

7. Program that will declare and initialize an integer and a floating point number. Then it will perform floating to integer and integer to floating conversions using **

(a) Assignment operation
(b) Type casting

Sample input	**Sample output**
-150 123.125	Assignment: 123.125000 assigned to an int produces 123 Assignment: -150 assigned to a float produces -150.000000 Type Casting: (float) -150 produces -150.000000 Type Casting: (int) 123.125 produces -123

8. Program that will take two numbers as inputs and print the maximum value. (Using conditional operator - ?) **

Sample input (x, y)	Sample output
20 100	Max: 100
50 -20	Max: 50

9. Program that will evaluate the following equations - *

$$X = a - b / 3 + c * 2 - 1$$
$$Y = a - (b / (3 + c) * 2) - 1$$
$$Z = a - ((b / 3) + c * 2) - 1$$

Sample input (a, b, c)	Sample output
9 12 3	X = 10 Y = 4 Z = -1

10. Program that will take **a**, **b** & **c** as inputs and decide if the statements are True (1) of False (0) **

a) $(a + b) \leq 80$
b) $!(a + b)$
c) $c! = 0$

Sample input (a, b, c)	Sample output
10 -10 0	a) 1 b) 1 c) 0

11. Program that will take **a**, **b** & **c** as inputs and decide if the statements are True (1) of False (0) ***

1) $(a + b) \leq 80 \;\&\&\; c \geq 0$
2) $(a - b) == 0 \;||\; c! = 0$
3) $a! = b \;||\; !(b < c) \;\&\&\; c > 0$
4) $(a! = b \;||\; !(b < c)) \;\&\&\; c > 0$

Sample input (a, b, c)	Sample output
10 -10 0	1) 0 2) 1 3) 1 4) 0

12. Program that will take calculate the roots of a quadratic equation ($a.x^2 + b.x + c = 0$) from the formula, (here, dot (.) stands for multiplication) - ***

$$root = \frac{-b \pm sqrt(b^2 - 4.a.c)}{2.a}$$

Sample input (a, b, c)	Sample output
2 4 -16	2.00 -4.00
1 2 3	Imaginary

13. Program that will evaluate the equation ***

$$2cos^2 x - \sqrt{3}\, sin\, sin\, x + log\frac{x}{2}$$

; where 1<= x <=180 [No checking needed]

Sample input (x)	Sample output
30	1.810066
120	0.778151
180	3.954243

14. Program that will take a floating point number **X** as input and evaluate **A,B,C** where- **

A = Value when **X** is rounded up to the nearest integer

B = Value when **X** is rounded down to the nearest integer

C = Absolute value of **X**

Sample input(X)	Sample output
10.6	A = 11, B = 10, C = 10.6
-77.9	A = 78, B = 77, C = 77.9

15. Program to find size of int, float, double and char of the system. **

Sample input	Sample output
	Size of int in byte(s) = 4 Size of float in byte(s) = 4 Size of double in byte(s) = 8 Size of char in byte(s) = 1