AMA2222 Exercise 2

1. State whether the following are *true* or *false*. If the answer is *false*, explain why.

   a) The expression (`x > y && a < b`) is `true` if either the expression `x > y` is `true` or the expression `a < b` is `true`.

   b) An expression containing the `||` operator is `true` if either or both of its operands are `true`.

   c) The two expressions `((p && q) || r)` and `(p && (q || r))` are equivalent, they always give the same result despite of the values of the boolean variables `p, q, r.`

   d) The two expressions `(!(a == b))` and `(a < b || a > b)` are equivalent, they always give the same result despite of the values of the integer variables `a, b.`

2. Evaluate the output of the follwoing.

```
int a, b, c;
a = 5;
b += a;
c = ++a;
cout << "a is " << a << endl;
cout << "b is " << b << endl;
cout << "c is " << c << endl;
```

3. Evaluate the boolean value of the following, if it can be determined.

a) `(3 > 1) && !(2 < 2)`

b) `(4 == 5) || (3 > 6) || 0`

c) `(x > 3) || (x <= 3)`

d) `(a < b) && (b < c) && (c < a)`

4. Write a C++ statement to accomplish the following instructions:

a) If `x` is less than 3, increase `x` by 10.

b) If both `x` and `y` are positive, output their product, otherwise output `-1`.

c) If `x` is greater than `y`, output `x-y`, otherwise output `y-x`.

5. Write a C++ program that reads a number and returns its absolute value. Refer to the following samples:

Sample 1:

```
Enter a number: -5
|-5| = 5
```

Sample 2:

```
Enter a number: 3
|3| = 3
```

6. Write a C++ program that checks if a set of three integers form a Pythagorean triple, i.e. they satisfys $a^2 + b^2 = c^2$. Refer to the following samples:

Sample 1:

```
Enter three integers: 1 2 3
This is not a Pythagorean triple.
```

Sample 2:

```
Enter three integers: 3 4 5
This is a Pythagorean triple.
```