Create a project called `lab5` (if using Visual Studio), and a source file called `lab5.cpp`.

Your group will define a class called `ComplexNumber` that is an abstract data type for a complex number. Include all of the following member or friend functions in your `ComplexNumber` class:

- a default constructor and a value constructor that do the "reasonable" things;
- mutator and accessor member functions that work on the real and imaginary parts of the complex number;
- an overloaded version of the insertion operator `<<` (written as a non-member friend function) that writes the complex number given as the right-hand operand of the insertion operator to the output stream given as the left-hand operand of the insertion operator, and representing the complex number as "`a+bi`" (where `a` is the value of the real part, and `b` is the value of the imaginary part) – e.g., `1.2+3.4i`;
- overloaded versions of the binary operators `+`, `-`, `*`, and `/` (written as member functions), that implement the corresponding operations for complex numbers as described in <https://en.wikipedia.org/wiki/Complex_number#Elementary_operations>; and
- an overloaded version of the unary operator `!` that implements the "complex conjugate" operation as described in the Wikipedia entry linked above.

Write a driver program in the `main` function that will fully test your class. Your `main` function should also create and output (using two separate `for` loops) a vector of 10 complex numbers that are initialized as $n+(2n)i$, where n is an index ranging from 0 to 9. Your first `for` loop should use an integer loop variable to index the vector. Your second `for` loop should use an iterator to access the variable elements in sequence.

The output of your program should look something like this:

```
Value of c1 (default constructor):
c1.Re() == 0, c1.Im() == 0
Value of c2 (value constructor):
c2.Re() == 1, c2.Im() == 2

c2 + c3 (1+2i + 3+4i) == 4+6i
c2 - c3 (1+2i - 3+4i) == -2+-2i
c2 * c3 (1+2i * 3+4i) == -5+10i
c2 / c3 (1+2i / 3+4i) == 0.44+0.08i
(c2/c3) + (c2*c3) == -4.56+10.08i
Conjugate of c2 (1+2i) == 1+-2i

Vector output using indexed for-loop:
0+0i
1+2i
2+4i
3+6i
4+8i
5+10i
6+12i
7+14i
8+16i
9+18i
```

```
Vector output using an iterator in for-loop:
0+0i
1+2i
2+4i
3+6i
4+8i
5+10i
6+12i
7+14i
8+16i
9+18i
```

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