

```
1
2 #include "Polynomial.h"
3 #include <cmath>
4
5 using namespace std;
6
7 double Polynomial::operator()(double aX) const {
8     double result = 0;
9     for (int i = 0; i <= this->fDegree; i++) {
10         result += this->fCoeffs[i] * pow(aX, i);
11     }
12     return result;
13 }
14
15 Polynomial Polynomial::getDerivative() const {
16     Polynomial derivative = Polynomial();
17     for (int i = 1; i <= this->fDegree; i++) {
18         derivative.fCoeffs[i - 1] = this->fCoeffs[i] * i;
19     }
20     derivative.fDegree = this->fDegree - 1;
21     return derivative;
22 }
23
24 Polynomial Polynomial::getIndefiniteIntegral() const {
25     Polynomial integral = Polynomial();
26     for (int i = 0; i <= this->fDegree; i++) {
27         integral.fCoeffs[i + 1] = this->fCoeffs[i] / (i + 1);
28     }
29     integral.fDegree = this->fDegree + 1;
30     return integral;
31 }
32
33 double Polynomial::getDefiniteIntegral(double aXLow, double aXHigh) const {
34     Polynomial integral = this->getIndefiniteIntegral();
35     return integral(aXHigh) - integral(aXLow);
36 }
```