LAB 7

3 new polynomial functions.

For this lab, you can add to either my solution (posted at 8:20 tomorrow) or yours. You will add 3 functions to the polynomial class.

1. Write a version of operator == to test whether two polynomials p1 and p2 are the same. Use this function to write operator !=. Be sure the function tests for polynomials of degree 0. Here is the stub:

```
bool polynomial::operator==(const polynomial& p1,
                            const polynomial& p2) const
{
        return true;
}
```

When this works, write operator != with super speed.

```
bool polynomial::operator!=(const polynomial& p1,
                            const polynomial& p2) const
{
        return true;
}
```

Show your TA that these functions work.

2. You have a function **derivative()** that computes the derivative of a polynomial. You can use the power rule in reverse to compute the integral:

$$\int x^n = \frac{x^{(n+1)}}{(n+1)} + C$$

With coefficients, this becomes

$$\int coefficient * x^n = coefficient * \frac{x^{(n+1)}}{(n+1)} + C$$

to compute the integral of a polynomial function. For example, the integral of x^2 is:

$$\int coefficient * x^2 = coefficient * \frac{x^3}{3} + C$$

But that constant C is not well defined for indefinite integrals like the ones above. We can get round this C by computing definite integrals, which we evaluate at one value of x (called a) and another value of x (called b).

$$\int_a^b coefficient * x^2 = coefficient * \left(\frac{b^3}{3} - \frac{a^3}{3}\right)$$

Then we can use the **`eval()`** function to plug in values for a and b for these. Subtracting the evaluation of the integral at b from the evaluation of the integral at a gives us the answer.

Finish this function to compute the definite integral of a polynomial. Here is the stub:

```
polynomial polynomial::definite_integral(double a, double b) const
{
    polynomial p_int;
    return 0;
}
```

Step 1. Begin by computing the terms of the polynomial for the integral, excluding the constant term. This is the inverse of the process you used to compute the derivative.

When you have this polynomial for the integral, evaluate it at a, and store the result; evaluate it at b, and store the result; finally, return ((the evaluation of the integral polynomial at b) – (the evaluation of the integral polynomial at a)) to get the definite integral answer. Show your TA that you can evaluate some simple integrals, and you’re done.