Task number 0

At this task we implement 3 classes:
1. Monom
2. Monom Comparator
3. Polynom

The class Monom:

This class represents a simple "Monom" of shape a*x^b while a is a real number and b is an integer none negative.
The class implements function and support simple operations as: construction, value at x, derivative, add and multiply.

The variables of the this class:
private double _coefficient;
private int _power;

The functions:
1. public double f(double x) {...}
This function calculates the value of Y at the point X.
The function received parameter X from the user.
The function returns the value of Y at X point.

2. public Monom(double a, int b) {...}
This function initializes the values of Monom's coefficient and power.
The function received parameters: a, b from the user.

3. public Monom(Monom ot) {...}
The copy constructor.
This function copy the values of the default Monom to the new Monom.
The function received Monom from the user which called ot.

4. public Monom (String str) {...}
This function received a String and change it to Monom
The function received string from the user.
If the string is invalid, for examples: 2x^ , 3*x^-6 the user will get an exception.

5. public Monom derivative() {...}
This function calculates the derivative of the Monom and return it.
If after the derivative the power become negative the user will get an exception.

6. public void add(Monom m) {...}
This function adds any Monom that it gets from the user to another Monom.
If the powers are not the same the user will get an exception.

7. public void sub(Monom m) {...}
This function subtracts any Monom to another Monom.
If the powers are not the same the user will get an exception.
8. Public void multiply(Monom m){...}
This function multiplies any Monom with another Monom.

9. public String toString() {...}

This function returns string of Monom.

10. public double get_coefficient() {...}
This function gets the value of the coefficient.

11. public int get_power() {...}
This function gets the value of the power.

12. private void set_coefficient(double a){...}
This function sets the value of the coefficient.

13. private void set_power(int p) {...}
This function sets the value of the power.

14. public boolean equals(Monom m) {...}
This function checks if two Momom are equal

The class Polynom:

This class represents a Polynom with add, multiply functionality, it also should support the following: integral of Riman, finding a numerical value between two values (currently support root only f(x)=0),and Derivative.

The functions:
1. public double f(double x) {...}
This function calculates the value of Y at the point X which received by the user.
This function return the value of Y at the point X.

2. public Polynom () {..}
The Polynom constructor.

3. public Polynom_able copy() {...}
The copy constructor.
The function return new Polynom which received the values of the default Polynom.

4. public Polynom(String p) {...}
This function received a string and change it to Polynom.
The string of the Polynom is from the shape "a*x^b+-cx^d..."

5. public void add(Polynom_able p1) {...}
This function adds any Polynom_able to another Polynom.

6. public void add(Monom m1){...}
This function adds any Monom to Polynom.
After each addition we perform a sort on the polynom.

7. public void sub(Monom m1){...}
This function subtracts any Monom from Polynom.
After the operation we perform a sort on the polynom.

8. public void substract(Polynom_able p1){...}
This function subtracts some Polynom_able from Polynom.

9. public void multiply(Polynom_able p1){…}
This function multiplies any Polynom_able with another Polynom.

10. public boolean equals(Polynom_able p1){…}
This function checks if the Polynom_able which received from the user equal to another Polynom_able.

11. public boolean isZero(){…}
This function checks if the Polynom contains just zero.
The function return true or false.

12. public double root(double x0, double x1, double eps){…}
This function finds the point of intersection with the x axis.
x0 - the first point which received from the user.
x1 - the second point which received from the user.
eps - the point range which received from the user.
The point of intersection with the x axis.

13. public String toString (){…}
This function returns string of Polynom.

14. public Polynom_able derivative(){...}
This function calculates the derivative of the Polynom.

15. public double area(double x0, double x1, double eps) {…}
This function assuming (f(x0)*f(x1)<=0.

16. public Iterator<Monom> iteretor(){…}
This function permit use with Iterator.

The class Monom_Comperator:

1.public class Monom_Comperator implements Comparator<Monom> {…}
This function compare between two Monoms.
If the first Monom smaller then the second Monom, the function return -1, if it bigger it return 1, else they equal ant the function return 0.

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