

```

package player.playeragent;

//this class is borrowed in its entirety from the iamrobot3
// code review. We thank them for their superior representation of
// the polynomials.
public class SimplePolynomial
{
    private int c0, c1, c2, c3;

    public SimplePolynomial(int c3, int c2, int c1, int c0)
    {
        this.c0 = c0;
        this.c1 = c1;
        this.c2 = c2;
        this.c3 = c3;
    }

    /** Solves the polynomial for the given value */
    public double solve (double x)
    {
        return ((((((c3 * x) + c2) * x) + c1) *x ) + c0);
    }

    /** Gets the derivative of this polynomial */
    public SimplePolynomial getDerivative()
    {
        return new SimplePolynomial(0, 3 * c3, 2 * c2, c1);
    }

    /** Gets the zeros of a 2 degree polynomial */
    public double[] getZeros()
    {
        if (c3 != 0)
            throw new RuntimeException("Cannot find the zeros of 3 degree polynomial");
        if (c2 == 0) {
            if (c1 == 0) {
                return new double[0];
            }
            return new double[] {-c0 / (double) c1};
        }

        double discriminant = (c1 * c1) - (4.0 * c2 * c0);
        if(discriminant < 0){
            return new double[0];
        }
        else if(discriminant == 0)
        {
            return new double[] {-c1 / (2.0 * c2)};
        }
        else
        {
            double sqrt_d = Math.sqrt(discriminant);
            return new double[] { (-c1 + sqrt_d) / (2.0 * c2), (-c1 - sqrt_d) / (2.0 * c2)}
        }
    }
}

```