How to do the polynomial division?

The basic idea is to eliminate the terms that their degrees are higher or equals to the divisor's degree from dividend. The results will be generated during this process.

According to the long division (see the web site https://www.mathsisfun.com/algebra/polynomials-division-long.html for the examples), the polynomial division can be done like the following algorithm.

Algorithm of polynomial long division (Polynomial p1, Polynomial p2)

    Define *result* polynomial

    If the degree of p1 is lower than the degree of p2

        The results should be 0 (zero)

    else

        temp ← p1

        result Polynomial degree ← p1's degree – p2's degree

        Allocate dynamic memory for the result polynomial (result's degree + 1)

        index ← result's degree

        When temp's degree is higher or equals to p2's degree

        Loop

            result[index] ← temp's (highest) degree term / p2's (highest) degree term

            Define a polynomial *ttemp* which has the degree of *index* and only set the highest degree term coefficient ← *results[index] (others are zeros)*

            ttemp ← *p2 * ttemp*

            temp ← *temp – ttemp*

        End loop

    End if

    Return the result polynomial

End of polynomial long division

Note: A polynomial's degree means its highest degree of all the terms. "←" means assign the value from right variable to the left variable.

Hint: temp contains the remainder of the division after the loop.