Determine $10\,x^3\,+\,27x^2+\,14x\,+\,5$ divided by $x^2\,+2x$

Solution

Procedure dividing of the polynomial by a polynomial in the following way:

1. Divide the first term of the dividend by the first term of the divisor and obtain the first term of the quotient.
2. Multiply the divisor by the first term of the quotient and subtract the product from the dividend. We get the first remainder.
3. Divide the first term of the residue on the first term of the divisor, we obtain the second term of the quotient, and continue for as long as the division is complete, or until we get a remainder, as in our math problem.

$$
\begin{array}{c|c}
10\,x^3\,+\,27x^2\,+\,14x\,+\,5 & x^2\,+2x \\ \hline
\underline{10x^3 + 20x^2} & 10x + 7 \\
\quad\quad 7x^2 + 14x & \\
\quad\quad \underline{7x^2 + 14x} & \\
\quad\quad\quad\quad\quad 5 &
\end{array}
$$

Remainder 5

Between the dividend A and the divisor B, quotient Q and remainder R there is a relationship:

$A = BQ + R$

In our example, the solution is as follows:

$10\,x^3\,+\,27x^2\,+\,14x\,+\,5\,=\,(x^2\,+2x)\,(10x+7)+5$