What's left?

Teacher notes

Why use this resource?

While practising algebraic division, students are asked to think about what what form they expect the quotient and remainder functions to take. This will develop familiarity with the structure behind polynomial division and will help students check that their answers are reasonable when manipulating or sketching graphs of rational functions.

Possible approaches

The first question asks students to find different ways of expressing 27 divided by 4. This is a short introductory question but one that can be be returned to once the resource has been completed, to reflect on the similarities and differences between numerical and algebraic division.

The main body of the task could be used to introduce and explore different methods of polynomial division, or to practise a preferred method. Either way, students should be encouraged to discuss what they notice with regards to the quotient and remainders as they work through the questions.

The final problem requires students to show they understand the structure of polynomial division without having to do any calculations.

Key questions

- Why will the remainder always be less than the divisor in numerical division?
- If a polynomial of degree m is dived by a polynomial of degree n, what can you say about the quotient? What can you say about the remainder?
- Are there any similarities between the remainder and divisor in algebraic division and the remainder and divisor in numerical division?
- Without any calculations, what can you say about the degree of the quotient and remainder polynomials of the following division: $\dfrac{x^9-5x^7+3x^2-11x+2}{2x^5+4x^4-x+7}$?

Possible support

Later questions have a quadratic divisor which may be unfamiliar. Students could be encouraged to conjecture what form the answer will take before trying the calculations. The suggestion section contains support for division by a quadratic.

Possible extension

Students could be asked to compare methods of finding remainders, which could highlight that the Remainder Theorem is limited to linear divisors.

- If we only wanted the remainder from each division, could we have used the Remainder Theorem instead?