

### Why use this resource?

This resource is designed to help students to make links between multiplication and division of polynomials using multiplication grids.

The **warm-up** is carefully designed to draw on students' prior knowledge, possibly from as far back as their Primary education. They will be reminded of how the grid method for multiplication can be used in a variety of situations and that working forwards and backwards through a problem can be helpful.

### Preparation

It is helpful if students are familiar with using the grid method for multiplication of two numbers.

### Possible approach

You might like to begin by giving students an opportunity to work on the **warm-up** problems individually for a short time before introducing the main problem. The three warm-up problems are closed and build on each other so it is important that students do consider each one before moving to the next (even if they think they look easy!).

When students are invited to think about the **main problem** it could be helpful to allow them to see all three of the questions posed at once. This will encourage them to make links between the multiplication grid and a variety of situations as well as allowing them to work at their own pace.

### Key questions

- What type of answer are you expecting when you carry out this division / multiplication?
- Do you expect there to be a remainder?
- In what order could you fill in the missing values in the multiplication grid? Do you have any choice?
- Which values did you find easiest / more difficult to complete?

## Possible support

Using and encouraging students to refer back to the [warm-up](#) questions should help them to see connections between the polynomial division and the grid method.

If students are struggling to fill in values in the grid you could choose to share the image of the multiplication grid in [things you might have noticed](#) that shows the order in which you could fill in values.

## Possible extension

The third question asks students to think about what happens when  $4x^4 + 3x^3 + 2x + 1$  is divided by  $x^2 + x + 2$  (the remainder will be  $11x + 15$ ). The same approach, using the grid method, could be taken but students will find that there must be an  $x$  term in the remainder.

Students could then be challenged to construct their own polynomial division that results in a remainder that contains an  $x$  term.