

## Arithmetic Operators and Formula Construction

60 minutes

ICT Specialism 3: Spreadsheets

Outcome M3.U3.3

### WHAT THIS LESSON DOES

In this lesson, learn to combine multiple arithmetic operations in spreadsheet formulas using BODMAS precedence rules. Discover how parentheses control calculation order. Practice building multi-operator formulas that answer questions from your own project.

### CURRICULUM OUTCOMES

| Outcome        | What the specification asks for                                                                                   |
|----------------|-------------------------------------------------------------------------------------------------------------------|
| <b>M3.U3.3</b> | Create formulas using cell references and arithmetic operators (addition, subtraction, multiplication, division). |

### WHAT STUDENTS SHOULD BE ABLE TO DO

- Use +, -, \*, /, and ^ with BODMAS precedence
- Force order with parentheses
- Build a multi-operator formula that answers a real project question

### BEFORE THE BELL

- Prepare a whiteboard or flipchart with the example formula 10 plus 5 times 2 for the opening discussion.
- Confirm Project\_Portfolio/09\_specialism/sm3/ exists on student accounts, or plan to create it with the class in the one minute allowed at the start of the step-by-step task.
- Organise mixed-ability student pairs in advance.
- Decide which project workbook each student should open for independent practice, either the multi-sheet workbook or the polished Unit 2 workbook.
- Open a blank spreadsheet on the classroom screen for the warm-up formula. Confirm which project workbook each student will use later.
- Be ready to type the warm-up pair live on the classroom screen.
- Confirm Project\_Portfolio/09\_specialism/sm3/ exists (create with the class if needed). Pair students; demo Problem 1 on the classroom screen. Optional: project a finished label scaffold.
- Have a blank sample tab ready to demo the mini-model, or draw the grid on the board.
- Confirm each student can open a project workbook in sm3, or guide them to the P4 fallback on sm3\_operators\_practice.
- Collect or spot-check both artefacts against the exit checklist. Issue matching worksheet as homework unless using it as exit match.

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### HOW THE LESSON RUNS

|               |              |                         |
|---------------|--------------|-------------------------|
| <b>5 min</b>  | introduction | Introduction            |
| <b>5 min</b>  | content      | Key concepts            |
| <b>18 min</b> | activity     | Step-by-step task       |
| <b>3 min</b>  | content      | Common issues           |
| <b>4 min</b>  | content      | Project formula pattern |
| <b>18 min</b> | activity     | Independent practice    |
| <b>4 min</b>  | content      | Reflection              |
| <b>3 min</b>  | summary      | Lesson summary          |

### TEACHING MOVES

- NEW 15 Sep: formulas are now written by hand before being typed. Keep hands off keyboards for the first few minutes and collect the written versions before typing starts, or they get quietly corrected afterwards.
- Model the first formula on the classroom screen before students begin.
- Project or pre-create the label scaffold so pairs spend their time on formulas rather than typing long labels.
- After Common issues, demonstrate the project mini-model on the board from start to finish, covering the question, the inputs, the multi-operator formula, the one-line note and a change to one input, before students open their own workbooks.
- Circulate during independent practice and ask each student to explain their formula in one sentence.

### WHAT TO WATCH FOR

- The formula displays as text instead of calculating, which means the cell starts with a space or an apostrophe before the equals sign.
- The order of operations is wrong, so remind students to check BODMAS and add parentheses where the real-world meaning needs them.
- Parentheses do not match, so ask students to count opening and closing brackets carefully.
- Numbers are typed into the project formula rather than into input cells, so steer students back to cell references or the result will not update when an input changes.

### DIFFERENTIATION

- Support: provide pre-filled label scaffolds and pair lower-confidence students with peers.
- Support: use the P4 block on sm3\_operators\_practice when no project workbook is ready.
- Extension: copy the profit formula to a second product row and test absolute references on the shared costs.