



Basic Mathematical Operations

ELEC1006: ENGINEERING COMPUTING

Basic Mathematical Operations & Formulas

- ***Operators:***

- Addition (+), Subtraction (-), Multiplication (*), and Division (/), Exponentiation (^)

- ***Order of Precedence:***

- Basic rules: anything in parenthesis performed first; then Exponentiation, then multiplication and division; then addition and subtraction

For example, $2*(2+3)+4^2/(1+1)$

Formula

- Formula always begin with “=”
- They can use other cells as variables.
 - For example cell E1 could be defined as “= M1 * C1 ^2”
 - Ranges of cells take the form “Start:End” (e.g. A1:B3)
- Formula can also make use of built-in functions.
 - “=SUM(A1:A10)”
 - “=AVERAGE(B2:E2)”
 - “=MIN(C1:E10) + 25”

Formula (continued)

| | A | B | C | D | E | F | G | H | I |
|----|---------|----------|--------|----------|---|---|---|---|---|
| 1 | | Quantity | Price | Subtotal | | | | | |
| 2 | Milk | 2 | \$3.50 | \$7.00 | | | | | |
| 3 | Cookies | 1 | \$2.10 | \$2.10 | | | | | |
| 4 | Honey | 3 | \$4.20 | \$12.60 | | | | | |
| 5 | Total | | | = | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | | | | | | | | | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | | | | | |
| 25 | | | | | | | | | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |

Formula bar

fx button

Function Menu

Named Cell

The screenshot shows an Excel spreadsheet with a named cell 'Factor' in cell B1 containing the value 1.467. The formula bar shows the value 1.467. A 'New Name' dialog box is open, showing the name 'Factor', scope 'Workbook', and the formula bar containing the formula `=1.24!B1`. Red boxes highlight the name 'Factor' in the formula bar, the value 1.467 in cell B1, and the 'New Name' dialog box.

The screenshot shows an Excel spreadsheet with a formula in cell E5: `=B5/C5*Factor`. The formula bar shows the formula. The spreadsheet data is as follows:

| | A | B | C | D | E |
|---|---------|----------|---------|----------|----------|
| 1 | Factor: | 1.467 | fps/mpg | | |
| 2 | | | | | |
| 3 | | Distance | Time | Velocity | Velocity |
| 4 | | miles | hours | mph | fps |
| 5 | | 90 | 1.5 | 60 | 88.02 |
| 6 | | 120 | 6 | 20 | |
| 7 | | 75 | 3 | 25 | |
| 8 | | 80 | 2 | 40 | |
| 9 | | 135 | 9 | 15 | |

Red boxes highlight the formula `=B5/C5*Factor` in the formula bar and the result 88.02 in cell E5. A red arrow points from the 'Factor' text in the formula to the value 1.467 in cell B5 of the spreadsheet.

In the formula, “Factor” could be used to instead of \$B\$1

Named Cell Ranges

| | A | B | C | D | E |
|----|----------|----------|---------|----------|----------|
| 1 | Factor: | 1.467 | fps/mph | | |
| 2 | | | | | |
| 3 | | Distance | Time | Velocity | Velocity |
| 4 | | miles | hours | mph | fps |
| 5 | | 90 | 1.5 | 60 | 88.0 |
| 6 | | 120 | 6 | 20 | 29.3 |
| 7 | | 75 | 3 | 25 | 36.7 |
| 8 | | 80 | 2 | 40 | 58.7 |
| 9 | | 135 | 9 | 15 | 22.0 |
| 10 | | | | | |
| 11 | Average: | 100 | | | |

| | A | B | C | D | E | F |
|----|----------|----------|---------|----------|----------|---|
| 1 | Factor: | 1.467 | fps/mph | | | |
| 2 | | | | | | |
| 3 | | Distance | Time | Velocity | Velocity | |
| 4 | | miles | hours | mph | fps | |
| 5 | | 90 | 1.5 | 60 | 88.0 | |
| 6 | | 120 | 6 | 20 | 29.3 | |
| 7 | | 75 | 3 | 25 | 36.7 | |
| 8 | | 80 | 2 | 40 | 58.7 | |
| 9 | | 135 | 9 | 15 | 22.0 | |
| 10 | | | | | | |
| 11 | Average: | 100 | | | | |
| 12 | | | | | | |

In the formula, “miles” could be used to instead of B5:B9

Excel Help

Help Button

The screenshot shows the Microsoft Excel application window. The title bar indicates the file is 'New Microsoft Excel Worksheet.xlsx' and is 'Upload Pending'. The user's name 'Upul Gunawardana' is visible in the top right. The ribbon is set to the 'Help' tab, which contains icons for 'Help', 'Contact Support', 'Feedback', 'Show Training', 'What's New', 'Community', and 'Excel Blog'. The main workspace shows a blank spreadsheet with cell A1 selected. The 'Help' pane is open on the right side, featuring a search box at the top and a list of help topics: 'Get started', 'Collaborate', 'Formulas & functions', 'Import & analyze', 'Format data', and 'Troubleshoot'. A 'Collaborate in real time' section is also visible at the bottom of the pane. Blue callout boxes with arrows point to the 'Help' button in the ribbon, the search box, and the 'Help Topics' list.

AutoSave On

New Microsoft Excel Worksheet.xlsx • Upload Pending

Upul Gunawardana UG

File Home Insert Page Layout Formulas Data Review View Automate Developer Add-ins **Help** Acrobat

Help Contact Support Feedback Show Training What's New Community Excel Blog

A1

Search Box

Help Topics

Help

- Get started
- Collaborate
- Formulas & functions
- Import & analyze
- Format data
- Troubleshoot

Collaborate in real time

Sheet1 Sheet2 **Sheet**

Ready Accessibility: Investigate 100%

More info

- References
 - Excel online help
 - Number of good books on Excel: e.g. Larsen, R. W. (2021). *Engineering with Excel* (5th ed.). Boston: Pearson.
 - Numerous online resources
- Widely available, learn by using