G.C.E. O/L Grade 10 ICT · Lesson 7

7.6 Relative and Absolute Cell References (A1)

When you copy a formula with the **fill handle**, the spreadsheet changes the cell references. A **relative reference** (B2) moves with the formula. An **absolute reference** (F1) stays fixed. Choosing the right one lets you write a formula once and copy it down a whole column.

1. Relative references

In the shop bill, D2 contains **=B2*C2** (Qty × Price). Dragging the fill handle from D2 to D5 changes the row number in each copy:

Cell	Formula	Result (Rs.)
D2	=B2*C2	600
D3	=B3*C3	180
D4	=B4*C4	160
D5	=B5*C5	150
D6	=SUM(D2:D5)	1090

💡 Rule: copying **down** changes the **row number**; copying **across** changes the **column letter**. Copying =SUM(B2:E2) from F2 to F6 gives =SUM(B6:E6).

2. Absolute references

The discount rate 5% is stored once in **F1** (0.05). E2 needs D2 × F1. If you copy **=D2*F1** down, F1 also moves (F2, F3…) and those cells are empty:

Cell	Wrong (relative)	Result	Correct (absolute)	Result
E2	=D2*F1	30	=D2*F1	30
E3	=D3*F2	0	=D3*F1	9
E4	=D4*F3	0	=D4*F1	8
E5	=D5*F4	0	=D5*F1	7.5

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Copying down: the relative formula =B2*C2 changes row by row, while F1 in =D2*F1 stays fixed.

Total discount =SUM(E2:E5) = Rs. 54.5. The **$** sign locks the column ($F) and the row ($1).

3. The F4 key

While editing a reference, press **F4** in Excel and Google Sheets (**Shift+F4** in LibreOffice Calc; Cmd+T in Excel for Mac). In Excel each press cycles:

Press	Reference	Type
0	F1	Relative
1	F1	Absolute
2	F$1	Mixed – row fixed
3	$F1	Mixed – column fixed
4	F1	Back to relative

NEW 2026 Extra (beyond the syllabus): **mixed references**. In A$1 only the row is fixed; in $A2 only the column is fixed. Copying =A$1*$A2 from B2 to C3 gives =B$1*$A3, and to D4 gives =C$1*$A4 – used for multiplication tables.

4. Worked example: mark totals

F2: =SUM(B2:E2) → Nimal 275. Copy to F3 → =SUM(B3:E3) → Sara 353. Copy to F4 → Kasun 233.

Key Words

Cell reference – The address of a cell used in a formula, e.g. B2.

Relative reference – A reference that changes when the formula is copied, e.g. B2.

Absolute reference – A reference that stays fixed when copied, e.g. F1.

Mixed reference – Only the row or only the column is fixed, e.g. F$1 or $F1.

Dollar sign ($) – Locks the column letter or row number that follows it.

F4 key – Cycles a reference through relative, absolute and mixed (Shift+F4 in Calc).

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Fill handle – Small square at the bottom-right of the active cell used to copy.

Copy down – Copying to rows below; relative row numbers increase.

Copy across – Copying to columns on the right; relative column letters change.

Constant cell – A cell holding a fixed value such as a rate, used by many formulas.

Discount rate – A percentage taken off a price, e.g. 0.05 = 5%.

Ctrl+D – Fills the formula from the cell above into the selected cells.

Sample Q&A

1. What is a relative reference?

> **Answer:** A reference such as B2 that adjusts when the formula is copied.

2. What does F1 mean?

> **Answer:** An absolute reference: column F and row 1 are both locked.

3. =B2*C2 in D2 is copied to D4. What is the formula?

> **Answer:** =B4*C4.

4. =D2*F1 in E2 is copied to E5. What is the formula?

> **Answer:** =D5*F1.

5. Why did =D2*F1 copied down give 0?

> **Answer:** F1 became F2, F3… which are empty (treated as 0). Use F1.

6. What does the F4 key do?

> **Answer:** Cycles the reference: F1 → F1 → F$1 → $F1 → F1.

MCQ

1. Which is an absolute reference?

A. C$4
B. $C4
C. C4
D. C4

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2. =B2*C2 in D2 copied to D3 becomes…

A. =B2*C2
B. =B3*C3
C. =C2*D2
D. =B3*C2

3. =B2*C2 copied to D5 gives Rs. …

A. 1090
B. 600
C. 150
D. 0

4. =D2*F1 in E2 copied to E4 becomes…

A. =D4*F1
B. =D4*F3
C. =D2*F1
D. =D4*F3

5. With D2 = 600 and F1 = 0.05, E2 =D2*F1 gives…

A. 3000
B. 30
C. 600
D. 0.05

6. The relative formula =D2*F1 copied to E3 gives…

A. 9
B. 180
C. 0
D. #VALUE!

7. Total of D2:D5 in the bill is Rs. …

A. 1090
B. 395
C. 1000
D. 1180

8. Total discount =SUM(E2:E5) is Rs. …

A. 109
B. 54.5
C. 545
D. 5.45

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9. In Excel, pressing F4 once on F1 gives...

A. F1
B. $F1
C. F$1
D. F1

10. In F$1 which part is fixed?

A. Neither
B. Both
C. Row 1 only
D. Column F only

11. =SUM(B2:E2) in F2 copied to F6 becomes...

A. =SUM(F2:I2)
B. =SUM(B2:E2)
C. =SUM(B6:E2)
D. =SUM(B6:E6)

12. =B2 in C5 copied to D7 becomes...

A. =B2
B. =C3
C. =C4
D. =D4

13. Copying a formula across to the right changes...

A. Absolute references
B. Relative column letters
C. Nothing
D. Relative row numbers

14. Extra: =A$1*$A2 in B2 copied to C3 becomes...

A. =B$2*$B3
B. =B1*A3
C. =A$1*$A2
D. =B$1*$A3

15. Nimal's total =SUM(B2:E2) is...

A. 275
B. 353
C. 72.4
D. 233

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Structured Questions

1. Define relative and absolute references with one example each. *(4 marks)*

> Relative changes when copied, e.g. B2. Absolute stays fixed, e.g. F1.

2. D2 has =B2*C2. Write the formulas and results in D3, D4 and D5 after copying down. *(3 marks)*

> D3 =B3*C3 = 180; D4 =B4*C4 = 160; D5 =B5*C5 = 150.

3. F1 holds the discount rate 0.05. Write a formula for E2 that can be copied down to E5 and give all results. *(4 marks)*

> =D2*F1; 30, 9, 8, 7.5; total 54.5.
>
> **Relative: =B2*C2 copied down**
>
> - D2 =B2*C2
> - D3 =B3*C3
> - D4 =B4*C4
> - D5 =B5*C5
>
> Row numbers change: B3, B4, B5...
>
> **Absolute: =D2*F1 copied down**
>
> - E2 =D2*F1
> - E3 =D3*F1
> - E4 =D4*F1
> - E5 =D5*F1
>
> F1 stays locked (F4 adds $)
>
> Model answer.

4. Explain why =D2*F1 gives wrong answers when copied down. *(2 marks)*

> F1 changes to F2, F3, F4 which are empty, so results are 0.

5. Write, in order, the four reference forms produced by pressing F4 on A1 in Excel. *(2 marks)*

> A1, A$1, $A1, A1.

Summary

- Relative references (B2) change when a formula is copied.
- Copy down → rows change; copy across → columns change.
- Absolute references (F1) never change.
- Use $ for a constant cell such as a rate.
- A relative constant moves to empty cells and gives 0.
- F4 cycles F1 → F1 → F$1 → $F1.
- Mixed references (extra) lock only a row or a column.
- Write once, copy with the fill handle or Ctrl+D.

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MCQ answer key – 7.6

1. **D** – Both locked.
2. **B** – Rows +1.
3. **C** – 1 × 150.
4. **A** – F1 fixed.
5. **B** – 600 × 0.05.
6. **C** – F2 is empty.
7. **A** – 600+180+160+150.
8. **B** – 1090 × 0.05.
9. **A** – First press = absolute.
10. **C** – $ before 1.
11. **D** – Rows +4.
12. **C** – +1 column, +2 rows.
13. **B** – Across = columns.
14. **D** – Mixed.
15. **A** – 72+65+58+80.

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