

18.2 Manipulate Data

Syllabus 2026 - 2028

WHAT YOU NEED TO KNOW

- Use arithmetic operations or numeric functions to perform calculations, including calculated fields and calculated controls
- Use formulae and functions at run time: addition, subtraction, multiplication, division, sum, average, maximum, minimum, count
- Sort data using single or multiple criteria, ascending or descending
- Search and select data using a query with single or multiple criteria, operators AND, OR, NOT, LIKE, >, <, =, >=, <=, <>, and wildcards

Calculations

Figure 104: Calculated fields and functions

Item	Qty	Price	Total
Pen	10	E2.50	E25.00
Book	4	E12.00	E48.00
Bag	1	E150.00	E150.00

Total: [Qty] * [Price] (calculated field)

SUM

adds values

AVG

mean value

MAX

largest

MIN

smallest

COUNT

how many

+ - * / also give results at run time

A calculated field is stored in a query; a calculated control sits on a form or report

- A **calculated field** in a query works out a new value for every record, for example Total: [Qty] * [Price]
- A **calculated control** is a text box on a form or report that holds a formula
- The result is worked out at **run time**, when the query, form or report is opened, so it is always up to date
- **Arithmetic**: add (+), subtract (-), multiply (*) and divide (/)
- **Functions**: SUM (total), AVG (average), MAX (largest), MIN (smallest), COUNT (number of records)

Sorting

Figure 105: Sorting data

Unsorted

Surname	Class	Mark
Dlamini	4B	70
Nkosi	4A	85
Dlamini	4A	92
Mamba	4A	70

Sort 1: Surname ascending, 2: Class ascending

Surname	Class	Mark
Dlamini	4A	92
Dlamini	4B	70
Mamba	4A	70
Nkosi	4A	85

Sorting

Ascending: A to Z, 0 to 9,
oldest to newest
Descending: Z to A, 9 to 0,
newest to oldest
A second criterion sorts
records with equal first values

- Sort into **ascending** (A to Z, smallest to largest, oldest to newest) or **descending** order
- Use a **single** criterion, or **multiple** criteria: the second field sorts records that have the same first value

Searching with a query

Figure 106: Searching with a query

Query design grid

Field:	Surname	Class	Mark
Sort:	Ascending		
Show:	[x]	[x]	[x]
Criteria:		"4A"	>=70
or:			

Criteria on the same row are combined with AND:

Class = 4A AND Mark >= 70

Criteria on different rows are combined with OR

Result: records that match

Surname	Class	Mark
Dlamini	4A	92
Nkosi	4A	85

Only the selected subset of data is shown

A **query** selects a **subset** of data that meets one or more criteria, and shows only the chosen fields. The query can also sort the results and do calculations.

Figure 107: Search operators and wildcards

= equal to	<> not equal to	> greater than
< less than	>= greater or equal	<= less or equal
AND both true	OR either true	NOT not true

LIKE and wildcards

LIKE "S*"
starts with S (Sipho, Sandile)
LIKE "a"**
ends with a (Thandi no, Zola yes)
LIKE "?ob"
one character then ob (Bob, Rob)

any number of characters
?
exactly one character

Operator	Meaning	Example
=, <>	Equal to, not equal to	Class = "4A"
>, <, >=, <=	Greater than, less than, greater or equal, less or equal	Mark >= 50
AND	Both conditions must be true	Class = "4A" AND Mark > 70
OR	At least one condition must be true	Class = "4A" OR Class = "4B"
NOT	Excludes records that match	NOT "4C"
LIKE with wildcards	Matches a pattern: * is any number of characters, ? is one	LIKE "S*"

EXAM TIP

Read the criteria carefully: **AND** narrows the results, **OR** widens them. For a range such as 'between 50 and 70' use **>= 50 AND <= 70**.

Key terms

Term	Meaning
Calculated field	A field in a query that works out a value.
Calculated control	A box on a form or report that holds a formula.
Query	A search that selects data meeting criteria.
Criteria	The conditions a record must meet.
Ascending	From smallest to largest or A to Z.
Descending	From largest to smallest or Z to A.
Wildcard	A symbol standing for unknown characters.
Run time	When a query, form or report is opened.

Practice questions

Answer each question in full sentences. Command words used: State (give a short answer), Describe (say what it is like), Explain (give reasons), Analyse (break it down and examine it), Suggest (apply your knowledge to a situation), Compare and contrast (similarities and differences), Evaluate (weigh up and reach a judgement).

No.	Question	Marks
1	State two functions that can be used to perform calculations in a database.	[2]
2	Describe how a calculated field is created in a query.	[3]
3	Explain the difference between sorting in ascending order and sorting in descending order.	[2]
4	Describe what the query criteria Class = "4A" AND Mark >= 70 would select.	[3]
5	Explain why a query uses OR rather than AND to select learners in class 4A or 4B.	[3]
6	Compare and contrast the * and ? wildcards used with LIKE.	[4]
7	Suggest a query to find all learners whose surnames begin with M and who have a mark below 50.	[4]
8	Analyse the benefits of using a query rather than searching through a table by hand.	[4]

Total: 25 marks