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The guide covers over 23 sections. Each section is sequenced so that the concepts build up each other.

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Study Guide for Exam 70-761: Querying Microsoft SQL Server

essentialSQL

Section 1 (Quiz 1)

Lesson Number	Name	Goal	Items
SQL Overview Get started using SQL Server by downloading, installing SQL Server, and using the AdventureWorks database.			
1	What is SQL Server	Understand what are the major pieces in SQL Server	• SQL Server Architecture • SQL Server Editions and Version.
2	Get Started Using SQL Server	Install SQL Server	• Download and Install SQL Server and SSMS.
3	Using SSMS (SQL Server Management Studio)	Understand SSMS basic functions.	• Getting Started with SQL Server Management Studio • Creating and Organizing T-SQL scripts
Writing Select Queries Learn to write query a table and return one or more column values.			
4	Writing Select Queries	Write a basic query	• Writing Simple SELECT Statements • Using Column and Table Aliases • Eliminating Duplicates with DISTINCT
Sorting Data Sort data returned from a query.			
5	Order Data	Sort data by ascending and descending values	• ORDER BY • ASC and DESC
6	Limit Results with Top	Return the first rows from a result.	• TOP
7	Paging with OFFSET and FETCH	Understand how to return the middle portion of a result.	• OFFSET • FETCH
Filtering Data Not all data is relevant, learn how to exclude those entries you don't need.			

Section 1 (Quiz 1)			
Lesson Number	**Name**	**Goal**	**Items**
8	Introduction to Filtering	Understand the function of the WHERE Clause	• WHERE clause • Comparison operators • BETWEEN and IN
9	Boolean Logic	Learn to write filters with multiple filter conditions	• Learn to use AND, OR, and NOT. • Learn to use together and under order of evaluation.
10	Pattern Matching	Understand how to use the LIKE operator to partially match data	• LIKE operator • Apply wild cards
Review Lessons			

Section 2 (Quiz 2)			
Lesson Number	**Name**	**Goal**	**Items**
Data Types Understand how SQL stored and organizes dates, numbers, and text. Data types define the characteristics of the data that can be stored in a location such as a database column. A data type defines the possible set of values that are accepted.			
1	Null Values	Understand NULL and it special meaning in SQL	• NULL • IS NULL
2	Common Data Types	Learn how to use date, numeric, and textual data in SQL	• INT • VARCHAR, NVARCHAR • DATETIME • DECIMAL, FLOAT • BIT
3	Exoteric Data Types	Know and understand the less commonly used data types with are on the exam.	• GUID • Spatial Data • XML
Review Lessons			

Section 3 (Quiz 3)			
Lesson Number	**Name**	**Goal**	**Items**
Built-In Functions Built-In functions are used in SQL SELECT expressions to calculate values and manipulate data. These functions can be used anywhere expressions are allowed. Common uses of functions include to change a name to all upper case.			
4	Introduction	How are functions used. What is the difference between deterministic and non-deterministic functions?	• Categories of Functions • How to use Functions • Deterministic and non-deterministic functions
5	CASE Statement	Understand practical uses of the CASE statement in the SELECT statement.	• CASE
6	Data Type Conversion	Understand how to convert data from one data type to another.	• CAST • CONVERT
7	Logical Functions	use logical conditions to display one of several values.	• CHOOSE • IIF
8	Math Functions	To know that math rocks!	• Learn common math functions such as: SQRT, SQIARE, CEILOMNG, FLOOR, ROUND, ABS, SIGN, RAND
9	String Functions	Learn to alter a text value, such as removing the first name from a full name.	• Learn common string functions such as: CHARINDEX, LEN, LEFT, LOWER, LTRIM, REPLACE, RGHT, RTRIM, SUBSTRING, UPPER
10	Date Functions	Manipulate date values	• Learn how to use functions such as GETDATE, DATENAME, DATEPART, DAY, MONTH, YEAR, DATEDIFF, and DATEADD

Section 3 (Quiz 3)

Lesson Number	Name	Goal	Items
	Review Lessons		

Section 4 (Quiz 4)			
Lesson Number	**Name**	**Goal**	**Items**
Grouping and Aggregating Data Learn to group and summarize data. Use SQL to calculate averages and subtotals.			
1	Aggregate Functions	Understand to how to use functions to summarize data in your SELECT list	• Learn about AVERAGE, COUNT, SUM, MIN, and MAX
2	Grouping Data	Use GROUP BY to collect data into rows of unique values	• GROUP BY
3	Filtering Grouped Data	Learn how HAVING is used to filter aggregate function results. Know the difference between WHERE and HAVING.	• HAVING
Set Operators Understand how to take rows from two or more queries and combine them into a single result.			
4	Union	Learn how to use the UNION statement in a SELECT statement.	• UNION • UNION ALL
5	Intersect	Know when and how to apply INTERSECT in a query.	• INTERSECT
6	Except	Understand the difference between INTERSECT and EXCEPT and apply to a query.	• EXCEPT
Joins Joins combine data from two or more tables. In this unit you'll learn about the most common types of joins and reasons to use them.			

Section 4 (Quiz 4)

Lesson Number	Name	Goal	Items
7	Introduction	Understand what is a join and when to use them.	• What is a Join? • Ware are typical uses?
8	Cross Joins	Understand which rows from two tables are returned in a CROSS JOIN.	• CROSS JOIN
9	Inner Joins	Understand how matching affects the rows returned within a result.	• INNER JOIN
10	Self-Join	When does it makes sense to use a self-join?	• INNER JOIN on Same Table •
11	Join Conditions	Explain when to use non-equi joins.	• Joining two or more columns • Non-equi joins
12	Outer Joins	Understand the difference between an inner and outer join.	• RIGHT OUTER JOIN • LEFT OUTER JOIN
Review Lessons			

Joins got you frustrated? Checkout my course SQL201. It's a sure way learn Joins and Subqueries.

Section 5 (Quiz 5)			
Lesson Number	**Name**	**Goal**	**Items**
Subqueries Subqueries provide a powerful means to combine data from two tables in to a single result. In this unit you learn and understand how to use subqueries in various parts of the SQL SELECT statements.			
1	Introduction	Explain what is a subquery and how it differs from a join.	• Subqueries are enclosed in ()'s • A subquery that returns a single value can be used anywhere you would use an expression.
2	Subquery in SELECT	Write a subquery in a SELECT statement.	• Subqueries in select lists must return a single result.
3	Correlated Subqueries	Understand how the results of a subquery can be affected by values in the outer query.	• Correlated subqueries are ways to incorporate the outer query's values into the subquery's clauses. • Correlated subqueries versus Inner Joins
4	Subquery in WHERE clause	Explain how subqueries can be used to filter results.	• EXISTS versus NOT EXISTS • IN versus NOT IN • ANY • ALL
5	Subquery in FROM Clause	User derived tables in the FROM clause.	• Derived tables and aggregate functions • Joining derived tables.
6	Subquery in HAVING Clause	Explain how to use subqueries in HAVING clause criteria.	• Correlated subqueries in HAVING clause
Common Table Expressions Common table expressions are used to simplify a query. Since they can reference themselves, they are useful when working with hierarchies.			
7	Common Table Expressions	Use CTE's (Common Table Expressions) within a SELECT statement	• Definition of CTE • WITH • Multiple CTE definitions in a single query

Section 5 (Quiz 5)			
Lesson Number	**Name**	**Goal**	**Items**
8	Recursive CTE's	Get comfortable with CTE that can call themselves.	• CTE's that reference them selves • Use CTE's to display a hierarchy.
Review Lessons			

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Section 6 (Quiz 6)			
Lesson Number	**Name**	**Goal**	**Items**
Modifying Data Create, remove, and modify rows within a table.			
1	Inserting Data	Insert rows into a table using explicit values or the results of a query.	• INSERT • INTO
2	Modifying Data	Update column values	• UPDATE
3	Delete Data	Remove rows from a table	• DELETE
4	Merging Data Changes	Performs insert, update, or delete operations on a target table based on the results of a join with a source table.	• MERGE
Review Lessons			
Window Functions Understand how to create running and sliding totals.			
5	Introduction	Be able to describe what is windowing and why it is useful in SQLServer	• What are window functions?
6	Creating Windows with Over	Define a window over which aggregate and ranking function apply.	• OVER

Section 6 (Quiz 6)

Lesson Number	Name	Goal	Items
7	Writing queries with Ranking Functions	Understand how to display the quartile of each member in an ordered set of quantitative data, such as Sales Year To Date data.	• RANK • NTITLE • DENSE_RANK • ROW_NUMBER
8	Using Offset Functions	Access data from the previous or next row in a result without having to use joins.	• LAG • LEAD • FIRST_VALUE • LAST_VALUE
9	Window Aggregate Functions	Understand how to use various aggregate functions with the OVER clause.	• Learn about aggregate functions such as AVG, COUNT, STDEV, MIN, and MAX
10	Window Analytic Functions	Understand how to use various analytic functions with the OVER clause.	• CUME_DIST • Percentile ranking functions
Pivoting and Grouping Transform table row values into columns and vice versa.			
11	Transforming Datasets	Create result set whose columns are row values from a source table.	• PIVOT • UNPIVOT
12	Geometry Aggregates	Aggregate shape data into a single geometric structure.	• Geometry Data Type • UnionAggregate • EnvelopeAggregate
13	Advanced Grouping	Group data using advanced GROUP BY arguments	• ROLLUP • CUBE • GROUPING SETS
Review Lessons			

Section 7 (Quiz 7)			
Lesson Number	**Name**	**Goal**	**Items**
Stored Procedures Write procedural code to execute and process SQL statements			
1	Introduction	Understand the benefits of stored procedures and how to create and execute them.	• CREATE PROCEDURE • EXECUTE • Parameters • Return Value
2	Programming Stored Procedures • Part 1 • Part 2	Understand control of flow language	• BEGIN, END • BREAK • IF, ELSE • RETURN • WHILE
3	Dynamic SQL	Build dynamic SQL in a stored procedure.	• sp_executesql • EXECUTE • Build SQL based on variable values
4	Cursors	Execute a query and programmatically (e.g. in a loop you build) visit each row.	• DECLARE CURSOR • OPEN • FETCH NEXT • @@FETCH_STATUS • CLOSE • DEALLOCATE
5	User Defined Functions	Create and use a user defined functions in a SELECT statement	• CREATE FUNCTION
6	Inline Table-Valued Functions	Create a user defined function which return the TABLE datatype.	• TABLE datatype

Section 7 (Quiz 7)

Lesson Number	Name	Goal	Items
7	Apply	Match one table's set of rows against the results of an inline table-valued function.	• CROSS APPLY • OUTER APPLY
Error Handling Detect and manage errors encountered as stored procedures and user defined functions execute.			
8	Catching Errors	Detect error in stored procedures.	• TRY • CATCH • ERROR functions such as ERROR_MESSAGE()
9	Throwing Errors	Pass error conditions to calling procedures.	• RAISERROR
Review Lessons			

Section 8 (Quiz 8)			
Lesson Number	**Name**	**Goal**	**Items**
Transaction and Isolation Levels SQL operations can be run independently of other users, but to do so, requires some resources to be locked. This prevents two people from working on the same item. The degree you lock and isolate these operations, affects what others "see" of uncommitted transactions and how long they wait until they have full access to read or write to the same resources.			
1	Introduction	Understand the relationship between Transactions, Locks, and Isolations Levels	• What is a transaction? • What are locks? • Isolation level overview.
2	Database Transactions	Write a statement to save a transaction, and if there is an error, rollback the changes.	• BEGIN TRANSACTION • COMMIT • ROLLBACK
3	Database Locks	Explain how locks affect resource availability amongst concurrent transactions.	• Intent shared (IS) • Intent exclusive (IX) • Intent update (IU) • Shared intent update (SIU) • Update intent exclusive (UIX)
4	Isolation Levels	Understand how isolation affect the visibility uncommitted data changes to operation within and outside the scope of a transaction.	• READ UNCOMMITTED • READ COMMITTED • REPEATABLE READ • SNAPSHOT • SERIALIZABLE
Review Lessons			

Section 9 (Quiz 9)			
Lesson Number	**Name**	**Goal**	**Items**
Creating Tables and Views Build database tables and views.			
1	Create and Modify Tables	Create table with primary key defined and then modify a column to another datatype.	• CREATE TABLE • ALTER TABLE
2	Create and Modify Views	Create a view which uses a join to present data from multiple tables.	• CREATE VIEW • ALTER VIEW
3	Deleting Objects	Drop is dangerous.	• DROP
Temporal Tables System versioned temporal tables contain all changes made to a database table and allow for easy point-in-time analysis of data. The tables maintain a full history of changes.			
4	Overview	Understand what are temporal tables and why they are useful.	• What is a temporal table. • Know why you would want to use a temporal table.
5	Create Temporal Tables	Learn how to create temporal tables and how this affects the database.	• CREATE TABLE WITH…
6	Query Temporal Tables	Query a temporal table	• AS OF • FROMTO • BETWEENAND • CONTAINED IN • ALL

Section 9 (Quiz 9)

Lesson Number	Name	Goal	Items
7	Influencing Query Plans	How does data modification affect a temporal table?	• INSERT • UPDATE • DELETE • MERGE
Database Integrity Understand what methods are available to preserve database integrity.			
8	Table Constraints	Understand why foreign key constraints preserve database integrity.	Types of constraints: • PRIMARY KEY • UNIQUE • FOREIGN KEY • CHECK
9	Database Triggers	Create a trigger to execute after a record is inserted in a table.	• CREATE TRIGGER • DML versus DDL triggers • AFTER triggers • INSTEAD OF
Review Lessons			

Section 10 (Quiz 10)			
Lesson Number	**Name**	**Goal**	**Items**
XML Data Work with XML data within the context of SQL Server.			
1	XML Schemas	Understand why you would want to store XML data in a table, and how to ensure the XML documents conform to a standard.	• XML datatype • Why XML? • Enforcing XML consistency with a schema
2	Querying XML Data	Use SQL and XQUERY to search individual XML elements and attributes.	• SELECT • XQuery specification
3	Import and Export XML Data	Export an XML document to the file system.	• FOR XML • OPENXML
4	Indexing XML Data	Understand how to make XML queries run faster.	• CREATE XML INDEX
JSON (JavaScript Object Notation) Work with JSON data within the context of SQL Server			
5	Work with JSON text	Extract values from JSON text and use them in queries.	• JSON_VALUE • JSON QUERY • ISJSON
6	Export JSON Data	Export JSON data to the file system.	• FOR JSON
7	Analyze JSON data	Filter or Aggregate JSON data using SQL Queries.	• OPENJSON

Section 10 (Quiz 10)

Lesson Number	Name	Goal	Items
Query Optimization SQL is a declarative language. That mean you declare what you want the DBMS to do, but it is really up to it to figure out how. The query optimizer helps the DBMS make efficient decisions regarding this.			

8	Optimizer Overview	Understand the optimizer's purpose and how it transforms your SQL into executable database operations.	• Generate a graphical plan.
			• Be familiar with the following commands:
			  ○ SET SHOWPLAN_TEXT ON
			  ○ SET SHOWPLAN_ALL ON
			  ○ SET SHOWPLAN_XML ON
			  ○ SET STATISTICS PROFILE ON
			  ○ SET STATISTICS XML ON

9	Reading Query Plans	Understand the operations the DBMS takes to execute your SQL.	• Actual versus Estimated Plans • Dynamic vs. parameterized queries • Describe the different join types (HASH, MERGE, LOOP) and describe the scenarios they would be used in
10	Database Statistics	How are statistics used by the query optimizer and what happens if they are inaccurate?	• What are statistics? • How are statistics updated? • How do you know the optimizer is using them? • How do you refresh statistics?
11	Influencing Query Plans	What hints can you give the query optimizer if you feel it is making poor decisions?	• When should you use hints. • Know and understand the hints. • Be familiar with table hints.
Review Lessons			