SQL Data Types for MySQL, SQL Server, and MS Access

The data type of a column defines what value the column can hold: integer, character, money, date and time, binary, and so on.

## **SQL Data Types**

Each column in a database table is required to have a name and a data type.

An SQL developer must decide what type of data that will be stored inside each column when creating a table. The data type is a guideline for SQL to understand what type of data is expected inside of each column, and it also identifies how SQL will interact with the stored data.

**Note:** Data types might have different names in different database. And even if the name is the same, the size and other details may be different! **Always check the documentation!**

## **MySQL Data Types (Version 8.0)**

In MySQL there are three main data types: string, numeric, and date and time.

### **String Data Types**

|  |  |
| --- | --- |
| **Data type** | **Description** |
| CHAR(size) | A FIXED length string (can contain letters, numbers, and special characters). The size parameter specifies the column length in characters - can be from 0 to 255. Default is 1 |
| VARCHAR(size) | A VARIABLE length string (can contain letters, numbers, and special characters). The size parameter specifies the maximum string length in characters - can be from 0 to 65535 |
| BINARY(size) | Equal to CHAR(), but stores binary byte strings. The size parameter specifies the column length in bytes. Default is 1 |
| VARBINARY(size) | Equal to VARCHAR(), but stores binary byte strings. The size parameter specifies the maximum column length in bytes. |
| TINYBLOB | For BLOBs (Binary Large Objects). Max length: 255 bytes |
| TINYTEXT | Holds a string with a maximum length of 255 characters |
| TEXT(size) | Holds a string with a maximum length of 65,535 bytes |
| BLOB(size) | For BLOBs (Binary Large Objects). Holds up to 65,535 bytes of data |
| MEDIUMTEXT | Holds a string with a maximum length of 16,777,215 characters |
| MEDIUMBLOB | For BLOBs (Binary Large Objects). Holds up to 16,777,215 bytes of data |
| LONGTEXT | Holds a string with a maximum length of 4,294,967,295 characters |
| LONGBLOB | For BLOBs (Binary Large Objects). Holds up to 4,294,967,295 bytes of data |
| ENUM(val1, val2, val3, ...) | A string object that can have only one value, chosen from a list of possible values. You can list up to 65535 values in an ENUM list. If a value is inserted that is not in the list, a blank value will be inserted. The values are sorted in the order you enter them |
| SET(val1, val2, val3, ...) | A string object that can have 0 or more values, chosen from a list of possible values. You can list up to 64 values in a SET list |

### **Numeric Data Types**

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| --- | --- |
| **Data type** | **Description** |
| BIT(size) | A bit-value type. The number of bits per value is specified in size. The size parameter can hold a value from 1 to 64. The default value for size is 1. |
| TINYINT(size) | A very small integer. Signed range is from -128 to 127. Unsigned range is from 0 to 255. The size parameter specifies the maximum display width (which is 255) |
| BOOL | Zero is considered as false, nonzero values are considered as true. |
| BOOLEAN | Equal to BOOL |
| SMALLINT(size) | A small integer. Signed range is from -32768 to 32767. Unsigned range is from 0 to 65535. The size parameter specifies the maximum display width (which is 255) |
| MEDIUMINT(size) | A medium integer. Signed range is from -8388608 to 8388607. Unsigned range is from 0 to 16777215. The size parameter specifies the maximum display width (which is 255) |
| INT(size) | A medium integer. Signed range is from -2147483648 to 2147483647. Unsigned range is from 0 to 4294967295. The size parameter specifies the maximum display width (which is 255) |
| INTEGER(size) | Equal to INT(size) |
| BIGINT(size) | A large integer. Signed range is from -9223372036854775808 to 9223372036854775807. Unsigned range is from 0 to 18446744073709551615. The size parameter specifies the maximum display width (which is 255) |
| FLOAT(size, d) | A floating point number. The total number of digits is specified in size. The number of digits after the decimal point is specified in the d parameter. This syntax is deprecated in MySQL 8.0.17, and it will be removed in future MySQL versions |
| FLOAT(p) | A floating point number. MySQL uses the p value to determine whether to use FLOAT or DOUBLE for the resulting data type. If p is from 0 to 24, the data type becomes FLOAT(). If p is from 25 to 53, the data type becomes DOUBLE() |
| DOUBLE(size, d) | A normal-size floating point number. The total number of digits is specified in size. The number of digits after the decimal point is specified in the d parameter |
| DOUBLE PRECISION(size, d) |  |
| DECIMAL(size, d) | An exact fixed-point number. The total number of digits is specified in size. The number of digits after the decimal point is specified in the d parameter. The maximum number for size is 65. The maximum number for d is 30. The default value for size is 10. The default value for d is 0. |
| DEC(size, d) | Equal to DECIMAL(size,d) |

**Note:** All the numeric data types may have an extra option: UNSIGNED or ZEROFILL. If you add the UNSIGNED option, MySQL disallows negative values for the column. If you add the ZEROFILL option, MySQL automatically also adds the UNSIGNED attribute to the column.

### **Date and Time Data Types**

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| --- | --- |
| **Data type** | **Description** |
| DATE | A date. Format: YYYY-MM-DD. The supported range is from '1000-01-01' to '9999-12-31' |
| DATETIME(fsp) | A date and time combination. Format: YYYY-MM-DD hh:mm:ss. The supported range is from '1000-01-01 00:00:00' to '9999-12-31 23:59:59'. Adding DEFAULT and ON UPDATE in the column definition to get automatic initialization and updating to the current date and time |
| TIMESTAMP(fsp) | A timestamp. TIMESTAMP values are stored as the number of seconds since the Unix epoch ('1970-01-01 00:00:00' UTC). Format: YYYY-MM-DD hh:mm:ss. The supported range is from '1970-01-01 00:00:01' UTC to '2038-01-09 03:14:07' UTC. Automatic initialization and updating to the current date and time can be specified using DEFAULT CURRENT\_TIMESTAMP and ON UPDATE CURRENT\_TIMESTAMP in the column definition |
| TIME(fsp) | A time. Format: hh:mm:ss. The supported range is from '-838:59:59' to '838:59:59' |
| YEAR | A year in four-digit format. Values allowed in four-digit format: 1901 to 2155, and 0000. MySQL 8.0 does not support year in two-digit format. |

## **SQL Server Data Types**

### **String Data Types**

|  |  |  |  |
| --- | --- | --- | --- |
| **Data type** | **Description** | **Max size** | **Storage** |
| char(n) | Fixed width character string | 8,000 characters | Defined width |
| varchar(n) | Variable width character string | 8,000 characters | 2 bytes + number of chars |
| varchar(max) | Variable width character string | 1,073,741,824 characters | 2 bytes + number of chars |
| text | Variable width character string | 2GB of text data | 4 bytes + number of chars |
| nchar | Fixed width Unicode string | 4,000 characters | Defined width x 2 |
| nvarchar | Variable width Unicode string | 4,000 characters |  |
| nvarchar(max) | Variable width Unicode string | 536,870,912 characters |  |
| ntext | Variable width Unicode string | 2GB of text data |  |
| binary(n) | Fixed width binary string | 8,000 bytes |  |
| varbinary | Variable width binary string | 8,000 bytes |  |
| varbinary(max) | Variable width binary string | 2GB |  |
| image | Variable width binary string | 2GB |  |

### **Numeric Data Types**

|  |  |  |
| --- | --- | --- |
| **Data type** | **Description** | **Storage** |
| bit | Integer that can be 0, 1, or NULL |  |
| tinyint | Allows whole numbers from 0 to 255 | 1 byte |
| smallint | Allows whole numbers between -32,768 and 32,767 | 2 bytes |
| int | Allows whole numbers between -2,147,483,648 and 2,147,483,647 | 4 bytes |
| bigint | Allows whole numbers between -9,223,372,036,854,775,808 and 9,223,372,036,854,775,807 | 8 bytes |
| decimal(p,s) | Fixed precision and scale numbers.  Allows numbers from -10^38 +1 to 10^38 –1.  The p parameter indicates the maximum total number of digits that can be stored (both to the left and to the right of the decimal point). p must be a value from 1 to 38. Default is 18.  The s parameter indicates the maximum number of digits stored to the right of the decimal point. s must be a value from 0 to p. Default value is 0 | 5-17 bytes |
| numeric(p,s) | Fixed precision and scale numbers.  Allows numbers from -10^38 +1 to 10^38 –1.  The p parameter indicates the maximum total number of digits that can be stored (both to the left and to the right of the decimal point). p must be a value from 1 to 38. Default is 18.  The s parameter indicates the maximum number of digits stored to the right of the decimal point. s must be a value from 0 to p. Default value is 0 | 5-17 bytes |
| smallmoney | Monetary data from -214,748.3648 to 214,748.3647 | 4 bytes |
| money | Monetary data from -922,337,203,685,477.5808 to 922,337,203,685,477.5807 | 8 bytes |
| float(n) | Floating precision number data from -1.79E + 308 to 1.79E + 308.  The n parameter indicates whether the field should hold 4 or 8 bytes. float(24) holds a 4-byte field and float(53) holds an 8-byte field. Default value of n is 53. | 4 or 8 bytes |
| real | Floating precision number data from -3.40E + 38 to 3.40E + 38 | 4 bytes |

### **Date and Time Data Types**

|  |  |  |
| --- | --- | --- |
| **Data type** | **Description** | **Storage** |
| datetime | From January 1, 1753 to December 31, 9999 with an accuracy of 3.33 milliseconds | 8 bytes |
| datetime2 | From January 1, 0001 to December 31, 9999 with an accuracy of 100 nanoseconds | 6-8 bytes |
| smalldatetime | From January 1, 1900 to June 6, 2079 with an accuracy of 1 minute | 4 bytes |
| date | Store a date only. From January 1, 0001 to December 31, 9999 | 3 bytes |
| time | Store a time only to an accuracy of 100 nanoseconds | 3-5 bytes |
| datetimeoffset | The same as datetime2 with the addition of a time zone offset | 8-10 bytes |
| timestamp | Stores a unique number that gets updated every time a row gets created or modified. The timestamp value is based upon an internal clock and does not correspond to real time. Each table may have only one timestamp variable |  |

### **Other Data Types**

|  |  |
| --- | --- |
| **Data type** | **Description** |
| sql\_variant | Stores up to 8,000 bytes of data of various data types, except text, ntext, and timestamp |
| uniqueidentifier | Stores a globally unique identifier (GUID) |
| xml | Stores XML formatted data. Maximum 2GB |
| cursor | Stores a reference to a cursor used for database operations |
| table | Stores a result-set for later processing |

## **MS Access Data Types**

|  |  |  |
| --- | --- | --- |
| **Data type** | **Description** | **Storage** |
| Text | Use for text or combinations of text and numbers. 255 characters maximum |  |
| Memo | Memo is used for larger amounts of text. Stores up to 65,536 characters. **Note:** You cannot sort a memo field. However, they are searchable |  |
| Byte | Allows whole numbers from 0 to 255 | 1 byte |
| Integer | Allows whole numbers between -32,768 and 32,767 | 2 bytes |
| Long | Allows whole numbers between -2,147,483,648 and 2,147,483,647 | 4 bytes |
| Single | Single precision floating-point. Will handle most decimals | 4 bytes |
| Double | Double precision floating-point. Will handle most decimals | 8 bytes |
| Currency | Use for currency. Holds up to 15 digits of whole dollars, plus 4 decimal places. **Tip:** You can choose which country's currency to use | 8 bytes |
| AutoNumber | AutoNumber fields automatically give each record its own number, usually starting at 1 | 4 bytes |
| Date/Time | Use for dates and times | 8 bytes |
| Yes/No | A logical field can be displayed as Yes/No, True/False, or On/Off. In code, use the constants True and False (equivalent to -1 and 0). **Note:** Null values are not allowed in Yes/No fields | 1 bit |
| Ole Object | Can store pictures, audio, video, or other BLOBs (Binary Large Objects) | up to 1GB |
| Hyperlink | Contain links to other files, including web pages |  |
| Lookup Wizard | Let you type a list of options, which can then be chosen from a drop-down list | 4 bytes |

# SQL Keywords Reference

This SQL keywords reference contains the reserved words in SQL.

## **SQL Keywords**

|  |  |
| --- | --- |
| **Keyword** | **Description** |
| [ADD](https://www.w3schools.com/sql/sql_ref_add.asp) | Adds a column in an existing table |
| [ADD CONSTRAINT](https://www.w3schools.com/sql/sql_ref_add_constraint.asp) | Adds a constraint after a table is already created |
| [ALL](https://www.w3schools.com/sql/sql_ref_all.asp) | Returns true if all of the subquery values meet the condition |
| [ALTER](https://www.w3schools.com/sql/sql_ref_alter.asp) | Adds, deletes, or modifies columns in a table, or changes the data type of a column in a table |
| [ALTER COLUMN](https://www.w3schools.com/sql/sql_ref_alter_column.asp) | Changes the data type of a column in a table |
| [ALTER TABLE](https://www.w3schools.com/sql/sql_ref_alter_table.asp) | Adds, deletes, or modifies columns in a table |
| [AND](https://www.w3schools.com/sql/sql_ref_and.asp) | Only includes rows where both conditions is true |
| [ANY](https://www.w3schools.com/sql/sql_ref_any.asp) | Returns true if any of the subquery values meet the condition |
| [AS](https://www.w3schools.com/sql/sql_ref_as.asp) | Renames a column or table with an alias |
| [ASC](https://www.w3schools.com/sql/sql_ref_asc.asp) | Sorts the result set in ascending order |
| [BACKUP DATABASE](https://www.w3schools.com/sql/sql_ref_backup_database.asp) | Creates a back up of an existing database |
| [BETWEEN](https://www.w3schools.com/sql/sql_ref_between.asp) | Selects values within a given range |
| [CASE](https://www.w3schools.com/sql/sql_ref_case.asp) | Creates different outputs based on conditions |
| [CHECK](https://www.w3schools.com/sql/sql_ref_check.asp) | A constraint that limits the value that can be placed in a column |
| [COLUMN](https://www.w3schools.com/sql/sql_ref_column.asp) | Changes the data type of a column or deletes a column in a table |
| [CONSTRAINT](https://www.w3schools.com/sql/sql_ref_constraint.asp) | Adds or deletes a constraint |
| [CREATE](https://www.w3schools.com/sql/sql_ref_create.asp) | Creates a database, index, view, table, or procedure |
| [CREATE DATABASE](https://www.w3schools.com/sql/sql_ref_create_database.asp) | Creates a new SQL database |
| [CREATE INDEX](https://www.w3schools.com/sql/sql_ref_create_index.asp) | Creates an index on a table (allows duplicate values) |
| [CREATE OR REPLACE VIEW](https://www.w3schools.com/sql/sql_ref_create_or_replace_view.asp) | Updates a view |
| [CREATE TABLE](https://www.w3schools.com/sql/sql_ref_create_table.asp) | Creates a new table in the database |
| [CREATE PROCEDURE](https://www.w3schools.com/sql/sql_ref_create_procedure.asp) | Creates a stored procedure |
| [CREATE UNIQUE INDEX](https://www.w3schools.com/sql/sql_ref_create_unique_index.asp) | Creates a unique index on a table (no duplicate values) |
| [CREATE VIEW](https://www.w3schools.com/sql/sql_ref_create_view.asp) | Creates a view based on the result set of a SELECT statement |
| [DATABASE](https://www.w3schools.com/sql/sql_ref_database.asp) | Creates or deletes an SQL database |
| [DEFAULT](https://www.w3schools.com/sql/sql_ref_default.asp) | A constraint that provides a default value for a column |
| [DELETE](https://www.w3schools.com/sql/sql_ref_delete.asp) | Deletes rows from a table |
| [DESC](https://www.w3schools.com/sql/sql_ref_desc.asp) | Sorts the result set in descending order |
| [DISTINCT](https://www.w3schools.com/sql/sql_ref_distinct.asp) | Selects only distinct (different) values |
| [DROP](https://www.w3schools.com/sql/sql_ref_drop.asp) | Deletes a column, constraint, database, index, table, or view |
| [DROP COLUMN](https://www.w3schools.com/sql/sql_ref_drop_column.asp) | Deletes a column in a table |
| [DROP CONSTRAINT](https://www.w3schools.com/sql/sql_ref_drop_constraint.asp) | Deletes a UNIQUE, PRIMARY KEY, FOREIGN KEY, or CHECK constraint |
| [DROP DATABASE](https://www.w3schools.com/sql/sql_ref_drop_database.asp) | Deletes an existing SQL database |
| [DROP DEFAULT](https://www.w3schools.com/sql/sql_ref_drop_default.asp) | Deletes a DEFAULT constraint |
| [DROP INDEX](https://www.w3schools.com/sql/sql_ref_drop_index.asp) | Deletes an index in a table |
| [DROP TABLE](https://www.w3schools.com/sql/sql_ref_drop_table.asp) | Deletes an existing table in the database |
| [DROP VIEW](https://www.w3schools.com/sql/sql_ref_drop_view.asp) | Deletes a view |
| [EXEC](https://www.w3schools.com/sql/sql_ref_exec.asp) | Executes a stored procedure |
| [EXISTS](https://www.w3schools.com/sql/sql_ref_exists.asp) | Tests for the existence of any record in a subquery |
| [FOREIGN KEY](https://www.w3schools.com/sql/sql_ref_foreign_key.asp) | A constraint that is a key used to link two tables together |
| [FROM](https://www.w3schools.com/sql/sql_ref_from.asp) | Specifies which table to select or delete data from |
| [FULL OUTER JOIN](https://www.w3schools.com/sql/sql_ref_full_outer_join.asp) | Returns all rows when there is a match in either left table or right table |
| [GROUP BY](https://www.w3schools.com/sql/sql_ref_group_by.asp) | Groups the result set (used with aggregate functions: COUNT, MAX, MIN, SUM, AVG) |
| [HAVING](https://www.w3schools.com/sql/sql_ref_having.asp) | Used instead of WHERE with aggregate functions |
| [IN](https://www.w3schools.com/sql/sql_ref_in.asp) | Allows you to specify multiple values in a WHERE clause |
| [INDEX](https://www.w3schools.com/sql/sql_ref_index.asp) | Creates or deletes an index in a table |
| [INNER JOIN](https://www.w3schools.com/sql/sql_ref_inner_join.asp) | Returns rows that have matching values in both tables |
| [INSERT INTO](https://www.w3schools.com/sql/sql_ref_insert_into.asp) | Inserts new rows in a table |
| [INSERT INTO SELECT](https://www.w3schools.com/sql/sql_ref_insert_into_select.asp) | Copies data from one table into another table |
| [IS NULL](https://www.w3schools.com/sql/sql_ref_is_null.asp) | Tests for empty values |
| [IS NOT NULL](https://www.w3schools.com/sql/sql_ref_is_not_null.asp) | Tests for non-empty values |
| [JOIN](https://www.w3schools.com/sql/sql_ref_join.asp) | Joins tables |
| [LEFT JOIN](https://www.w3schools.com/sql/sql_ref_left_join.asp) | Returns all rows from the left table, and the matching rows from the right table |
| [LIKE](https://www.w3schools.com/sql/sql_ref_like.asp) | Searches for a specified pattern in a column |
| [LIMIT](https://www.w3schools.com/sql/sql_ref_limit.asp) | Specifies the number of records to return in the result set |
| [NOT](https://www.w3schools.com/sql/sql_ref_not.asp) | Only includes rows where a condition is not true |
| [NOT NULL](https://www.w3schools.com/sql/sql_ref_not_null.asp) | A constraint that enforces a column to not accept NULL values |
| [OR](https://www.w3schools.com/sql/sql_ref_or.asp) | Includes rows where either condition is true |
| [ORDER BY](https://www.w3schools.com/sql/sql_ref_order_by.asp) | Sorts the result set in ascending or descending order |
| [OUTER JOIN](https://www.w3schools.com/sql/sql_ref_outer_join.asp) | Returns all rows when there is a match in either left table or right table |
| [PRIMARY KEY](https://www.w3schools.com/sql/sql_ref_primary_key.asp) | A constraint that uniquely identifies each record in a database table |
| [PROCEDURE](https://www.w3schools.com/sql/sql_ref_procedure.asp) | A stored procedure |
| [RIGHT JOIN](https://www.w3schools.com/sql/sql_ref_right_join.asp) | Returns all rows from the right table, and the matching rows from the left table |
| [ROWNUM](https://www.w3schools.com/sql/sql_ref_rownum.asp) | Specifies the number of records to return in the result set |
| [SELECT](https://www.w3schools.com/sql/sql_ref_select.asp) | Selects data from a database |
| [SELECT DISTINCT](https://www.w3schools.com/sql/sql_ref_select_distinct.asp) | Selects only distinct (different) values |
| [SELECT INTO](https://www.w3schools.com/sql/sql_ref_select_into.asp) | Copies data from one table into a new table |
| [SELECT TOP](https://www.w3schools.com/sql/sql_ref_select_top.asp) | Specifies the number of records to return in the result set |
| [SET](https://www.w3schools.com/sql/sql_ref_set.asp) | Specifies which columns and values that should be updated in a table |
| [TABLE](https://www.w3schools.com/sql/sql_ref_table.asp) | Creates a table, or adds, deletes, or modifies columns in a table, or deletes a table or data inside a table |
| [TOP](https://www.w3schools.com/sql/sql_ref_top.asp) | Specifies the number of records to return in the result set |
| [TRUNCATE TABLE](https://www.w3schools.com/sql/sql_ref_truncate_table.asp) | Deletes the data inside a table, but not the table itself |
| [UNION](https://www.w3schools.com/sql/sql_ref_union.asp) | Combines the result set of two or more SELECT statements (only distinct values) |
| [UNION ALL](https://www.w3schools.com/sql/sql_ref_union_all.asp) | Combines the result set of two or more SELECT statements (allows duplicate values) |
| [UNIQUE](https://www.w3schools.com/sql/sql_ref_unique.asp) | A constraint that ensures that all values in a column are unique |
| [UPDATE](https://www.w3schools.com/sql/sql_ref_update.asp) | Updates existing rows in a table |
| [VALUES](https://www.w3schools.com/sql/sql_ref_values.asp) | Specifies the values of an INSERT INTO statement |
| [VIEW](https://www.w3schools.com/sql/sql_ref_view.asp) | Creates, updates, or deletes a view |
| [WHERE](https://www.w3schools.com/sql/sql_ref_where.asp) | Filters a result set to include only records that fulfill a specified condition |

# MySQL Functions

MySQL has many built-in functions.

This reference contains string, numeric, date, and some advanced functions in MySQL.

## **MySQL String Functions**

|  |  |
| --- | --- |
| **Function** | **Description** |
| [ASCII](https://www.w3schools.com/sql/func_mysql_ascii.asp) | Returns the ASCII value for the specific character |
| [CHAR\_LENGTH](https://www.w3schools.com/sql/func_mysql_char_length.asp) | Returns the length of a string (in characters) |
| [CHARACTER\_LENGTH](https://www.w3schools.com/sql/func_mysql_character_length.asp) | Returns the length of a string (in characters) |
| [CONCAT](https://www.w3schools.com/sql/func_mysql_concat.asp) | Adds two or more expressions together |
| [CONCAT\_WS](https://www.w3schools.com/sql/func_mysql_concat_ws.asp) | Adds two or more expressions together with a separator |
| [FIELD](https://www.w3schools.com/sql/func_mysql_field.asp) | Returns the index position of a value in a list of values |
| [FIND\_IN\_SET](https://www.w3schools.com/sql/func_mysql_find_in_set.asp) | Returns the position of a string within a list of strings |
| [FORMAT](https://www.w3schools.com/sql/func_mysql_format.asp) | Formats a number to a format like "#,###,###.##", rounded to a specified number of decimal places |
| [INSERT](https://www.w3schools.com/sql/func_mysql_insert.asp) | Inserts a string within a string at the specified position and for a certain number of characters |
| [INSTR](https://www.w3schools.com/sql/func_mysql_instr.asp) | Returns the position of the first occurrence of a string in another string |
| [LCASE](https://www.w3schools.com/sql/func_mysql_lcase.asp) | Converts a string to lower-case |
| [LEFT](https://www.w3schools.com/sql/func_mysql_left.asp) | Extracts a number of characters from a string (starting from left) |
| [LENGTH](https://www.w3schools.com/sql/func_mysql_length.asp) | Returns the length of a string (in bytes) |
| [LOCATE](https://www.w3schools.com/sql/func_mysql_locate.asp) | Returns the position of the first occurrence of a substring in a string |
| [LOWER](https://www.w3schools.com/sql/func_mysql_lower.asp) | Converts a string to lower-case |
| [LPAD](https://www.w3schools.com/sql/func_mysql_lpad.asp) | Left-pads a string with another string, to a certain length |
| [LTRIM](https://www.w3schools.com/sql/func_mysql_ltrim.asp) | Removes leading spaces from a string |
| [MID](https://www.w3schools.com/sql/func_mysql_mid.asp) | Extracts a substring from a string (starting at any position) |
| [POSITION](https://www.w3schools.com/sql/func_mysql_position.asp) | Returns the position of the first occurrence of a substring in a string |
| [REPEAT](https://www.w3schools.com/sql/func_mysql_repeat.asp) | Repeats a string as many times as specified |
| [REPLACE](https://www.w3schools.com/sql/func_mysql_replace.asp) | Replaces all occurrences of a substring within a string, with a new substring |
| [REVERSE](https://www.w3schools.com/sql/func_mysql_reverse.asp) | Reverses a string and returns the result |
| [RIGHT](https://www.w3schools.com/sql/func_mysql_right.asp) | Extracts a number of characters from a string (starting from right) |
| [RPAD](https://www.w3schools.com/sql/func_mysql_rpad.asp) | Right-pads a string with another string, to a certain length |
| [RTRIM](https://www.w3schools.com/sql/func_mysql_rtrim.asp) | Removes trailing spaces from a string |
| [SPACE](https://www.w3schools.com/sql/func_mysql_space.asp) | Returns a string of the specified number of space characters |
| [STRCMP](https://www.w3schools.com/sql/func_mysql_strcmp.asp) | Compares two strings |
| [SUBSTR](https://www.w3schools.com/sql/func_mysql_substr.asp) | Extracts a substring from a string (starting at any position) |
| [SUBSTRING](https://www.w3schools.com/sql/func_mysql_substring.asp) | Extracts a substring from a string (starting at any position) |
| [SUBSTRING\_INDEX](https://www.w3schools.com/sql/func_mysql_substring_index.asp) | Returns a substring of a string before a specified number of delimiter occurs |
| [TRIM](https://www.w3schools.com/sql/func_mysql_trim.asp) | Removes leading and trailing spaces from a string |
| [UCASE](https://www.w3schools.com/sql/func_mysql_ucase.asp) | Converts a string to upper-case |
| [UPPER](https://www.w3schools.com/sql/func_mysql_upper.asp) | Converts a string to upper-case |

## **MySQL Numeric Functions**

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| --- | --- |
| **Function** | **Description** |
| [ABS](https://www.w3schools.com/sql/func_mysql_abs.asp) | Returns the absolute value of a number |
| [ACOS](https://www.w3schools.com/sql/func_mysql_acos.asp) | Returns the arc cosine of a number |
| [ASIN](https://www.w3schools.com/sql/func_mysql_asin.asp) | Returns the arc sine of a number |
| [ATAN](https://www.w3schools.com/sql/func_mysql_atan.asp) | Returns the arc tangent of one or two numbers |
| [ATAN2](https://www.w3schools.com/sql/func_mysql_atan2.asp) | Returns the arc tangent of two numbers |
| [AVG](https://www.w3schools.com/sql/func_mysql_avg.asp) | Returns the average value of an expression |
| [CEIL](https://www.w3schools.com/sql/func_mysql_ceil.asp) | Returns the smallest integer value that is >= to a number |
| [CEILING](https://www.w3schools.com/sql/func_mysql_ceiling.asp) | Returns the smallest integer value that is >= to a number |
| [COS](https://www.w3schools.com/sql/func_mysql_cos.asp) | Returns the cosine of a number |
| [COT](https://www.w3schools.com/sql/func_mysql_cot.asp) | Returns the cotangent of a number |
| [COUNT](https://www.w3schools.com/sql/func_mysql_count.asp) | Returns the number of records returned by a select query |
| [DEGREES](https://www.w3schools.com/sql/func_mysql_degrees.asp) | Converts a value in radians to degrees |
| [DIV](https://www.w3schools.com/sql/func_mysql_div.asp) | Used for integer division |
| [EXP](https://www.w3schools.com/sql/func_mysql_exp.asp) | Returns e raised to the power of a specified number |
| [FLOOR](https://www.w3schools.com/sql/func_mysql_floor.asp) | Returns the largest integer value that is <= to a number |
| [GREATEST](https://www.w3schools.com/sql/func_mysql_greatest.asp) | Returns the greatest value of the list of arguments |
| [LEAST](https://www.w3schools.com/sql/func_mysql_least.asp) | Returns the smallest value of the list of arguments |
| [LN](https://www.w3schools.com/sql/func_mysql_ln.asp) | Returns the natural logarithm of a number |
| [LOG](https://www.w3schools.com/sql/func_mysql_log.asp) | Returns the natural logarithm of a number, or the logarithm of a number to a specified base |
| [LOG10](https://www.w3schools.com/sql/func_mysql_log10.asp) | Returns the natural logarithm of a number to base 10 |
| [LOG2](https://www.w3schools.com/sql/func_mysql_log2.asp) | Returns the natural logarithm of a number to base 2 |
| [MAX](https://www.w3schools.com/sql/func_mysql_max.asp) | Returns the maximum value in a set of values |
| [MIN](https://www.w3schools.com/sql/func_mysql_min.asp) | Returns the minimum value in a set of values |
| [MOD](https://www.w3schools.com/sql/func_mysql_mod.asp) | Returns the remainder of a number divided by another number |
| [PI](https://www.w3schools.com/sql/func_mysql_pi.asp) | Returns the value of PI |
| [POW](https://www.w3schools.com/sql/func_mysql_pow.asp) | Returns the value of a number raised to the power of another number |
| [POWER](https://www.w3schools.com/sql/func_mysql_power.asp) | Returns the value of a number raised to the power of another number |
| [RADIANS](https://www.w3schools.com/sql/func_mysql_radians.asp) | Converts a degree value into radians |
| [RAND](https://www.w3schools.com/sql/func_mysql_rand.asp) | Returns a random number |
| [ROUND](https://www.w3schools.com/sql/func_mysql_round.asp) | Rounds a number to a specified number of decimal places |
| [SIGN](https://www.w3schools.com/sql/func_mysql_sign.asp) | Returns the sign of a number |
| [SIN](https://www.w3schools.com/sql/func_mysql_sin.asp) | Returns the sine of a number |
| [SQRT](https://www.w3schools.com/sql/func_mysql_sqrt.asp) | Returns the square root of a number |
| [SUM](https://www.w3schools.com/sql/func_mysql_sum.asp) | Calculates the sum of a set of values |
| [TAN](https://www.w3schools.com/sql/func_mysql_tan.asp) | Returns the tangent of a number |
| [TRUNCATE](https://www.w3schools.com/sql/func_mysql_truncate.asp) | Truncates a number to the specified number of decimal places |

## **MySQL Date Functions**

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| **Function** | **Description** |
| [ADDDATE](https://www.w3schools.com/sql/func_mysql_adddate.asp) | Adds a time/date interval to a date and then returns the date |
| [ADDTIME](https://www.w3schools.com/sql/func_mysql_addtime.asp) | Adds a time interval to a time/datetime and then returns the time/datetime |
| [CURDATE](https://www.w3schools.com/sql/func_mysql_curdate.asp) | Returns the current date |
| [CURRENT\_DATE](https://www.w3schools.com/sql/func_mysql_current_date.asp) | Returns the current date |
| [CURRENT\_TIME](https://www.w3schools.com/sql/func_mysql_current_time.asp) | Returns the current time |
| [CURRENT\_TIMESTAMP](https://www.w3schools.com/sql/func_mysql_current_timestamp.asp) | Returns the current date and time |
| [CURTIME](https://www.w3schools.com/sql/func_mysql_curtime.asp) | Returns the current time |
| [DATE](https://www.w3schools.com/sql/func_mysql_date.asp) | Extracts the date part from a datetime expression |
| [DATEDIFF](https://www.w3schools.com/sql/func_mysql_datediff.asp) | Returns the number of days between two date values |
| [DATE\_ADD](https://www.w3schools.com/sql/func_mysql_date_add.asp) | Adds a time/date interval to a date and then returns the date |
| [DATE\_FORMAT](https://www.w3schools.com/sql/func_mysql_date_format.asp) | Formats a date |
| [DATE\_SUB](https://www.w3schools.com/sql/func_mysql_date_sub.asp) | Subtracts a time/date interval from a date and then returns the date |
| [DAY](https://www.w3schools.com/sql/func_mysql_day.asp) | Returns the day of the month for a given date |
| [DAYNAME](https://www.w3schools.com/sql/func_mysql_dayname.asp) | Returns the weekday name for a given date |
| [DAYOFMONTH](https://www.w3schools.com/sql/func_mysql_dayofmonth.asp) | Returns the day of the month for a given date |
| [DAYOFWEEK](https://www.w3schools.com/sql/func_mysql_dayofweek.asp) | Returns the weekday index for a given date |
| [DAYOFYEAR](https://www.w3schools.com/sql/func_mysql_dayofyear.asp) | Returns the day of the year for a given date |
| [EXTRACT](https://www.w3schools.com/sql/func_mysql_extract.asp) | Extracts a part from a given date |
| [FROM\_DAYS](https://www.w3schools.com/sql/func_mysql_from_days.asp) | Returns a date from a numeric datevalue |
| [HOUR](https://www.w3schools.com/sql/func_mysql_hour.asp) | Returns the hour part for a given date |
| [LAST\_DAY](https://www.w3schools.com/sql/func_mysql_last_day.asp) | Extracts the last day of the month for a given date |
| [LOCALTIME](https://www.w3schools.com/sql/func_mysql_localtime.asp) | Returns the current date and time |
| [LOCALTIMESTAMP](https://www.w3schools.com/sql/func_mysql_localtimestamp.asp) | Returns the current date and time |
| [MAKEDATE](https://www.w3schools.com/sql/func_mysql_makedate.asp) | Creates and returns a date based on a year and a number of days value |
| [MAKETIME](https://www.w3schools.com/sql/func_mysql_maketime.asp) | Creates and returns a time based on an hour, minute, and second value |
| [MICROSECOND](https://www.w3schools.com/sql/func_mysql_microsecond.asp) | Returns the microsecond part of a time/datetime |
| [MINUTE](https://www.w3schools.com/sql/func_mysql_minute.asp) | Returns the minute part of a time/datetime |
| [MONTH](https://www.w3schools.com/sql/func_mysql_month.asp) | Returns the month part for a given date |
| [MONTHNAME](https://www.w3schools.com/sql/func_mysql_monthname.asp) | Returns the name of the month for a given date |
| [NOW](https://www.w3schools.com/sql/func_mysql_now.asp) | Returns the current date and time |
| [PERIOD\_ADD](https://www.w3schools.com/sql/func_mysql_period_add.asp) | Adds a specified number of months to a period |
| [PERIOD\_DIFF](https://www.w3schools.com/sql/func_mysql_period_diff.asp) | Returns the difference between two periods |
| [QUARTER](https://www.w3schools.com/sql/func_mysql_quarter.asp) | Returns the quarter of the year for a given date value |
| [SECOND](https://www.w3schools.com/sql/func_mysql_second.asp) | Returns the seconds part of a time/datetime |
| [SEC\_TO\_TIME](https://www.w3schools.com/sql/func_mysql_sec_to_time.asp) | Returns a time value based on the specified seconds |
| [STR\_TO\_DATE](https://www.w3schools.com/sql/func_mysql_str_to_date.asp) | Returns a date based on a string and a format |
| [SUBDATE](https://www.w3schools.com/sql/func_mysql_subdate.asp) | Subtracts a time/date interval from a date and then returns the date |
| [SUBTIME](https://www.w3schools.com/sql/func_mysql_subtime.asp) | Subtracts a time interval from a datetime and then returns the time/datetime |
| [SYSDATE](https://www.w3schools.com/sql/func_mysql_sysdate.asp) | Returns the current date and time |
| [TIME](https://www.w3schools.com/sql/func_mysql_time.asp) | Extracts the time part from a given time/datetime |
| [TIME\_FORMAT](https://www.w3schools.com/sql/func_mysql_time_format.asp) | Formats a time by a specified format |
| [TIME\_TO\_SEC](https://www.w3schools.com/sql/func_mysql_time_to_sec.asp) | Converts a time value into seconds |
| [TIMEDIFF](https://www.w3schools.com/sql/func_mysql_timediff.asp) | Returns the difference between two time/datetime expressions |
| [TIMESTAMP](https://www.w3schools.com/sql/func_mysql_timestamp.asp) | Returns a datetime value based on a date or datetime value |
| [TO\_DAYS](https://www.w3schools.com/sql/func_mysql_to_days.asp) | Returns the number of days between a date and date "0000-00-00" |
| [WEEK](https://www.w3schools.com/sql/func_mysql_week.asp) | Returns the week number for a given date |
| [WEEKDAY](https://www.w3schools.com/sql/func_mysql_weekday.asp) | Returns the weekday number for a given date |
| [WEEKOFYEAR](https://www.w3schools.com/sql/func_mysql_weekofyear.asp) | Returns the week number for a given date |
| [YEAR](https://www.w3schools.com/sql/func_mysql_year.asp) | Returns the year part for a given date |
| [YEARWEEK](https://www.w3schools.com/sql/func_mysql_yearweek.asp) | Returns the year and week number for a given date |

## **MySQL Advanced Functions**

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| --- | --- |
| **Function** | **Description** |
| [BIN](https://www.w3schools.com/sql/func_mysql_bin.asp) | Returns a binary representation of a number |
| [BINARY](https://www.w3schools.com/sql/func_mysql_binary.asp) | Converts a value to a binary string |
| [CASE](https://www.w3schools.com/sql/func_mysql_case.asp) | Goes through conditions and return a value when the first condition is met |
| [CAST](https://www.w3schools.com/sql/func_mysql_cast.asp) | Converts a value (of any type) into a specified datatype |
| [COALESCE](https://www.w3schools.com/sql/func_mysql_coalesce.asp) | Returns the first non-null value in a list |
| [CONNECTION\_ID](https://www.w3schools.com/sql/func_mysql_connection_id.asp) | Returns the unique connection ID for the current connection |
| [CONV](https://www.w3schools.com/sql/func_mysql_conv.asp) | Converts a number from one numeric base system to another |
| [CONVERT](https://www.w3schools.com/sql/func_mysql_convert.asp) | Converts a value into the specified datatype or character set |
| [CURRENT\_USER](https://www.w3schools.com/sql/func_mysql_current_user.asp) | Returns the user name and host name for the MySQL account that the server used to authenticate the current client |
| [DATABASE](https://www.w3schools.com/sql/func_mysql_database.asp) | Returns the name of the current database |
| [IF](https://www.w3schools.com/sql/func_mysql_if.asp) | Returns a value if a condition is TRUE, or another value if a condition is FALSE |
| [IFNULL](https://www.w3schools.com/sql/func_mysql_ifnull.asp) | Return a specified value if the expression is NULL, otherwise return the expression |
| [ISNULL](https://www.w3schools.com/sql/func_mysql_isnull.asp) | Returns 1 or 0 depending on whether an expression is NULL |
| [LAST\_INSERT\_ID](https://www.w3schools.com/sql/func_mysql_last_insert_id.asp) | Returns the AUTO\_INCREMENT id of the last row that has been inserted or updated in a table |
| [NULLIF](https://www.w3schools.com/sql/func_mysql_nullif.asp) | Compares two expressions and returns NULL if they are equal. Otherwise, the first expression is returned |
| [SESSION\_USER](https://www.w3schools.com/sql/func_mysql_session_user.asp) | Returns the current MySQL user name and host name |
| [SYSTEM\_USER](https://www.w3schools.com/sql/func_mysql_system_user.asp) | Returns the current MySQL user name and host name |
| [USER](https://www.w3schools.com/sql/func_mysql_user.asp) | Returns the current MySQL user name and host name |
| [VERSION](https://www.w3schools.com/sql/func_mysql_version.asp) | Returns the current version of the MySQL database |

SQL Quick Reference from W3Schools

|  |  |
| --- | --- |
| **SQL Statement** | **Syntax** |
| AND / OR | SELECT column\_name(s) FROM table\_name WHERE condition AND|OR condition |
| ALTER TABLE | ALTER TABLE table\_name ADD column\_name datatype  or  ALTER TABLE table\_name DROP COLUMN column\_name |
| AS (alias) | SELECT column\_name AS column\_alias FROM table\_name  or  SELECT column\_name FROM table\_name  AS table\_alias |
| BETWEEN | SELECT column\_name(s) FROM table\_name WHERE column\_name BETWEEN value1 AND value2 |
| CREATE DATABASE | CREATE DATABASE database\_name |
| CREATE TABLE | CREATE TABLE table\_name ( column\_name1 data\_type, column\_name2 data\_type, column\_name3 data\_type, ... ) |
| CREATE INDEX | CREATE INDEX index\_name ON table\_name (column\_name)  or  CREATE UNIQUE INDEX index\_name ON table\_name (column\_name) |
| CREATE VIEW | CREATE VIEW view\_name AS SELECT column\_name(s) FROM table\_name WHERE condition |
| DELETE | DELETE FROM table\_name WHERE some\_column=some\_value  or  DELETE FROM table\_name (**Note:**Deletes the entire table!!)  DELETE \* FROM table\_name (**Note:**Deletes the entire table!!) |
| DROP DATABASE | DROP DATABASE database\_name |
| DROP INDEX | DROP INDEX table\_name.index\_name (SQL Server) DROP INDEX index\_name ON table\_name (MS Access) DROP INDEX index\_name (DB2/Oracle) ALTER TABLE table\_name DROP INDEX index\_name (MySQL) |
| DROP TABLE | DROP TABLE table\_name |
| EXISTS | IF EXISTS (SELECT \* FROM table\_name WHERE id = ?) BEGIN --do what needs to be done if exists END ELSE BEGIN --do what needs to be done if not END |
| GROUP BY | SELECT column\_name, aggregate\_function(column\_name) FROM table\_name WHERE column\_name operator value GROUP BY column\_name |
| HAVING | SELECT column\_name, aggregate\_function(column\_name) FROM table\_name WHERE column\_name operator value GROUP BY column\_name HAVING aggregate\_function(column\_name) operator value |
| IN | SELECT column\_name(s) FROM table\_name WHERE column\_name IN (value1,value2,..) |
| INSERT INTO | INSERT INTO table\_name VALUES (value1, value2, value3,....)  *or*  INSERT INTO table\_name (column1, column2, column3,...) VALUES (value1, value2, value3,....) |
| INNER JOIN | SELECT column\_name(s) FROM table\_name1 INNER JOIN table\_name2 ON table\_name1.column\_name=table\_name2.column\_name |
| LEFT JOIN | SELECT column\_name(s) FROM table\_name1 LEFT JOIN table\_name2 ON table\_name1.column\_name=table\_name2.column\_name |
| RIGHT JOIN | SELECT column\_name(s) FROM table\_name1 RIGHT JOIN table\_name2 ON table\_name1.column\_name=table\_name2.column\_name |
| FULL JOIN | SELECT column\_name(s) FROM table\_name1 FULL JOIN table\_name2 ON table\_name1.column\_name=table\_name2.column\_name |
| LIKE | SELECT column\_name(s) FROM table\_name WHERE column\_name LIKE pattern |
| ORDER BY | SELECT column\_name(s) FROM table\_name ORDER BY column\_name [ASC|DESC] |
| SELECT | SELECT column\_name(s) FROM table\_name |
| SELECT \* | SELECT \* FROM table\_name |
| SELECT DISTINCT | SELECT DISTINCT column\_name(s) FROM table\_name |
| SELECT INTO | SELECT \* INTO new\_table\_name [IN externaldatabase] FROM old\_table\_name  *or*  SELECT column\_name(s) INTO new\_table\_name [IN externaldatabase] FROM old\_table\_name |
| SELECT TOP | SELECT TOP number|percent column\_name(s) FROM table\_name |
| TRUNCATE TABLE | TRUNCATE TABLE table\_name |
| UNION | SELECT column\_name(s) FROM table\_name1 UNION SELECT column\_name(s) FROM table\_name2 |
| UNION ALL | SELECT column\_name(s) FROM table\_name1 UNION ALL SELECT column\_name(s) FROM table\_name2 |
| UPDATE | UPDATE table\_name SET column1=value, column2=value,... WHERE some\_column=some\_value |
| WHERE | SELECT column\_name(s) FROM table\_name WHERE column\_name operator value |

**Source : https://www.w3schools.com/sql/sql\_quickref.asp**