# Transforming data in SQL

Data analysts usually need to convert data from one format to another to complete an analysis. But what if you are using SQL rather than a spreadsheet? Just like spreadsheets, SQL uses standard rules to convert one type of data to another. If you are wondering why data transformation is an important skill to have as a data analyst, think of it like being a driver who is able to change a flat tire. Being able to convert data to the right format speeds you along in your analysis. You don’t have to wait for someone else to convert the data for you.



In this reading, you will go over the conversions that can be done using the CAST function. There are also more specialized functions like COERCION to work with big numbers, and UNIX\_DATE to work with dates. UNIX\_DATE returns the number of days that have passed since January 1, 1970 and is used to compare and work with dates across multiple time zones. You will likely use CAST most often.

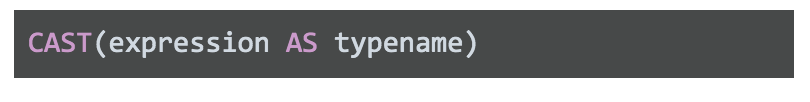
## Common conversions

The following table summarizes some of the more common conversions made with the CAST function. Refer to [Conversion Rules in Standard SQL](https://cloud.google.com/bigquery/docs/reference/standard-sql/conversion_rules) for a full list of functions and associated rules.

| **Starting with** | **CAST function can convert to:** |
| --- | --- |
| Numeric (number) | - Integer  - Numeric (number)  - Big number  - Floating integer  - String |
| String | - Boolean  - Integer  - Numeric (number)  - Big number  - Floating integer  - String  - Bytes  - Date  - Date time  - Time  - Timestamp |
| Date | - String  - Date  - Date time  - Timestamp |

## The CAST function (syntax and examples)

CAST is an American National Standards Institute (ANSI) function used in lots of programming languages, including BigQuery. This section provides the BigQuery syntax and examples of converting the data types in the first column of the previous table. The syntax for the CAST function is as follows:



Where expression is the data to be converted and typename is the data type to be returned.

### Converting a number to a string

The following CAST statement returns a string from a numeric identified by the variable MyCount in the table called MyTable.



In the above SQL statement, the following occurs:

* SELECT indicates that you will be selecting data from a table
* CAST indicates that you will be converting the data you select to a different data type
* AS comes before and identifies the data type which you are casting to
* STRING indicates that you are converting the data to a string
* FROM indicates which table you are selecting the data from

### Converting a string to a number

The following CAST statement returns an integer from a string identified by the variable MyVarcharCol in the table called MyTable. (An integer is any whole number.)



In the above SQL statement, the following occurs:

* SELECT indicates that you will be selecting data from a table
* CAST indicates that you will be converting the data you select to a different data type
* AS comes before and identifies the data type which you are casting to
* INT indicates that you are converting the data to an integer
* FROM indicates which table you are selecting the data from

### Converting a date to a string

The following CAST statement returns a string from a date identified by the variable MyDate in the table called MyTable.



* SELECT indicates that you will be selecting data from a table
* CAST indicates that you will be converting the data you select to a different data type
* AS comes before and identifies the data type which you are casting to
* STRING indicates that you are converting the data to a string
* FROM indicates which table you are selecting the data from

### **Converting a date to a datetime**

Datetime values have the format of YYYY-MM-DD hh: mm: ss format, so date and time are retained together. The following CAST statement returns a datetime value from a date.



In the above SQL statement, the following occurs:

* SELECT indicates that you will be selecting data from a table
* CAST indicates that you will be converting the data you select to a different data type
* AS comes before and identifies the data type which you are casting to
* DATETIME indicates that you are converting the data to a datetime value
* FROM indicates which table you are selecting the data from

## The SAFE\_CAST function

Using the CAST function in a query that fails returns an error in BigQuery. To avoid errors in the event of a failed query, use the SAFE\_CAST function instead. The SAFE\_CAST function returns a value of Null instead of an error when a query fails.

The syntax for SAFE\_CAST is the same as for CAST. Simply substitute the function directly in your queries. The following SAFE\_CAST statement returns a string from a date.



SELECT SAFE\_CAST (MyDate AS STRING) FROM MyTable

## More information

Browse these resources for more information about data conversion using other SQL dialects (instead of BigQuery):

* [CAST and CONVERT](https://docs.microsoft.com/en-us/sql/t-sql/functions/cast-and-convert-transact-sql?view=sql-server-ver15): SQL Server reference documentation
* [MySQL CAST Functions and Operators](https://dev.mysql.com/doc/refman/8.0/en/cast-functions.html): MySQL reference documentation
* [How to: SQL Type Casting](https://www.blendo.co/blog/how-to-sql-type-casting/): Blog about type casting that has links to other SQL short guides