Data Analysis Expressions(DAX)

DAX, or Data Analysis Expressions, is a formula language used in Microsoft tools like Power BI, Power Pivot, and SQL Server Analysis Services (SSAS). It is designed for data modeling and analysis, allowing users to create custom calculations, aggregations, and queries.

1. Aggregation Functions

DAX Formula Name	Syntax	Definition
AVERAGE	AVERAGE(<column>)	Returns the average (arithmetic mean) of the values in a column.
AVERAGEX	AVERAGEX(<table>, <expression>)	Returns the average of an expression evaluated over a table.
COUNT	COUNT(<column>)	Counts the number of values in a column (ignoring blank values).
COUNTAX	COUNTAX(<table>, <expression>)	Counts the number of rows that contain a value in an expression evaluated over a table.
COUNTBLANK	COUNTBLANK(<column>)	Counts the number of blank values in a column.
COUNTROWS	COUNTROWS(<table>)	Returns the number of rows in a table or table expression.
DISTINCTCOUNT	DISTINCTCOUNT(<column>)	Counts the number of distinct (unique) values in a column.
MAX	MAX(<column>)	Returns the largest value in a column.
MAXX	MAXX(<table>, <expression>)	Returns the largest value from an expression evaluated over a table.
MIN	MIN(<column>)	Returns the smallest value in a column.

MINX	MINX(<table>, <expression>)	Returns the smallest value from an expression evaluated over a table.
SUM	SUM(<column>)	Returns the sum of values in a column.
SUMAX	SUMAX(<table>, <expression>)	Returns the sum of an expression evaluated over a table.
SUMX	SUMX(<table>, <expression>)	Returns the sum of an expression evaluated over a table.
PRODUCT	PRODUCT(<column>)	Returns the product of all values in a column.
PRODUCTX	PRODUCTX(<table>, <expression>)	Returns the product of an expression evaluated over a table.
MEDIAN	MEDIAN(<column>)	Returns the median value of a column.
STDEV	STDEV(<column>)	Returns the sample standard deviation of a column.
STDEVP	STDEVP(<column>)	Returns the population standard deviation of a column.
VAR	VAR(<column>)	Returns the sample variance of a column.
VARP	VARP(<column>)	Returns the population variance of a column.

2. Date and Time Functions

DAX Formula Name	Syntax	Definition
DATE	DATE(<year>, <month>, <day>)	Returns the date value for the specified year, month, and day.

DATEDIFF	DATEDIFF(<start_date>, <end_date>, <interval>)	Returns the difference between two dates, in the specified interval (e.g., days, months, years).
DATEADD	DATEADD(<dates>, <number>, <interval>)	Returns a table that shifts the dates in a column by a specified number of intervals.
DAYS	DAYS(<end_date>, <start_date>)	Returns the number of days between two dates.
DAY	DAY(<date>)	Returns the day of the month from a date.
ENDOFMONTH	ENDOFMONTH(<dates>, <shift>)	Returns the last date of the month, with an optional offset.
ENDOFYEAR	ENDOFYEAR(<dates>, <shift>)	Returns the last date of the year, with an optional offset.
HOUR	HOUR(<time>)	Returns the hour of a given time.
MONTH	MONTH(<date>)	Returns the month of the year from a date.
MONTHNAME	MONTHNAME(<date>)	Returns the name of the month for a given date.
NOW	NOW()	Returns the current date and time.
QUARTER	QUARTER(<date>)	Returns the quarter of the year from a date.
STARTOFMONTH	STARTOFMONTH(<dates>)	Returns the first date of the month.
STARTOFYEAR	STARTOFYEAR(<dates>)	Returns the first date of the year.
TIME	TIME(<hour>, <minute>, <second>)	Returns a time value for the specified hour, minute, and second.

TIMEVALUE	TIMEVALUE(<time>)	Returns the time portion of a date-time value as a time value.
TODAY	TODAY()	Returns the current date.
YEAR	YEAR(<date>)	Returns the year from a date.
YEARFRAC	YEARFRAC(<start_date>, <end_date>)	Returns the year fraction between two dates.
SAMEPERIODLASTYEAR	SAMEPERIODLASTYEAR(<dates>)	Returns a table of the same period last year, based on the provided dates.
TOTALYTD	TOTALYTD(<expression>, <dates>, <filter>, <year_end_date>)	Calculates the year-to-date (YTD) value for an expression over a date range.
DATESBETWEEN	DATESBETWEEN(<dates>, <start_date>, <end_date>)	Returns a table of dates between the specified start and end date.
DATESINPERIOD	DATESINPERIOD(<dates>, <start_date>, <number_of_periods>, <interval>)	Returns a table of dates within the specified period.
DATESMTD	DATESMTD(<dates>)	Returns a table of dates for the month-to-date (MTD).
DATESQTD	DATESQTD(<dates>)	Returns a table of dates for the quarter-to-date (QTD).
DATESYTD	DATESYTD(<dates>)	Returns a table of dates for the year-to-date (YTD).
PREVIOUSMONTH	PREVIOUSMONTH(<dates>)	Returns a table of dates for the previous month.

NEXTMONTH	NEXTMONTH(<dates>)	Returns a table of dates for the next month.
PARALLELPERIOD	PARALLELPERIOD(<dates>, <number_of_intervals>, <interval>)	Returns a table of dates shifted by a specified number of intervals.
FIRSTDATE	FIRSTDATE(<dates>)	Returns the first date in a column or table.
LASTDATE	LASTDATE(<dates>)	Returns the last date in a column or table.
LASTNONBLANK	LASTNONBLANK(<dates>, <expression>)	Returns the last date in a column or table that contains a non-blank value for the expression.

3. Filter Functions

DAX Formula Name	Syntax	Definition
ALL	ALL(<table_or_column>)	Removes all filters from a table or column.
ALLSELECTED	ALLSELECTED(<table_or_column>)	Returns all values in a table or column, considering any filters in the report context.
ALLEXCEPT	ALLEXCEPT(<table>, <column1>, <column2>, ...)	Removes all filters in a table except the ones on specified columns.
REMOVEFILTERS	REMOVEFILTERS(<table_or_column>)	Removes filters from a table or column.
SELECTEDVALUE	SELECTEDVALUE(<column>, <default>)	Returns the value when a single value is selected in a column, otherwise returns the default value.

VALUES	VALUES(<column>)	Returns a one-column table that contains the unique values in a column.
FILTER	FILTER(<table>, <expression>)	Returns a table that contains only rows for which the expression evaluates to true.
CALCULATE	CALCULATE(<expression>, <filter1>, <filter2>, ...)	Evaluates an expression in a modified filter context.
CALCULATETABLE	CALCULATETABLE(<table>, <filter1>, <filter2>, ...)	Returns a table modified by the specified filters.
TREATAS	TREATAS(<table>, <column1>, <column2>, ...)	Treats one table as if it were another, with different column names and relationships.
USERELATIONSHIP	USERELATIONSHIP(<column1>, <column2>)	Specifies an alternative relationship to be used in the calculation.
CROSSFILTER	CROSSFILTER(<column1>, <column2>, <relationship>)	Defines a cross-filtering direction for a relationship.
KEEPFILTERS	KEEPFILTERS(<filter>)	Applies additional filters to the current context in a calculation.
ISFILTERED	ISFILTERED(<column>)	Returns TRUE if the column is being filtered, otherwise returns FALSE.
ISBLANK	ISBLANK(<value>)	Returns TRUE if a value is blank, otherwise returns FALSE.

4. Information Functions

DAX Formula Name	Syntax	Definition
ISBLANK	ISBLANK(<value>)	Returns TRUE if the value is blank, otherwise returns FALSE.
ISERROR	ISERROR(<expression>)	Returns TRUE if the expression results in an error, otherwise returns FALSE.
ISNONTEXT	ISNONTEXT(<value>)	Returns TRUE if the value is not text, otherwise returns FALSE.
ISNUMBER	ISNUMBER(<value>)	Returns TRUE if the value is a number, otherwise returns FALSE.
ISTEXT	ISTEXT(<value>)	Returns TRUE if the value is text, otherwise returns FALSE.
ISLOGICAL	ISLOGICAL(<value>)	Returns TRUE if the value is a logical (TRUE/FALSE), otherwise returns FALSE.

5. Logical Functions

DAX Formula Name	Syntax	Definition
AND	AND(<expression1>, <expression2>)	Returns TRUE if both expressions evaluate to TRUE, otherwise returns FALSE.
IF	IF(<logical_test>, <value_if_true>, <value_if_false>)	Returns one value if the condition is TRUE and another if the condition is FALSE.
IFERROR	IFERROR(<expression>, <value_if_error>)	Returns the value of an expression if it does not result in an error, otherwise returns a specified value.
NOT	NOT(<logical_expression>)	Reverses the result of a logical expression, returning TRUE if the expression is FALSE, and vice versa.
OR	OR(<expression1>, <expression2>)	Returns TRUE if any of the expressions evaluate to TRUE.
SWITCH	SWITCH(<expression>, <value1>, <result1>, ...)	Evaluates an expression against a list of values and returns the result corresponding to the first matching value.
TRUE	TRUE()	Returns the logical value TRUE.
FALSE	FALSE()	Returns the logical value FALSE.

ISINSCOPE	ISINSCOPE(<column>)	Returns TRUE if a column is in the current scope, otherwise returns FALSE.
IFBLANK	IFBLANK(<value>, <alternative_value>)	Returns a value if the expression is not blank; otherwise, returns an alternative value.
COALESCE	COALESCE(<expression 1>, <expression2>, …)	Returns the first non-blank value among the expressions.
IFERROR	IFERROR(<expression>, <value_if_error>)	Returns a specified value if an expression evaluates to an error.

6. Statistical Functions

DAX Formula Name	Syntax	Definition
MEDIAN	MEDIAN(<column>)	Returns the median value of a column.
PERCENTILE.EXC	PERCENTILE.EXC(<column>, <percentile>)	Returns the value at the given percentile of a column, excluding the 0th and 100th percentiles.
PERCENTILE.INC	PERCENTILE.INC(<column>, <percentile>)	Returns the value at the given percentile of a column, including the 0th and 100th percentiles.

DAX Formula Name	Syntax	Definition
STDEV	STDEV(<column>)	Returns the sample standard deviation of a column.
STDEVP	STDEVP(<column>)	Returns the population standard deviation of a column.
VAR	VAR(<column>)	Returns the sample variance of a column.
VARP	VARP(<column>)	Returns the population variance of a column.
RANKX	RANKX(<table>, <expression>, <value>, <order>, <ties>)	Returns the rank of an expression evaluated over a table, with options for sorting and handling ties.
RUNNINGTOTAL	RUNNINGTOTAL(<expression>, <dates>, <order>)	Computes the running total of an expression over time, based on the provided date and sort order.
COVARIANCE.P	COVARIANCE.P(<column1>, <column2>)	Returns the population covariance between two columns.
COVARIANCE.S	COVARIANCE.S(<column1>, <column2>)	Returns the sample covariance between two columns.

7. Text Functions

DAX Formula Name	Syntax	Definition
CONCATENATE	CONCATENATE(<text1>, <text2>)	Joins two text values into one text string.
CONCATENATEX	CONCATENATEX(<table>, <expression>, <delimiter>, <order>)	Concatenates the result of an expression evaluated over a table with a specified delimiter, and an optional sort order.
LEFT	LEFT(<text>, <num_chars>)	Returns the leftmost characters from a text string, based on a specified number of characters.
RIGHT	RIGHT(<text>, <num_chars>)	Returns the rightmost characters from a text string, based on a specified number of characters.
MID	MID(<text>, <start_position>, <num_chars>)	Returns a substring from a text string, starting at a specified position and with a specified length.
LEN	LEN(<text>)	Returns the number of characters in a text string.
UPPER	UPPER(<text>)	Converts a text string to uppercase.
LOWER	LOWER(<text>)	Converts a text string to lowercase.
TRIM	TRIM(<text>)	Removes leading and trailing spaces from a text string.

REPLACE	REPLACE(<text>, <start_position>, <num_chars>, <new_text>)	Replaces part of a text string with another text string, starting from a specified position.
SEARCH	SEARCH(<find_text>, <within_text>, <start_position>)	Returns the position of the first occurrence of a substring within another string.
EXACT	EXACT(<text1>, <text2>)	Compares two text strings and returns TRUE if they are exactly the same, otherwise returns FALSE.
TEXT	TEXT(<value>, <format>)	Converts a value to text according to the specified format.
VALUE	VALUE(<text>)	Converts a text string that represents a number to a numeric value.
SUBSTITUTE	SUBSTITUTE(<text>, <old_text>, <new_text>, <instance_num>)	Replaces occurrences of a substring with another substring.
TEXTJOIN	TEXTJOIN(<delimiter>, <ignore_empty>, <text1>, <text2>, ...)	Joins multiple text strings into one, with an optional delimiter and the option to ignore empty values.
FIND	FIND(<find_text>, <within_text>, <start_position>)	Returns the position of the first occurrence of a substring within another string, case-sensitive.

UNICHAR	UNICHAR(<unicode>)	Returns the Unicode character that corresponds to a specified code point.
UNICODE	UNICODE(<text>)	Returns the Unicode value of the first character in a text string.

8. Parent-Child Functions

DAX Formula Name	Syntax	Definition
PATH	PATH(<parent>, <child>)	Returns a delimited text string with the path from the parent to the child in a parent-child hierarchy.
PATHITEM	PATHITEM(<path>, <item_number>)	Returns a specific item from a path. The path is defined by the PATH function.
PATHITEMREVERSE	PATHITEMREVERSE(<path>, <item_number>)	Returns a specific item from a path in reverse order.
PATHLENGTH	PATHLENGTH(<path>)	Returns the length (number of items) of a path.
LOOKUPVALUE	LOOKUPVALUE(<result_column>, <search_column>, <search_value>)	Returns the value in a result column for a row where a specified column has a matching value.

9. Rank Functions

DAX Formula Name	Syntax	Definition
RANKX	RANKX(<table>, <expression>, <value>, <order>, <ties>)	Ranks the rows in a table based on the result of an expression, with the option to handle sorting and ties.
RANK.EQ	RANK.EQ(<number>, <values>, <order>)	Returns the rank of a number in a list of numbers, where duplicates receive the same rank.
RANK.AVG	RANK.AVG(<number>, <values>, <order>)	Returns the average rank of a number in a list of numbers, where duplicates receive the average rank.

10. Mathematical Functions

DAX Formula Name	Syntax	Definition
ABS	ABS(<number>)	Returns the absolute value of a number.
CEILING	CEILING(<number>, <significance>)	Rounds a number up, away from zero, to the nearest multiple of significance.
FLOOR	FLOOR(<number>, <significance>)	Rounds a number down, towards zero, to the nearest multiple of significance.
MOD	MOD(<number>, <divisor>)	Returns the remainder after a number is divided by a divisor.

POWER	POWER(<number>, <exponent>)	Returns the result of a number raised to the power of an exponent.
ROUND	ROUND(<number>, <num_digits>)	Rounds a number to a specified number of digits.
ROUNDUP	ROUNDUP(<number>, <num_digits>)	Rounds a number up, away from zero, to the specified number of digits.
ROUNDDOWN	ROUNDDOWN(<number>, <num_digits>)	Rounds a number down, towards zero, to the specified number of digits.
SQRT	SQRT(<number>)	Returns the square root of a number.
TRUNC	TRUNC(<number>, <num_digits>)	Truncates a number to a specified number of digits by removing the fractional part.
EXP	EXP(<number>)	Returns the constant e raised to the power of a number.
LN	LN(<number>)	Returns the natural logarithm of a number.
LOG	LOG(<number>, <base>)	Returns the logarithm of a number to the specified base.
PI	PI()	Returns the value of the mathematical constant pi.
RAND	RAND()	Returns a random number between 0 and 1.

SIGN	SIGN(<number>)	Returns the sign of a number, indicating whether the number is positive, negative, or zero.
SQUAREROOT	SQUAREROOT(<number>)	Returns the square root of a number.
LN10	LN10()	Returns the natural logarithm of 10.

11. Financial Functions

DAX Formula Name	Syntax	Definition
FV	FV(<rate>, <nper>, <pmt>, <pv>, <type>)	Returns the future value of an investment based on constant periodic payments and a constant interest rate.
IPMT	IPMT(<rate>, <period>, <nper>, <pv>, <fv>, <type>)	Returns the interest payment for an investment based on constant periodic payments and a constant interest rate.
PMT	PMT(<rate>, <nper>, <pv>, <fv>, <type>)	Returns the periodic payment for an investment based on constant periodic payments and a constant interest rate.
PV	PV(<rate>, <nper>, <pmt>, <fv>, <type>)	Returns the present value of an investment based on constant periodic payments and a constant interest rate.

RATE	RATE(<nper>, <pmt>, <pv>, <fv>, <type>, <guess>)	Returns the interest rate for an investment based on constant periodic payments and a constant present value.
NPER	NPER(<rate>, <pmt>, <pv>, <fv>, <type>)	Returns the number of periods for an investment based on constant periodic payments and a constant interest rate.

12. Miscellaneous Functions

DAX Formula Name	Syntax	Definition
BLANK	BLANK()	Returns a blank value.
DISTINCT	DISTINCT(<table>)	Returns a table with distinct values from a specified column.
EARLIER	EARLIER(<expression>, <level>)	Returns the value of an expression evaluated in an earlier row context in a nested iteration.
EARLIEST	EARLIEST(<expression>, <level>)	Returns the earliest value in a column for the current row context.
NEXTMONTH	NEXTMONTH(<dates>)	Returns the next month from the given date range.
PREVIOUSMONTH	PREVIOUSMONTH(<dates>)	Returns the previous month from the given date range.

USERELATIONSHIP	USERELATIONSHIP(<column1>, <column2>)	Specifies an alternative relationship to be used in the calculation.
EXACT	EXACT(<text1>, <text2>)	Compares two text strings and returns TRUE if they are exactly the same, otherwise returns FALSE.

13. Conversion Functions

DAX Formula Name	Syntax	Definition
VALUE	VALUE(<text>)	Converts a text string that represents a number to a numeric value.
DATEVALUE	DATEVALUE(<text>)	Converts a date in the form of text to a date/time value.
TIMEVALUE	TIMEVALUE(<text>)	Converts a time in the form of text to a time value.
TEXT	TEXT(<value>, <format>)	Converts a value to text according to the specified format.
INT	INT(<value>)	Converts a number to an integer by rounding down.
REAL	REAL(<value>)	Converts a text or number to a real number (float).
BOOLEAN	BOOLEAN(<value>)	Converts a value to a boolean (TRUE or FALSE).

14. Geospatial Functions

DAX Formula Name	Syntax	Definition
GEOADD	GEOADD(<geometry1>, <geometry2>)	Returns the geometry resulting from the union of two geometries, effectively combining them.
GEOMETRY	GEOMETRY(<geospatial_ expression>)	Returns the geometry of a geospatial object, enabling the handling and manipulation of spatial data.

Advanced Functions

DAX Formula Name	Syntax	Definition
CROSSJOIN	CROSSJOIN(<table1>, <table2>, ...)	Returns the Cartesian product of two or more tables. Every row from the first table is combined with every row from the second table.
UNION	UNION(<table1>, <table2>, ...)	Combines the rows of two or more tables, removing duplicates.
INTERSECT	INTERSECT(<table1>, <table2>)	Returns a table with the rows common to both tables.
EXCEPT	EXCEPT(<table1>, <table2>)	Returns a table with the rows that exist in the first table but not in the second table.

NATURALINNERJOIN	NATURALINNERJOIN(<table1>, <table2>)	Returns a table that contains only the rows where there is a match between both tables, joining on columns with the same names.
NATURALLEFTOUTERJOIN	NATURALLEFTOUTERJOIN(<table1>, <table2>)	Returns a table that contains all rows from the first table and matching rows from the second table, joining on columns with the same names.
GENERATE	GENERATE(<table1>, <expression>)	Returns a table by applying an expression to each row of the first table. The expression must return a table.
GENERATEALL	GENERATEALL(<table1>, <expression>)	Similar to GENERATE, but it returns all rows from the second table regardless of the filter context.
SUMMARIZE	SUMMARIZE(<table>, <group_by_column1>, <group_by_column2>, ...)	Returns a table grouped by one or more columns, with aggregated results for each group.
SUMMARIZECOLUMNS	SUMMARIZECOLUMNS(<column1>, <column2>, ...)	Returns a table with one or more columns of data, performing aggregations over the provided columns and expressions.

ADDCOLUMNS	ADDCOLUMNS(<table>, <new_column1>, <expression1>, ...)	Adds one or more columns to a table, evaluating the specified expressions for each row in the table.
SELECTCOLUMNS	SELECTCOLUMNS(<table>, <column1>, <expression1>, ...)	Returns a table with the specified columns, evaluating expressions for each column.