```
mysql> SELECT 0 > 'x6';
        -> 0
mysql> SELECT 0 = 'x6';
        -> 1
```

For comparisons of a string column with a number, MySQL cannot use an index on the column to look up the value quickly. If *`str_col`* is an indexed string column, the index cannot be used when performing the lookup in the following statement:

```
SELECT * FROM tbl_name WHERE str_col=1;
```

The reason for this is that there are many different strings that may convert to the value `1`, such as `'1'`, `' 1'`, or `'1a'`.

Comparisons between floating-point numbers and large values of `INTEGER` type are approximate because the integer is converted to double-precision floating point before comparison, which is not capable of representing all 64-bit integers exactly. For example, the integer value 2^{53} + 1 is not representable as a float, and is rounded to 2^{53} or 2^{53} + 2 before a float comparison, depending on the platform.

To illustrate, only the first of the following comparisons compares equal values, but both comparisons return true (1):

```
mysql> SELECT '9223372036854775807' = 9223372036854775807;
        -> 1
mysql> SELECT '9223372036854775807' = 9223372036854775806;
        -> 1
```

When conversions from string to floating-point and from integer to floating-point occur, they do not necessarily occur the same way. The integer may be converted to floating-point by the CPU, whereas the string is converted digit by digit in an operation that involves floating-point multiplications. Also, results can be affected by factors such as computer architecture or the compiler version or optimization level. One way to avoid such problems is to use `CAST()` so that a value is not converted implicitly to a float-point number:

```
mysql> SELECT CAST('9223372036854775807' AS UNSIGNED) = 9223372036854775806;
        -> 0
```

For more information about floating-point comparisons, see Section B.3.4.8, “Problems with Floating-Point Values”.

The server includes `dtoa`, a conversion library that provides the basis for improved conversion between string or `DECIMAL` values and approximate-value (`FLOAT`/`DOUBLE`) numbers:

- Consistent conversion results across platforms, which eliminates, for example, Unix versus Windows conversion differences.
- Accurate representation of values in cases where results previously did not provide sufficient precision, such as for values close to IEEE limits.
- Conversion of numbers to string format with the best possible precision. The precision of `dtoa` is always the same or better than that of the standard C library functions.

Because the conversions produced by this library differ in some cases from non-`dtoa` results, the potential exists for incompatibilities in applications that rely on previous results. For example, applications that depend on a specific exact result from previous conversions might need adjustment to accommodate additional precision.

The `dtoa` library provides conversions with the following properties. *`D`* represents a value with a `DECIMAL` or string representation, and *`F`* represents a floating-point number in native binary (IEEE) format.

- *`F`* -> *`D`* conversion is done with the best possible precision, returning *`D`* as the shortest string that yields *`F`* when read back in and rounded to the nearest value in native binary format as specified by IEEE.