

SQL Quick Reference

SELECT, JOIN, subqueries, indexes, transactions

SELECT

```
SELECT * FROM users;
SELECT name, email FROM users;
SELECT DISTINCT city FROM users;
SELECT name AS full_name FROM users;
```

WHERE

Comparison Operators

= <> (!=)	Equal / not equal
< > <= >=	Comparison operators
AND OR NOT	Logical operators
IS NULL / IS NOT NULL	Null checks

Pattern Matching

```
SELECT * FROM users WHERE name LIKE 'A%';
-- % = any chars, _ = single char
SELECT * FROM users WHERE age IN (20, 25, 30);
SELECT * FROM users WHERE age BETWEEN 18 AND 30;
```

JOIN

Join Types

INNER JOIN	Rows matching in both tables
LEFT JOIN	All left rows + matching right
RIGHT JOIN	All right rows + matching left
FULL OUTER JOIN	All rows from both tables
CROSS JOIN	Cartesian product of both tables

Join Syntax

```
SELECT u.name, o.total
FROM users u
INNER JOIN orders o ON u.id = o.user_id;

SELECT u.name, o.total
FROM users u
LEFT JOIN orders o ON u.id = o.user_id;
```

INSERT / UPDATE / DELETE

Insert

```
INSERT INTO users (name, email)
VALUES ('Alice', 'alice@example.com');

INSERT INTO users (name, email) VALUES
('Bob', 'bob@ex.com'),
('Carol', 'carol@ex.com');
```

Update

```
UPDATE users SET email = 'new@ex.com'
WHERE id = 1;
```

Delete

```
DELETE FROM users WHERE id = 1;
DELETE FROM users; -- delete all rows
```

CREATE TABLE

Syntax

```
CREATE TABLE users (
  id INTEGER PRIMARY KEY AUTOINCREMENT,
  name TEXT NOT NULL,
  email TEXT UNIQUE,
  age INTEGER DEFAULT 0,
  score REAL
);
```

Common Data Types

INTEGER	Whole numbers
REAL	Floating-point numbers
TEXT	String / text data
BLOB	Binary data
BOOLEAN	TRUE / FALSE (stored as 0/1)
DATE / DATETIME	Date and timestamp values

Constraints

PRIMARY KEY	Unique row identifier
NOT NULL	Value required
UNIQUE	No duplicate values
DEFAULT val	Default value if omitted
CHECK (expr)	Custom validation rule
FOREIGN KEY	Reference to another table

Aggregate Functions

COUNT(*)	Number of rows
COUNT(col)	Non-null values in column
SUM(col)	Sum of numeric column
AVG(col)	Average of numeric column
MIN(col)	Minimum value
MAX(col)	Maximum value

Example

```
SELECT COUNT(*) AS total,
       AVG(age) AS avg_age,
       MAX(score) AS top_score
FROM users;
```

GROUP BY / HAVING

```
SELECT city, COUNT(*) AS num_users
FROM users
GROUP BY city;

SELECT city, AVG(age) AS avg_age
FROM users
GROUP BY city
HAVING AVG(age) > 25;
```

WHERE filters rows before grouping; HAVING filters groups after aggregation

ORDER BY / LIMIT

```
SELECT * FROM users ORDER BY name ASC;
SELECT * FROM users ORDER BY age DESC;
SELECT * FROM users
ORDER BY city, name
LIMIT 10 OFFSET 20; -- skip 20, take 10
```

Subqueries

In WHERE Clause

```
SELECT name FROM users
WHERE id IN (
  SELECT user_id FROM orders
  WHERE total > 100
);
```

As Derived Table

```
SELECT city, avg_age FROM (
  SELECT city, AVG(age) AS avg_age
  FROM users GROUP BY city
) WHERE avg_age > 30;
```

Indexes

```
CREATE INDEX idx_name ON users(name);
CREATE UNIQUE INDEX idx_email
  ON users(email);
DROP INDEX idx_name;
```

When to Index

Columns in WHERE	Speed up filtering
Columns in JOIN ON	Speed up join lookups
Columns in ORDER BY	Speed up sorting
High-cardinality cols	Many unique values benefit most