

# Jest Quick Reference

Tests, matchers, mocking, async, and snapshots

## Setup

### Installation

```
npm install --save-dev jest
# package.json: "scripts": { "test": "jest" }
npx jest # run all tests
npx jest --watch # re-run on changes
```

### File Naming

|                   |                                  |
|-------------------|----------------------------------|
| <b>*.test.js</b>  | Test files (default pattern)     |
| <b>*.spec.js</b>  | Alternative test pattern         |
| <b>__tests__/</b> | Test directory (auto-discovered) |

### Running Specific Tests

```
npx jest path/to/file.test.js
npx jest --testNamePattern="adds"
npx jest --verbose # detailed output
```

## Basic Tests

### Test Structure

```
describe("Calculator", () => {
  test("adds 1 + 2 to equal 3", () => {
    expect(add(1, 2)).toBe(3);
  });
});
```

### test vs it

```
test("works correctly", () => { /* ... */ });
it("should work correctly", () => { /* ... */ });
// Both are identical; "it" reads like English
```

### Skipping & Focusing

|                        |                     |
|------------------------|---------------------|
| <b>test.skip()</b>     | Skip this test      |
| <b>test.only()</b>     | Run only this test  |
| <b>describe.skip()</b> | Skip entire suite   |
| <b>describe.only()</b> | Run only this suite |

## Matchers

### Equality

|                            |                                |
|----------------------------|--------------------------------|
| <b>.toBe(val)</b>          | Strict equality (===)          |
| <b>.toEqual(val)</b>       | Deep equality (objects/arrays) |
| <b>.toStrictEqual(val)</b> | Deep + type + undefined props  |
| <b>.not.toBe(val)</b>      | Negate any matcher             |

### Truthiness

|                         |                          |
|-------------------------|--------------------------|
| <b>.toBeTruthy()</b>    | Truthy value             |
| <b>.toBeFalsy()</b>     | Falsy value              |
| <b>.toBeNull()</b>      | Exactly <b>null</b>      |
| <b>.toBeUndefined()</b> | Exactly <b>undefined</b> |
| <b>.toBeDefined()</b>   | Not <b>undefined</b>     |

### Numbers

|                                |                             |
|--------------------------------|-----------------------------|
| <b>.toBeGreaterThan(n)</b>     | Greater than n              |
| <b>.toBeLessThanOrEqual(n)</b> | Less than or equal          |
| <b>.toBeCloseTo(0.3, 5)</b>    | Float comparison (5 digits) |

### Strings, Arrays, Objects

|                                  |                              |
|----------------------------------|------------------------------|
| <b>.toMatch(/regex/)</b>         | String matches regex         |
| <b>.toContain(item)</b>          | Array/iterable contains item |
| <b>.toHaveLength(n)</b>          | Length of array/string       |
| <b>.toHaveProperty(key, val)</b> | Object has property          |
| <b>.toMatchObject(obj)</b>       | Object contains subset       |

## Async Testing

### async / await

```
test("fetches data", async () => {
  const data = await fetchData();
  expect(data).toEqual({ id: 1 });
});
```

### Promises

```
test("resolves to data", () => {
  return expect(fetchData())
    .resolves.toEqual({ id: 1 });
});
```

### Rejections

```
test("rejects with error", async () => {
  await expect(fetchBad())
    .rejects.toThrow("Not Found");
});
```

### Exceptions

```
test("throws on invalid input", () => {
  expect(() => validate(null)).toThrow();
  expect(() => validate(null)).toThrow("invalid");
});
```

## Mocking

### Mock Functions

```
const fn = jest.fn();
fn("hello");
expect(fn).toHaveBeenCalledWith("hello");
expect(fn).toHaveBeenCalledTimes(1);
```

### Mock Return Values

```
const fn = jest.fn()
  .mockReturnValue(42)
  .mockReturnValueOnce(99);
fn(); // 99 (first call)
fn(); // 42 (subsequent)
```

### Mocking Modules

```
jest.mock("./api");
const { fetchUser } = require("./api");
fetchUser.mockResolvedValue({ name: "Alice" });
```

### Mock Matchers

|  |                                |
|--|--------------------------------|
| <b>.toHaveBeenCalledTimes()</b>        | Called at least once           |
| <b>.toHaveBeenCalledWith(n)</b>        | Called exactly n times         |
| <b>.toHaveBeenCalledWith(args)</b>     | Called with specific arguments |
| <b>.toHaveBeenLastCalledWith(args)</b> | Last call had these arguments  |

## Spies

### Spying on Methods

```
const spy = jest.spyOn(Math, "random")
  .mockReturnValue(0.5);
expect(Math.random()).toBe(0.5);
spy.mockRestore(); // restore original
```

### Spying on Object Methods

```
const obj = { greet: (n) => `Hi ${n}` };
const spy = jest.spyOn(obj, "greet");
obj.greet("Alice");
expect(spy).toHaveBeenCalledWith("Alice");
```

## Snapshots

### Snapshot Testing

```
test("renders correctly", () => {
  const tree = renderer.create(<App />).toJSON();
  expect(tree).toMatchSnapshot();
});
```

### Inline Snapshots

```
test("formats name", () => {
  expect(formatName("alice"))
    .toMatchInlineSnapshot(`"Alice"`);
});
```

### Updating Snapshots

```
npx jest --updateSnapshot # update all
npx jest --updateSnapshot --testNamePattern="renders"
```

## Setup & Teardown

### Lifecycle Hooks

```
beforeAll(() => { /* once before all tests */ });
afterAll(() => { /* once after all tests */ });
beforeEach(() => { /* before each test */ });
afterEach(() => { /* after each test */ });
```

### Scoping

```
describe("Database", () => {
  beforeEach(() => db.connect());
  afterEach(() => db.disconnect());
  test("reads data", () => { /* ... */ });
});
```

Hooks inside describe only apply to that block

## Configuration

### jest.config.js

```
module.exports = {
  testEnvironment: "node",
  coverageThreshold: {
    global: { branches: 80, lines: 80 }
  },
};
```

### Common Options

|                                 |                                   |
|---------------------------------|-----------------------------------|
| <b>testEnvironment</b>          | "node" or "jsdom" (DOM)           |
| <b>roots</b>                    | Directories to search for tests   |
| <b>collectCoverage</b>          | Enable coverage reporting         |
| <b>coverageDirectory</b>        | Output directory for coverage     |
| <b>moduleNameMapper</b>         | Path aliases (e.g., @/ prefix)    |
| <b>transform</b>                | File transforms (Babel, TS, etc.) |
| <b>setupFilesAfterFramework</b> | Run setup before each suite       |

### Coverage

```
npx jest --coverage
npx jest --collectCoverageFrom="src/**/*.js"
```

## Common Patterns

### Testing API Calls

```
jest.mock("./api");
test("loads users", async () => {
  api.getUsers.mockResolvedValue([{id: 1}]);
  const users = await loadUsers();
  expect(users).toHaveLength(1);
});
```

# Jest Quick Reference

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## Timer Mocks

```
jest.useFakeTimers();
test("delays execution", () => {
  const cb = jest.fn();
  setTimeout(cb, 1000);
  jest.advanceTimersByTime(1000);
  expect(cb).toHaveBeenCalled();
});
```

## Parameterized Tests

```
test.each([
  [1, 1, 2],
  [2, 3, 5],
])("add(%i, %i) = %i", (a, b, expected) => {
  expect(add(a, b)).toBe(expected);
});
```

## Custom Matchers

```
expect.extend({
  toBeWithinRange(received, floor, ceil) {
    const pass = received >= floor
      && received <= ceil;
    return { pass, message: () =>
      `expected ${received} in [${floor},${ceil}]` };
  }
});
```