# Math API – Project Startup Guide

This document provides step-by-step instructions to run and test the Math API project in a containerized environment using Docker and Rancher Desktop.

## 1. Prerequisites

Make sure you have the following installed on your system:

- Rancher Desktop

- Docker (enabled and set to 'containerd')

- SQL Server Management Studio (SSMS) for database inspection

## 2. Initial Setup

1. Clone or download the project.

2. Open the project folder in your IDE (e.g., PyCharm, VS Code).

3. The project structure should include at least the following files: docker-compose.yml, Dockerfile, requirements.txt, and the Python application code (in the /app directory).

## 3. Create the SQL Server Database

Before starting the containers, make sure to manually create the database (e.g., mathdb) using SSMS:

1. Open SSMS and connect to the server at `localhost,1433`.

2. Login using the username: sa and password: Str0ng\_Pa55!

3. Create a new database with the name `mathdb`.

## 4. Build and Start the Containers

In your terminal (inside the project directory), run the following command:

```   
docker compose up --build  
```

This command will build the API image and start both the API and SQL Server containers.

## 5. Test the Application

Once the containers are running, open your browser and go to:

http://localhost:8000/docs

This will open the Swagger UI interface where you can test the math operations (factorial, fibonacci, pow).

## 6. Inspect the Database

Use SSMS to connect to the SQL Server instance and inspect the 'operations' table inside the 'mathdb' database to view the logged results.

## Notes

- If the mathdb database is missing, the application will not start successfully.

- The database password must match in both docker-compose.yml and database.py.

## 7. Expected Result

A screenshot of a computer

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**How to Open and Use the Browser-Based Frontend**

This project includes an HTML page (index.html) that lets you test the Math API without using Swagger UI. Here's how to open and use it.

**Step 1: Make Sure the HTML File Is in the Right Place**

The index.html file should be located in a folder called frontend, inside your project.

**Step 2: Open the Frontend Page in Your Browser**

There are two ways to open the HTML page in your browser:

**Using your IDE (like PyCharm):**

* Find the index.html file in the project explorer.
* Right-click on it and choose **"Open in Browser"**.
* It will open in your default browser.

**Step 3: Start the Backend**

Before using the frontend, make sure the backend (FastAPI app) is running. Use Docker Compose:

docker-compose up –build

This will start both the FastAPI server (on port 8000) and the database.

**Step 4: Using the Interface**

Once the backend is running, you can:

* Enter input values in the form on the web page
* Click one of the buttons (Power, Factorial, Fibonacci)
* See the result appear on the page

## 8. Expected Result of the upgraded version

A screenshot of a math application

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