

A Calculus Gamified Virtual Lab

# Integrals & Derivatives

#2 – Back End



# Daftar Isi

**Website**



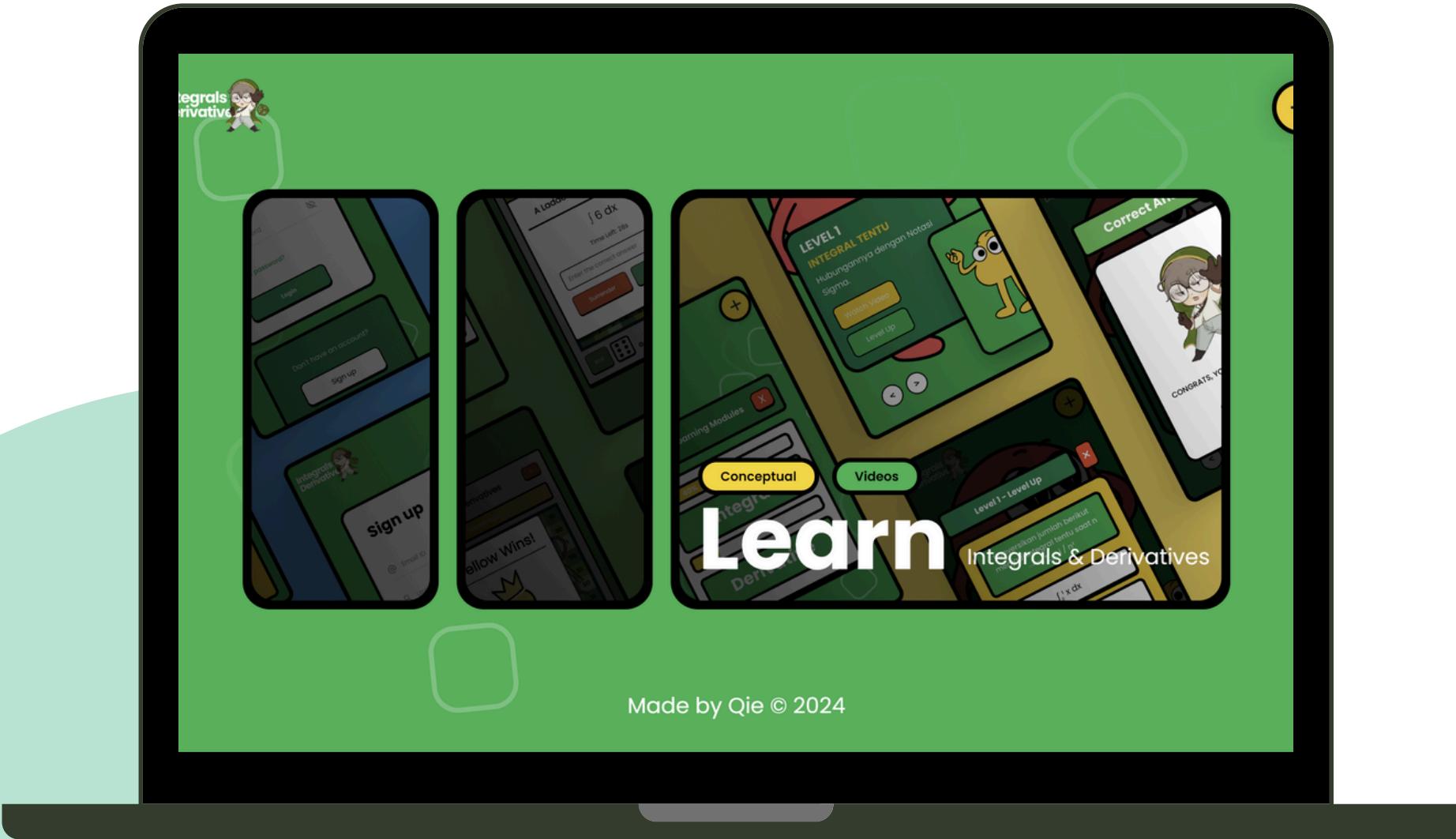
**Database**



**Fitur-Fitur**



# Website Information



**Nama**

Integrals & Derivatives

**Website**

[intrive.space](https://intrive.space)

**Repository**

[github.com/qiewi/integrals-and-derivatives](https://github.com/qiewi/integrals-and-derivatives)

Website

Database

Fitur-Fitur

# Virtual Lab Apa?



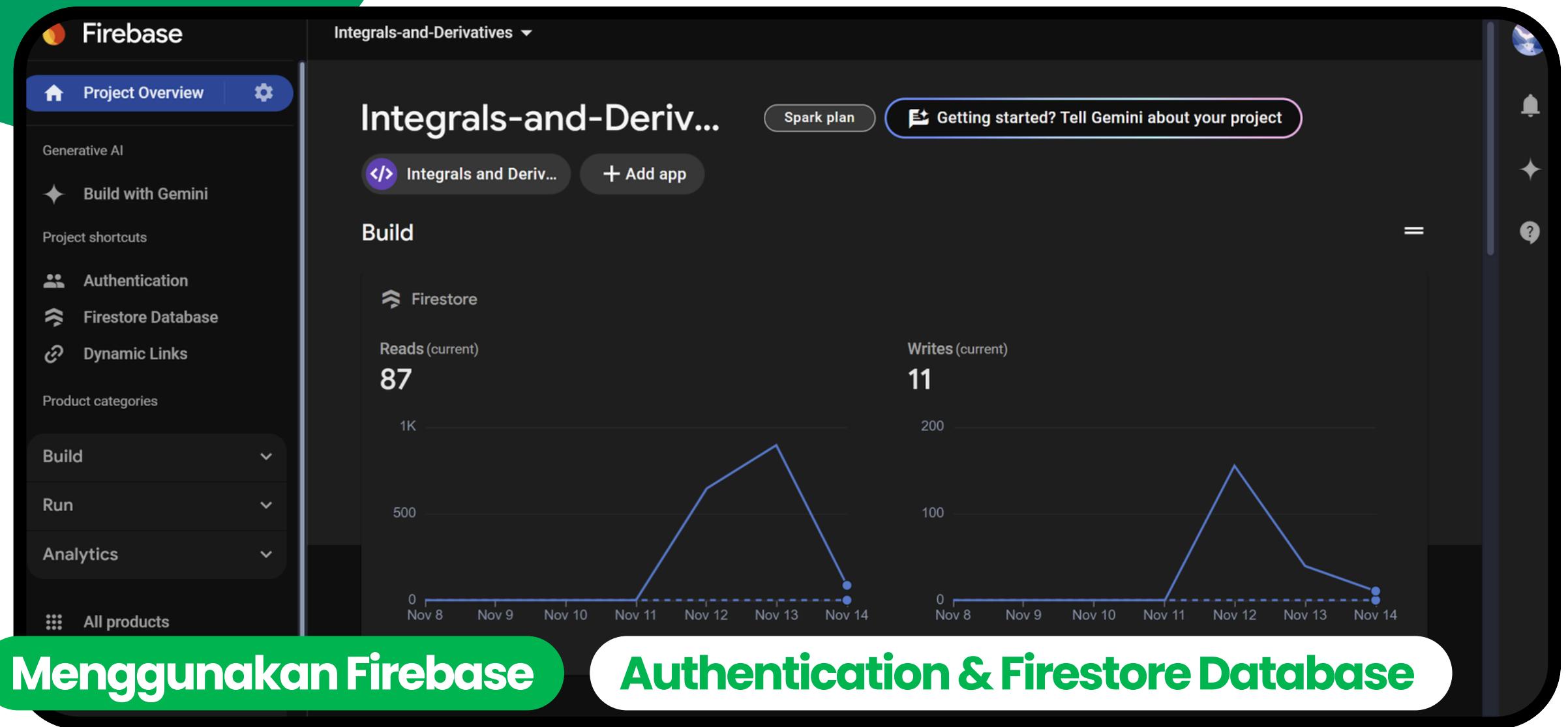
**Integral & Derivatives** adalah sebuah **virtual lab** berbasis web menggunakan HTML, CSS, dan JavaScript untuk topik pada mata kuliah Matematika Dasar di TPB, khususnya **kalkulus**. Virtual lab ini membawakan sebuah materi khusus yaitu **integral dan turunan** dalam bentuk video pembelajaran sebagai konsep dan aplikasi permainan untuk menguji pemahaman pengguna.

Website

Database

Fitur-Fitur

# Database Overview



Website

Database

Fitur-Fitur

# Data Structures #1



The screenshot shows the Google Cloud Firestore interface. On the left, the navigation bar includes 'users' and a specific document ID '2KvpfM9RZYfh9...'. The main area displays a hierarchical data structure under the 'users' collection:

- (default) collection:
  - + Start collection
  - Derivative
  - Integral
  - users
- users collection:
  - + Add document
  - 2KvpfM9RZYfh9pEeLwfL64F3U9O2 (selected):
    - + Start collection
    - + Add field
    - createdAt: "2024-11-14T05:56:29.070Z"
    - email: "qiwi@gmail.com"
    - profilePicture: "data:image/jpeg;base64,/9j/4AAQSkZJRgA..."
    - unlockedCards array:
      - 0: 1
      - 1: 3
      - 2: 4

Struktur Data

Firestore Database

CRUD Operations

The screenshot shows a derivative document structure under the 'Derivative' collection:

- (default) collection:
  - + Start collection
  - Derivative
  - Integral
  - users
- Derivative collection:
  - + Add document
  - 2KvpfM9RZYfh9pEeLwfL64F3U9O2 (selected):
    - + Start collection
    - + Add field
    - completedLevels: 5
    - userId: "2KvpfM9RZYfh9pEeLwfL64F3U9O2"

The screenshot shows an integral document structure under the 'Integral' collection:

- (default) collection:
  - + Start collection
  - Derivative
  - Integral
  - users
- Integral collection:
  - + Add document
  - 2KvpfM9RZYfh9pEeLwfL64F3U9O2 (selected):
    - + Start collection
    - + Add field
    - completedLevels: 4
    - userId: "2KvpfM9RZYfh9pEeLwfL64F3U9O2"

Website

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# Data Structures #2



## Authentication

Menggunakan **fitur authentication** Firestore

## users

Menyimpan **data user** berupa username, email, profile picture, kartu yang dimiliki, dan tanggal join

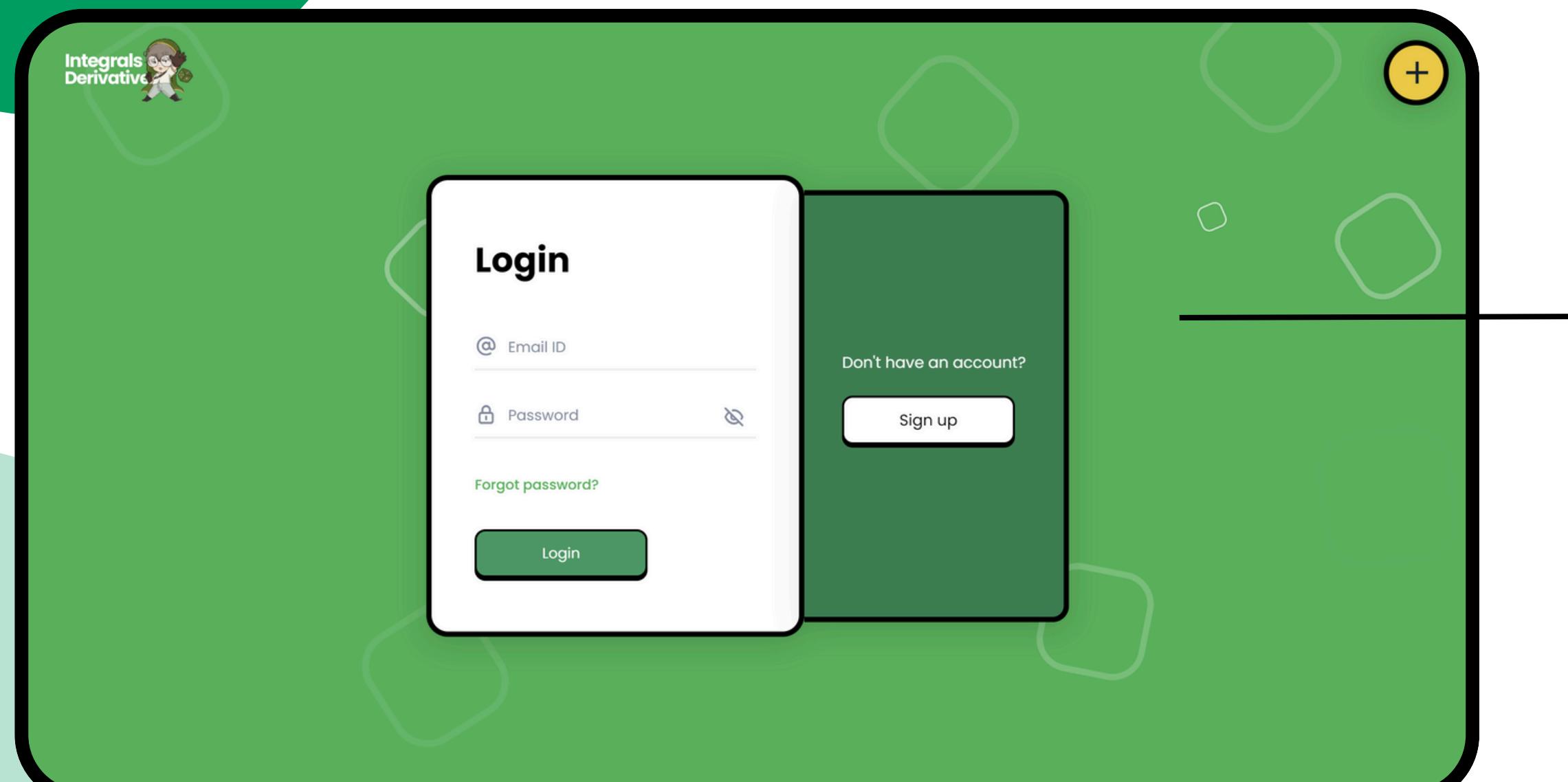
## Integral

Menyimpan data user berupa progress level yang sudah di-unlock pada **module Integral**

## Derivative

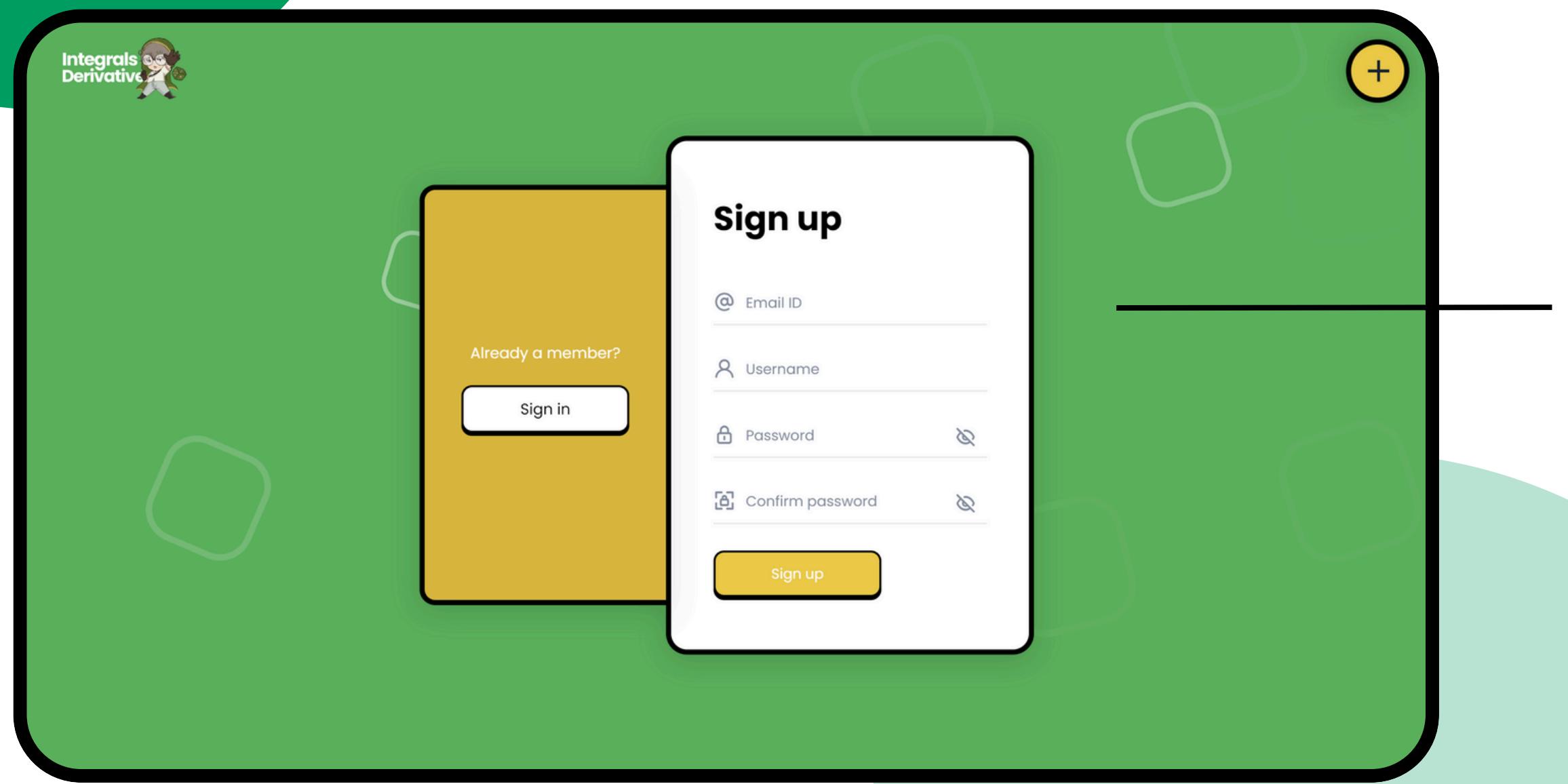
Menyimpan data user berupa progress level yang sudah di-unlock pada **module Derivative**

# #1 - Login/Sign Up



Melakukan **autentikasi** pada user dengan mencocokkan **data yang di-input** dengan **data yang ada di database**

# #1 - Login/Sign Up



Melakukan **autentikasi** dengan menyimpan data yang di-input oleh user ke dalam database

Website

Database

Fitur-Fitur

# #2 - Reset Password



Reset Password

Current Password

New Password

Confirm Password

Reset Password

Melakukan reset password pada akun yang dimiliki user dengan **melakukan update data** pada database

# #3 - Profile

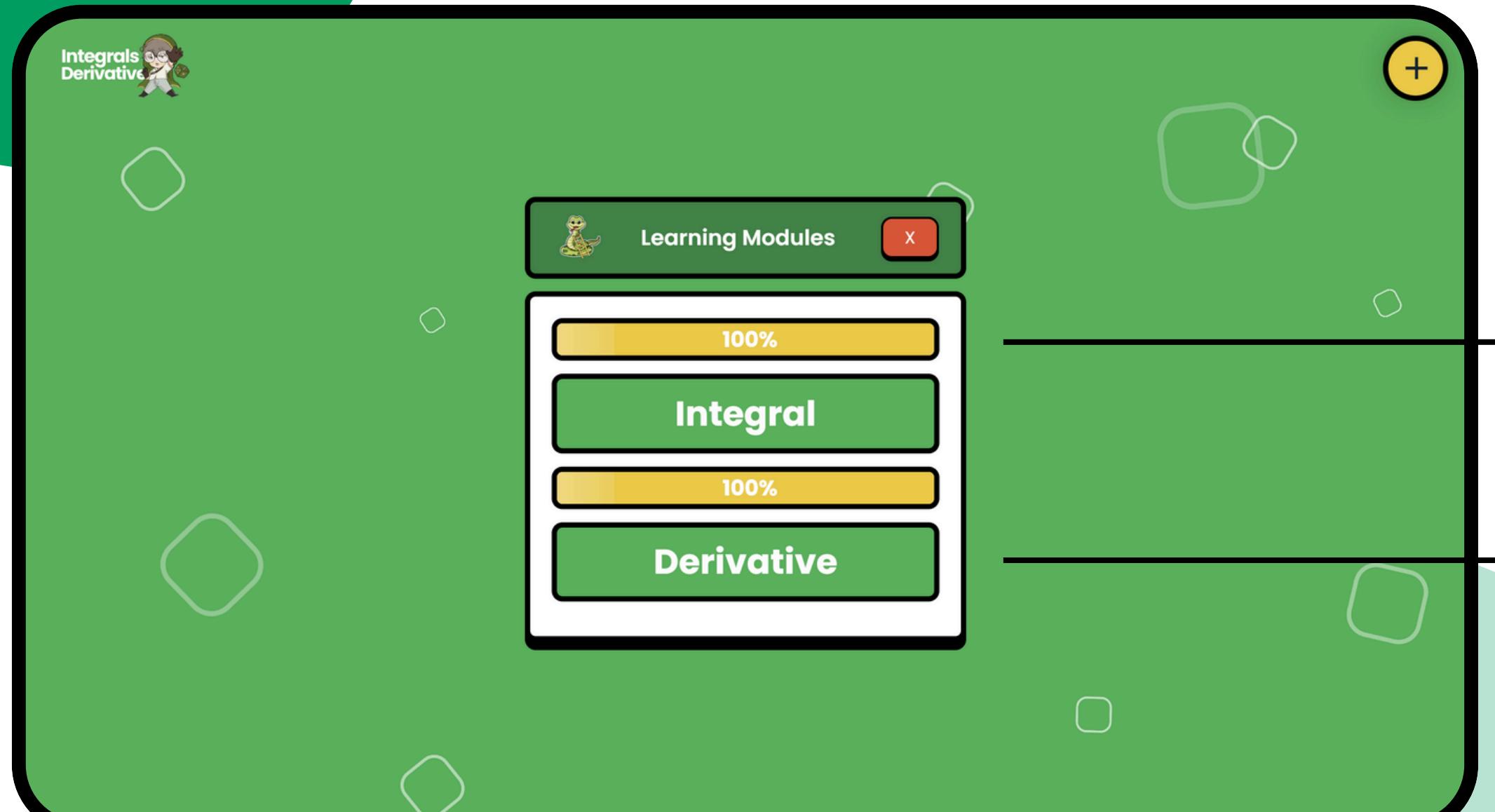


The image shows a mobile application interface titled "Profile". At the top left is a logo for "Integrals Derivative" featuring a cartoon character. The main screen has two sections: "Profile Information" and "Cards Collection".  
**Profile Information:** Displays the user's name "qie", email "qiewifruit@gmail.com", and joining date "Joined 11/14/2024". It includes buttons for "Edit Username" and "Reset Password".  
**Cards Collection:** Shows a grid of four cards: "GURIN" (Completed), "BL", "CREAMU" (Completed), and "AKARI". A progress bar at the top indicates "75%".  
The entire application is set against a background with a green circular graphic and a yellow "+" button in the top right corner.

Mengambil dan menampilkan **data users** dari database. Dapat mengubah password juga

Menampilkan **data collectedCards** yang dimiliki user di database. Kartu dapat di-unlock sesuai tugas.

# #4 - Materials Page



Mengambil dan menampilkan **data progress pengajaran setiap module** yang dimiliki oleh user

Mengarahkan user ke page module

# #5 Modules

(Integral/Derivative)

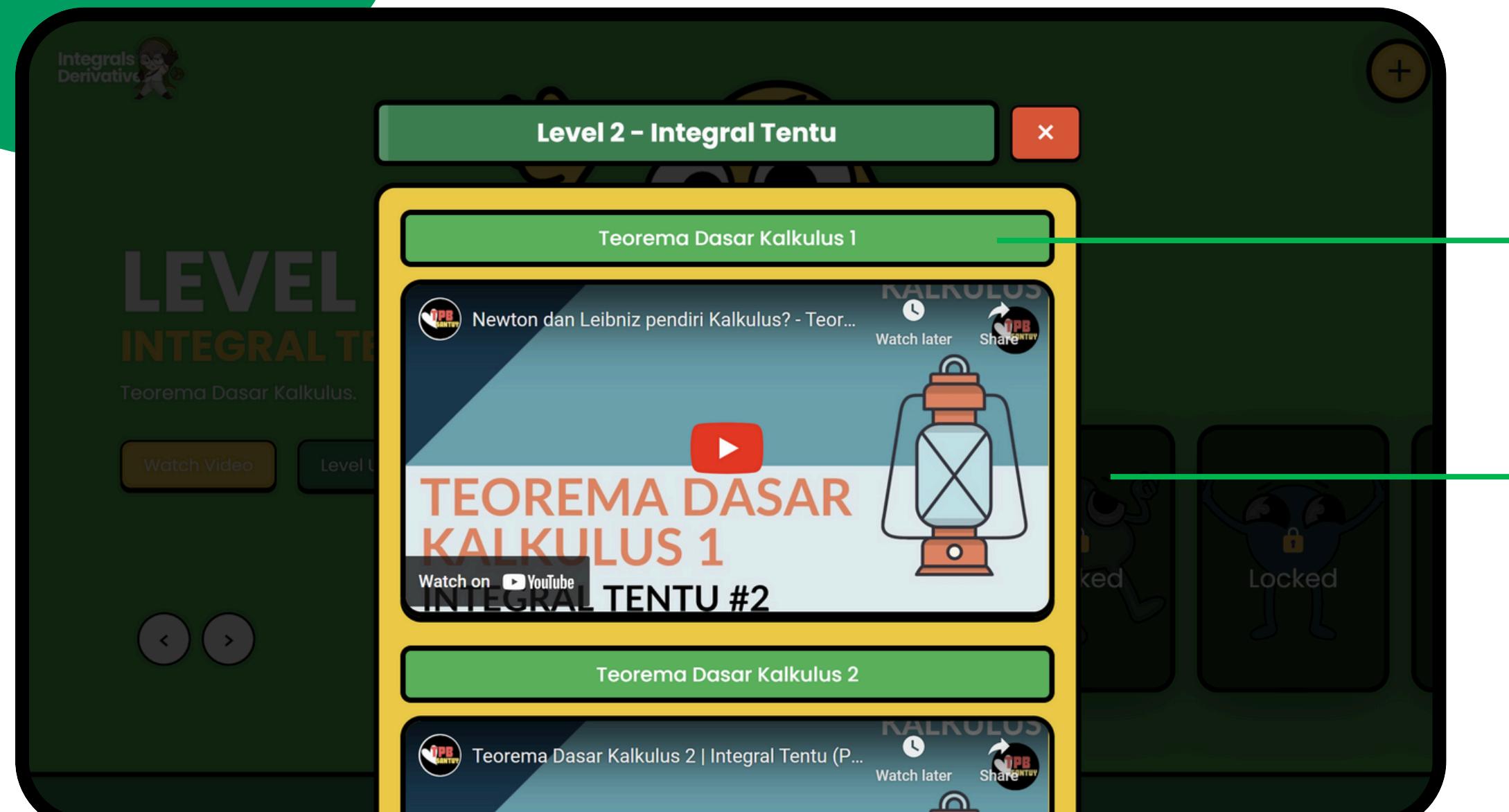


The screenshot shows a digital module interface. At the top left is a logo for 'Integrals Derivative' with a small character icon. The main title 'LEVEL 1 INTEGRAL TENTU' is displayed in large white and yellow text. Below it, a subtitle 'Hubungannya dengan Notasi Sigma.' is shown. There are two buttons: 'Watch Video' (yellow) and 'Level Up' (green). At the bottom are navigation arrows (< and >) and a copyright notice 'Made by Qie © 2024'. On the right side, there is a large red cartoon character with large eyes. Above the character is a yellow button with a plus sign (+). To the right of the character is a horizontal line pointing to a progress bar. The progress bar consists of three segments: a green segment, a grey segment labeled 'Locked' with a padlock icon, and a blue segment. A vertical line points from the text 'Progress level user pada modul tersebut' to the 'Locked' segment of the progress bar.

Level materi pada modul, terdapat button watch video untuk **melihat list video** dan button level up untuk **mengerjakan quiz**

**Progress level** user pada modul tersebut

# #5 Modules (Integral/Derivative)



Topik submateri yang dibahas dalam video tersebut

Video **penjelasan materi** sesuai dari submateri dan topik pada level tersebut

# #5 - Modules

(Integral/Derivative)



Integrals & Derivative

Level 1 - Level Up

Konversikan jumlah berikut menjadi integral tentu saat n →  
 $\infty: \sum_{i=1}^n i / n^2$

$\int_0^1 x \, dx$   $\int_0^1 x^2 \, dx$   $\int_0^1 x^3 \, dx$   $\int_0^1 \sqrt{x} \, dx$

Watch Video

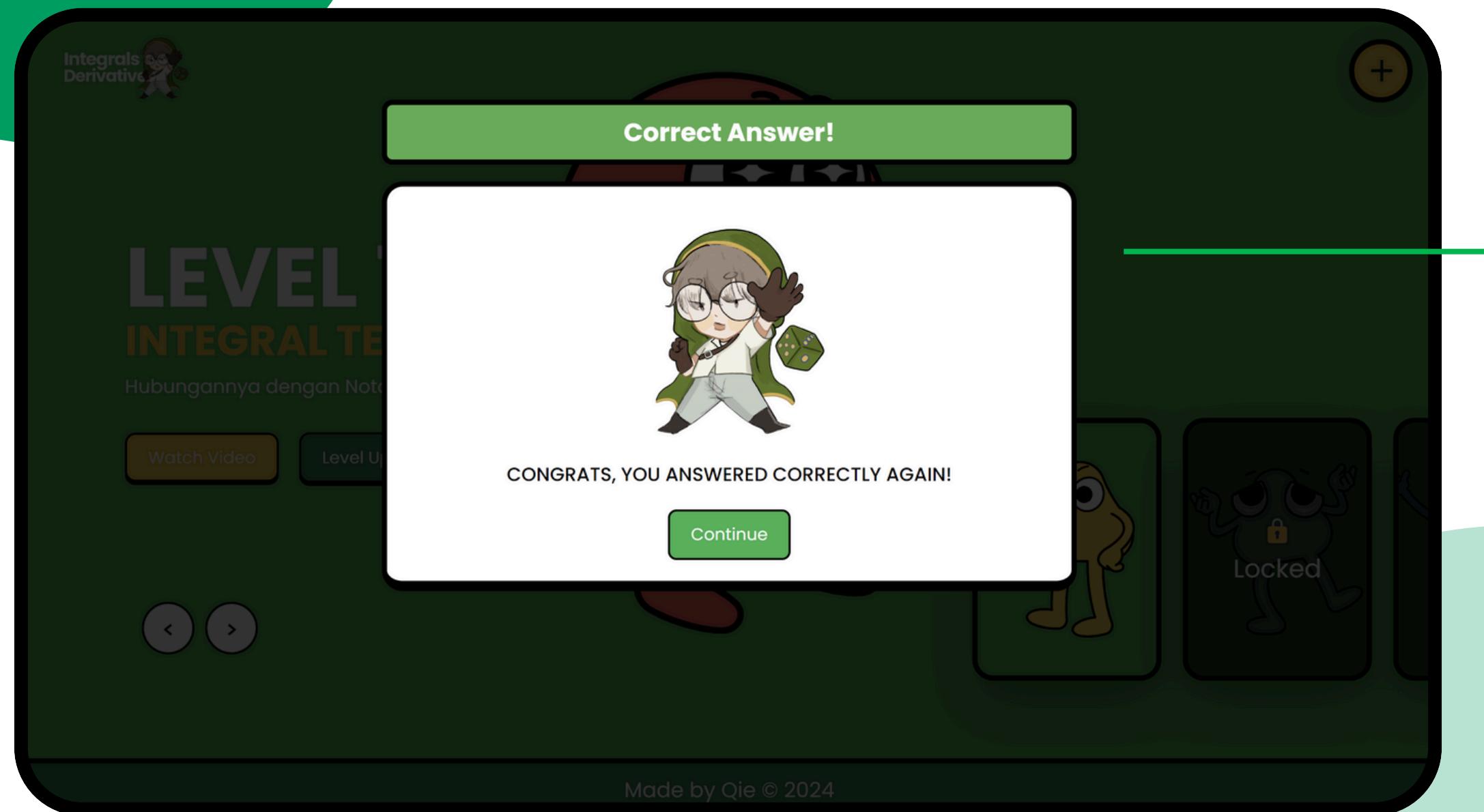
Level Up

Made by Qie © 2024

**Pertanyaan dan jawaban** sesuai  
topik submateri yang dibahas  
dalam video tersebut

# #5 - Modules

(Integral/Derivative)



Ketika user berhasil menjawab pertanyaan dengan benar, user akan **meng-unlock level baru** dan datanya **disimpan** ke dalam database

**Thank You**