



# Welcome to Snorkel

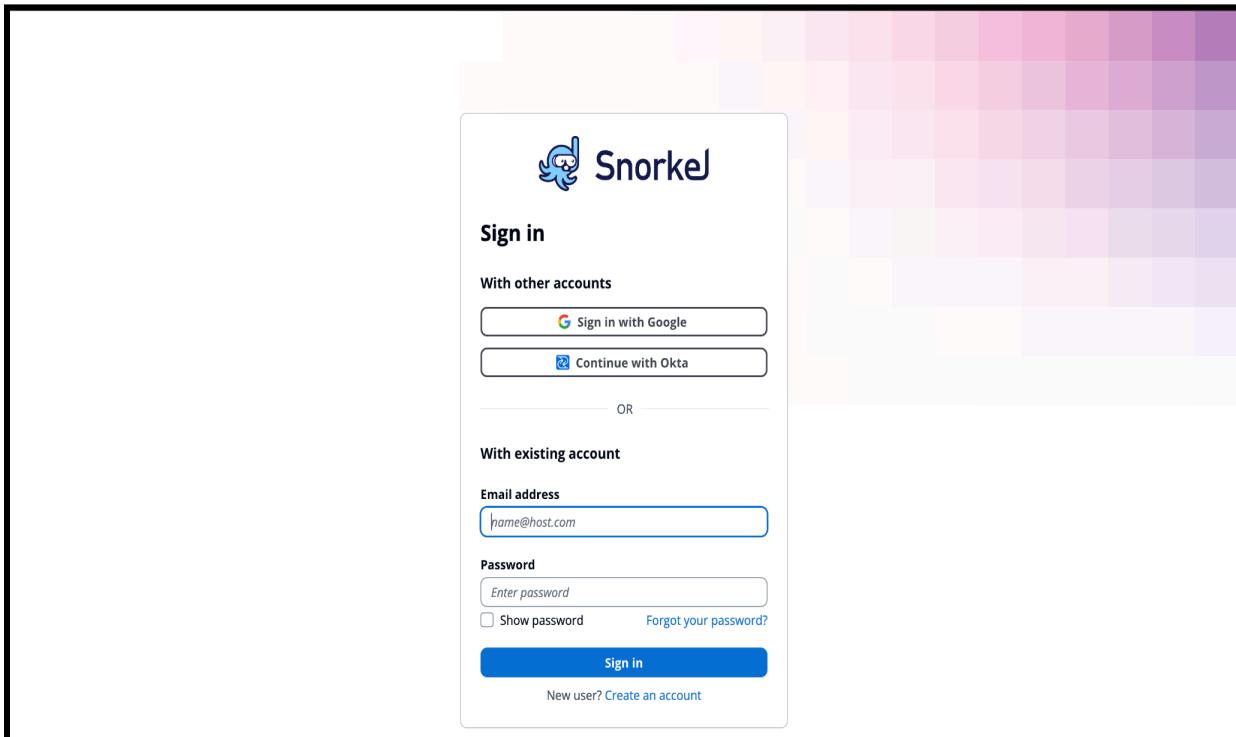
# Welcome to Snorkel! (and Einstein team)

We are happy to have you aboard. This document will guide you through the necessary steps to start contributing to our projects.

## Platform Navigation & Functionality

1. Sign into our platform —>>>[Snorkel Expert Platform](#)<<<—

You will see this landing page, **sign in with the email address where you received your project invite**



### 🔒 First-time User Sign-In

Once you're added to your first project in the Snorkel Expert Platform, you will **receive an email with your login credentials and a temporary password**.

The temporary password will be a string of characters that may include punctuation marks at the end – You will need to include all

letters, numbers, punctuation, and special characters in the password.

You will be asked to change your password once you login.

**If you don't receive a temporary password contact the support team**

1. Start collaborating

Once you are logged in you will see our home screen, here you will see three options per project.

**At the start of every project you will only be enabled to do ORIGINAL SUBMISSION task**

The screenshot shows a user interface titled "My projects". At the top, it says "2 projects available". Below this, there is a search bar containing "einstein" and a sorting dropdown set to "Newest First". Two project cards are listed:

- independent\_submission** Start  
Project: einstein\_stem
- original\_submission** Start  
Project: einstein\_stem

## Slack

We use slack as our main communication tool, you can use slack on your browser or download the app

**If this is your first time using slack or working with snorkel, you will receive an invitation to join the workspace, please check your email**

#### **Accept the invite to Snorkel Expert Contributors**

Once you're added to your first project in the Snorkel Expert Platform, you will **receive an email with your login credentials and a temporary password**.

The temporary password will be a string of characters that may include punctuation marks at the end – You will need to include all letters, numbers, punctuation, and special characters in the password.

You will be asked to change your password once you login.

1. Once you are assigned to the project you will be added to the **#einstein-submission** channel. On this channel we will share updates, feedback and general project announcements.

# Snorkel Expert Co... ▾



You're only viewing channels in this workspace. [Show all channels](#)

Threads

Huddles

Drafts & sent  2

Directories

▶ einstein

einstein\_submission

# Task Summary





# Process Overview

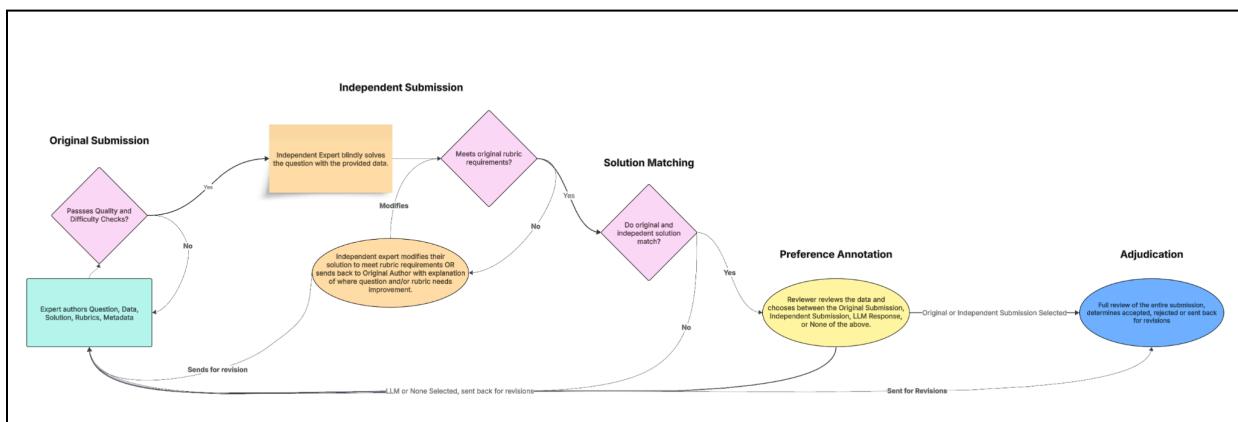
# Einstein Data Collection Workflow

## Our goal:

Build a frontier multi-modal dataset that measures model performance on multi-step reasoning and computation tasks and can be used for SFT and RLFT across STEM disciplines.

## Executive Summary

Einstein data is collected through a structured, multi-phase workflow designed to ensure tasks are well-specified, solvable, and consistently evaluated. The diagram below illustrates the process each task goes through as well as possible revision paths.



Tier	Target Distribution	Difficulty
Frontier	~ 20 – 30%	At least 4 models fail
Advanced	~ 30 – 40%	Between 2-3 models fail
Core	~ 20 – 30%	1 model fails

A **model failure** is defined as a model achieving under **60%** of **Required criteria** scores and under **70%** of **Optional criteria**.

## Original Submission

**Who:** Expert task authors

**What happens:**

- Authors create a complete task package as outlined in the Original Submission [description](#)
- Once all the necessary fields are filled in and the in-app difficulty evaluation is met, the task proceeds.

## Automated Checks

**Who:** Automated systems

**What happens:**

- Validation of data file integrity and accessibility
- Review of reference solution for completeness and coherence
- Rubric coverage and alignment checks
- Metadata verification
- Automated scientific and citation sanity checks

**Outcomes:**

- Pass → Task advances
- Fail → Task returned to author with feedback
- Authors may revise a given task up to 3 times

## Independent Solution

**Who:** Independent expert (not the original author)

**What happens:**

- Solver attempts the task using only:
  - The question
  - Provided data files
- Solver writes:
  - Step-by-step reasoning
  - Final answer in the required format
  - Notes on missing information, ambiguities, or inconsistencies (if any)

- Time spent is tracked.

### **System checks:**

- Completeness of reasoning
- Correctness relative to the rubric
- Clarity and internal consistency
- Rubric alignment

### **Outcomes:**

- Pass → Task advances to solution comparison
- Fail → Solver revises or flags task as problematic

## Solution Matching

**Who:** Automated comparison with optional author follow-up

### **What happens:**

- Original reference solution is compared with the independent solution.
- Comparison method depends on answer type:
  - Short-form: numeric tolerance, symbolic equivalence, or categorical match
  - Long-form: comparison of key steps, claims, methods, and conclusions

### **Outcomes:**

- Match → Task advances to preference ratings
- Mismatch → Task returns for revision to clarify question, solution, etc. to prevent ambiguity and ensure solutions match
  - After edits → Proceeds through the process again
  - Disagreements should be escalated

## Preference Ratings

**Who:** Expert

### **What happens:**

- Expert reviews three solutions presented in random order and picks a *single preferred* answer.

- Solutions should be reviewed based on the below (in this order of importance):
  1. Technical correctness
  2. Completeness and instruction following
  3. Structure and presentation
- If None of the solutions are correct or preferred, you must provide a rationale why and send it back.

#### **System actions:**

- Original or independent solution selected as acceptable -> Advanced to Adjudication
- If the LLM is chosen or none are deemed acceptable -> Sent back to the original author for revision

## **Adjudication**

**Who:** Adjudicators

#### **What happens:**

- Complete review of the entire submission for quality:
  - Task and data
  - All solutions
  - Automated check results
  - Preference ratings and notes
  - Any submitted disagreements

#### **Outcomes:**

- Accept → Task is finalized and added to the dataset
- Revise → Task returned with specific feedback
- Reject → Task removed from the pipeline

1 Original Submission



# Original Submission Workflow

**Step 1: Category and Modality**

**Step 2: Multimodal file**

**Step 3: Reference Steps**

**Step 4: Final Answer & References**

**Step 5: Rubrics**

# Step 1: Category and Modality

# Step 1: Domain and Sub Domain

## 1. Select a Domain

- For each task you will be assigned a Domain based on your background knowledge. Select this same **Domain** on the “Annotations” -> “Domain” section on the right.

The screenshot shows the Snorkel interface for a task titled "original\_submission". On the left, there's a sidebar with icons for file operations. The main area has a header "original\_submission" and a status bar at the top right showing "UID: 888833da-ac73-4dce-844b-a2b9d4ac9cdb Last saved at 9:30 a.m.". The left panel contains two sections: "Assigned Domain" (Biology) and "Modality" (Free). Below these are instructions: "Instructions: First, complete all required form fields on the right. Once you reach the Difficulty section, copy your written question here to retrieve the model responses. Then, click the Evaluate Model Responses button to judge the difficulty of your question based on the rubric." A "Prompt" section with a text input field and a "→" button follows. The right panel is divided into "Questions to answer" (with a note: "All form questions are required unless marked as optional.") and "Annotations". The "Annotations" section has a dropdown menu for "Domain" containing the following options:

- Mathematics
- Physics
- Chemistry
- Biology
- Computer Science
- Engineering

Below the domain options is a "Sub Domain" section.

## 2. Select a Sub Domain

- Once you've selected a domain, you will need to choose a subdomain. This is a free choice, select whatever you feel more comfortable with.

**Sub Domain**

- Biophysics
- Computational Biology
- Genetics
- Molecular & Cellular Biology,
- Physiology
- Ecology & Environmental Biology
- Microbiology
- Biotechnology
- Developmental Biology
- Evolutionary Biology
- Immunology

## Step 2: Multimodal file & Question

# Step 2: Multimodal file & Question

1. For each task you will be assigned a **Modality**, this indicates whether it's mandatory or optional to upload a file

The screenshot shows the Snorkel interface for creating a new submission. On the left, there's a sidebar with 'Assigned Domain' set to 'Biology' and 'Modality' set to 'Free'. A blue box highlights the 'Modality' field. The main area is titled 'original\_submission'. It includes instructions for completing required fields and retrieving model responses. On the right, there's a 'Multimodal file uploader (optional)' section with a file upload button and a 'Question' section with a rich text editor and a list of reference answers.

2. Your data file must be in csv format. For the data, you can either create a data file yourself, **or** you can find an open source data file for use.
  - a. Open source data files must have an explicit CC0 license. This [database](#) is a good source, but please ensure that the “CC0 1.0” License filter is selected.

- Once you've uploaded your file (or not) you will need to write a question.

## **IMPORTANT GUIDELINES FOR EACH QUESTION**

- The question should adhere to the chosen Domain<> Sub Domain**
- The question should be fully self-contained (solvable with just your knowledge and uploaded data if applicable.)**
- If needed you need to format your question using RegEx**
- Should require multi-step reasoning ( $\geq 3$  steps).**
- Must specify:**
  - Required derivation or computation**
  - Expected output form (symbolic, numeric, or descriptive)**

Snorkel

### original\_submission

Assigned Domain  
Biology

Modality  
Free

Instructions: First, complete all required form fields on the right. Once you reach the Difficulty section, copy your written question here to retrieve the model responses. Then, click the Evaluate Model Responses button to judge the difficulty of your question based on the rubric.

Prompt  
Enter your question here

Multimodal file uploader (optional)  
Multimodal file uploader

Upload file  
Drag and drop or click to select  
Only ZIP and TAR.GZ files, maximum 500MB

**Question**

B I U Ø

Input field text

► (Original) Reference Answer Step 1  
 ► (Original) Reference Answer Step 2  
 ► (Original) Reference Answer Step 3

Add item  
Add a new step  
+ Add step

(Original) Answer Type

# Sample question

## Mathematics

None

Let  $A \in \mathbb{R}^{m \times n}$  be an arbitrary real matrix with singular values

$\sigma_1 \geq \sigma_2 \geq \dots \geq \sigma_r > 0$ ,  $r = \text{rank}(A)$ .  
 $\sigma_1 \geq \sigma_2 \geq \dots \geq \sigma_r > 0$ ,  $r = \text{rank}(A)$ .

Fix an integer  $k$  with  $0 \leq k < r$ . Consider the optimization problem

$\min_{X \in \mathbb{R}^{m \times n}} \|A - X\|_F$ .  
 $\min_{X \in \mathbb{R}^{m \times n}}$ ,  
 $\text{rank}(X) \leq k$ ,  
 $\|A - X\|_F$ .

**Task:**

Prove that every minimizer  $X^* X^* \backslash \text{star} X^*$  satisfies

$$\|A - X^* \|_F^2 = \sum_{i=k+1}^r \sigma_i^2, \|A - X^* \|_F^2 = \sum_{i=k+1}^r \sigma_i^2,$$

and that one minimizer is obtained by truncating the singular value decomposition of  $A$  to its top  $k$  singular values.

## Biology

None

A microbial population is grown in batch culture and measured via optical density,  $OD_{600\_600}$ .

The population follows **logistic growth**:

$$N(t) = K + (K - N_0)e^{-rt}, N(t) = \frac{K}{1 + \left(\frac{K - N_0}{N_0}\right)e^{-rt}}, N(t) = \frac{N_0 K}{N_0 + (K - N_0)e^{-rt}},$$

where

$N(t)$  is proportional to  $OD_{600\_600}$ ,  
 $K$  is the carrying capacity,  
 $N_0$  is the initial population size, and  
 $r$  is the intrinsic growth rate ( $hr^{-1}$ ).

You are provided with the following dataset.

Assume:

$OD_{600\_600}$  is directly proportional to population size.

Measurement noise is negligible.

The carrying capacity is  $K=0.450$ .

**Task:**

Estimate the intrinsic growth rate  $r$  (in  $\text{hr}^{-1}$ ) using the logistic growth model above.

**Expected output format:**

A single numeric value for  $r$ , rounded to three decimal places.

## Step 3: Reference Steps

# **Step 3: Reference Steps**

Once you have written your question/problem you will need to specify each step required to get to the final answer.

## **Short - form answers**

For short - form answers you will need to describe each step to get to the final answer (You will write this down in the next step)

## **Long - form answers**

For long - form answers the steps itself will be the answer, so you won't need to provide a final answer.

Last saved at 10:54 am

**Question**

B I U Ø

Input field text

▼ (Original) Reference Answer Step 1

**Rich Text**

B I U Ø

Input field text

▼ (Original) Reference Answer Step 2

**Rich Text**

B I U Ø

Input field text

▼ (Original) Reference Answer Step 3

**Rich Text**

B I U Ø

Input field text

Add item

Add a new step

+ Add step

The screenshot shows a digital form interface with a dark header bar. Below it, there's a section for a question with a rich text editor containing the text 'B I U Ø' and an input field labeled 'Input field text'. Three blue-bordered boxes represent 'Reference Answer Step 1', 'Reference Answer Step 2', and 'Reference Answer Step 3', each containing identical rich text and input fields. At the bottom left, there's a panel with a blue border containing the text 'Add item', 'Add a new step', and a button labeled '+ Add step'.

## Sample steps

### Mathematics

- **Multimodal (Y/N):** N
- **Domain:** Mathematics
- **Subdomain:** Linear Algebra
- **Long vs. Short Form:** Long-form
- **Difficulty Tier:** N/A

- **Tags:** SVD; best-rank-k; Eckart–Young; Frobenius-norm; orthogonal-invariance; low-rank-approximation

### Step 1: Orthogonal invariance of the Frobenius norm

For any orthogonal matrices  $U$  and  $V$ ,

$$\|A - X\|_F = \|U^\top(A - X)V\|_F = \|U^\top AV - U^\top XV\|_F \leq \|A - X\|_F = \sqrt{\lambda_{\max}(A - X)} \leq \sqrt{\lambda_{\max}(A - X)} = \sqrt{\lambda_{\max}(A - X)}.$$

Define

$$Y = U^\top XV, Y = U^\top X V, Y = U^\top XV.$$

Since multiplication by orthogonal matrices preserves rank,

$$\text{rank}(Y) = \text{rank}(X) \leq k. \text{rank}(Y) = \text{rank}(X) \leq k. \text{rank}(Y) = \text{rank}(X) \leq k.$$

Moreover,

$$U^\top AV = \Sigma, U^\top A V = \Sigma.$$

Thus the original optimization problem is equivalent to

$$\min_{Y \in \mathbb{R}^{n \times n}} \|\Sigma - Y\|_F \quad \text{subject to } \text{rank}(Y) \leq k \quad \text{and} \quad \|\Sigma - Y\|_F \leq \epsilon.$$


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### Step 2: Frobenius norm decomposition

Write  $Y = (y_{ij})Y = (y_{ij})Y = (y_{ij})$ . Since  $\Sigma$  is diagonal,

$$\|\Sigma - Y\|_F^2 = \sum_{i,j} (\sigma_i - y_{ii})^2 + \sum_{i \neq j} y_{ij}^2 \geq \sum_{i,j} (\sigma_i - y_{ii})^2, \quad \|\Sigma - Y\|_F^2 = \sum_i (\sigma_i - y_{ii})^2 + \sum_{i \neq j} y_{ij}^2 \geq \sum_i (\sigma_i - y_{ii})^2, \quad \|\Sigma - Y\|_F^2 = \sum_i (\sigma_i - y_{ii})^2 + \sum_{i \neq j} y_{ij}^2 \geq \sum_i (\sigma_i - y_{ii})^2,$$

with equality if and only if  $Y$  is diagonal.

---

### Step 3: Lower bound imposed by the rank constraint

Any matrix  $Y$  with  $\text{rank}(Y) \leq k$  can capture at most  $k$  independent singular directions. Consequently, at least the last  $r - k$  singular values of  $\Sigma$  must contribute fully to the approximation error.

Let

$$\Sigma_k = \text{diag}(\sigma_1, \dots, \sigma_k) \mathbf{0} \mathbf{0} \mathbf{0}. \Sigma_k = \begin{pmatrix} \sigma_1 & & \\ & \ddots & \\ & & \sigma_k \end{pmatrix}.$$

Then

$$\|\Sigma - \Sigma_k\|_F^2 = \sum_{i=k+1}^n \sigma_i^2. \|\Sigma - \Sigma_k\|_F^2 = \sum_{i=k+1}^n \sigma_i^2.$$

For any  $Y$  with  $\text{rank}(Y) \leq k$ ,  $\text{rank}(Y) \leq k$ ,

$$\|\Sigma - Y\|_F^2 \geq \|\Sigma - \Sigma_k\|_F^2 + \sum_{i=k+1}^n \sigma_i^2. \|\Sigma - Y\|_F^2 \geq \|\Sigma - \Sigma_k\|_F^2 + \sum_{i=k+1}^n \sigma_i^2.$$

---

#### Step 4: Achievability via truncated SVD

Define

$$X_k = U \Sigma_k V^\top. X_k = U \Sigma_k V^\top.$$

Then  $\text{rank}(X_k) \leq k$ , and by orthogonal invariance,

$$\|A - X_k\|_F^2 = \|U^\top(A - X_k)V\|_F^2 = \|\Sigma - \Sigma_k\|_F^2 + \sum_{i=k+1}^n \sigma_i^2. \|\Sigma - X_k\|_F^2 = \|\Sigma - \Sigma_k\|_F^2 + \sum_{i=k+1}^n \sigma_i^2.$$

Thus the lower bound is tight, and  $X_k X_k^\top$  is a minimizer.

---

#### Step 5: Characterization of all minimizers

Let  $X^* X^{*\top}$  be any minimizer and define  $Y^* = U^\top X^* V Y^{*\top} = U^\top X^{*\top} V$ .

Then

$$\|A - X^*\|_F^2 = \|\Sigma - Y^*\|_F^2 = \sum_{i=k+1}^n \sigma_i^2. \|A - X^*\|_F^2 = \|\Sigma - Y^*\|_F^2 = \sum_{i=k+1}^n \sigma_i^2.$$

Therefore, every minimizer attains this same optimal value, and the truncated SVD provides one explicit construction.

This completes the proof.

# Biology

- **Multimodal (Y/N):** Y
- **Domain:** Biology
- **Subdomain:** Computational Biology
- **Long vs. Short Form:** Short form
- **Difficulty Tier:** N/A
- **Tags:** logistic growth; nonlinear modeling; parameter estimation; microbial dynamics; carrying capacity

Start from the logistic growth equation:

$$N(t) = K + Ae^{-rt}, \text{ where } A = K - N_0. N(t) = \frac{K}{1 + A e^{-rt}}, \quad \text{where } A = \frac{K - N_0}{N_0}. N(t) = 1 + Ae^{-rt} \frac{K}{K - N_0}, \text{ where } A = N_0 K - N_0.$$

Rearrange the equation:

$$KN(t) - 1 = Ae^{-rt}. \frac{K}{N(t)} - 1 = A e^{-rt}. N(t)K - 1 = Ae^{-rt}.$$

Take the natural logarithm:

$$\ln(KN(t) - 1) = \ln A - rt. \ln\left(\frac{K}{N(t)} - 1\right) = \ln A - rt. \ln(N(t)K - 1) = \ln A - rt.$$

Thus, defining

$$y(t) = \ln(KN(t) - 1), y(t) = \ln\left(\frac{K}{N(t)} - 1\right), y(t) = \ln(N(t)K - 1),$$

we obtain a linear relationship in  $t$  with slope  $-r$ .

Using  $K=0.450$ ,  $K=0.450$ , and  $N_0=0.050$ ,  $N_0=0.050$ ,

$$A=0.450-0.050=0.400. A = \frac{0.450 - 0.050}{0.050} = 8. A=0.050. 0.450 - 0.050 = 8.$$

Compute transformed values:

For  $t=0$ ,  $y(t)=0$ :

$$\ln(0.450-0.050) = 2.079 \ln\left(\frac{0.450}{0.050} - 1\right) = 2.079 \ln(8) = 2.079$$

For  $t=1$ ,  $y(t)=1$ :

$$\ln(0.450-0.082) = 1.517 \ln\left(\frac{0.450}{0.082} - 1\right) = 1.517 \ln(5.5) = 1.517$$

For t=2.0t = 2.0t=2.0:

$$\ln(0.4500.130-1)=0.912\ln(\frac{0.450}{0.130}-1)=0.912\ln(0.1300.450-1)=0.912$$

For t=3.0t = 3.0t=3.0:

$$\ln(0.4500.198-1)=0.298\ln(\frac{0.450}{0.198}-1)=0.298\ln(0.1980.450-1)=0.298$$

For t=4.0t = 4.0t=4.0:

$$\ln(0.4500.285-1)=-0.322\ln(\frac{0.450}{0.285}-1)=-0.322\ln(0.2850.450-1)=-0.322$$

For t=5.0t = 5.0t=5.0:

$$\ln(0.4500.360-1)=-0.799\ln(\frac{0.450}{0.360}-1)=-0.799\ln(0.3600.450-1)=-0.799$$

For t=6.0t = 6.0t=6.0:

$$\ln(0.4500.420-1)=-1.504\ln(\frac{0.450}{0.420}-1)=-1.504\ln(0.4200.450-1)=-1.504$$

Performing least-squares linear regression of y(t) against t yields a slope of approximately -0.596.

Since the slope equals -r, the estimated growth rate is

## Step 4: Final Answer & References

# Step 4: Final Answer & References

## Answer Type and Answer

Once you've completed your question and steps, you will need to select the type of answer.

- Short Form: You will be displayed a new text box. Write down your final answer here.
- Long Form: Since the steps themselves are the answer, you won't be displayed a new text box

## Reference

- One or more citations supporting the reference answer. References must be provided in APA format.
- Each reference must also include a brief summary describing how it informs the problem context, assumptions, or solution approach.

## Reference samples

Mathematics

None

Horn, R. A., & Johnson, C. R. (2013). *Matrix analysis* (2nd ed.). Cambridge University Press.

**Relevance:** Singular value theory, orthogonal invariance of norms, and matrix optimization foundations.

Golub, G. H., & Van Loan, C. F. (2013). *Matrix computations* (4th ed.). Johns Hopkins University Press.

**Relevance:** Classical treatment of the Eckart–Young theorem and optimal low-rank approximations.

# Biology

None

Zwietering, M. H., Jongenburger, I., Rombouts, F. M., & van 't Riet, K. (1990).

*Modeling of the bacterial growth curve.*

Applied and Environmental Microbiology, 56(6), 1875–1881.

Relevance: Establishes logistic growth models and parameter estimation from microbial OD data.

Seber, G. A. F., & Wild, C. J. (2003).

*Nonlinear regression.* Wiley.

Relevance: Provides mathematical foundations for linearization and estimation in nonlinear biological models.

**(Original) Answer Type**

Short-Form

Long-Form

**(Original) Answer**

B I U Ø

Input field text

**(Original) Reference**

B I U Ø

Input field text

## Step 5: Rubrics

# Step 5: Rubrics

A collection of objective evaluation criteria designed to produce rich and reproducible assessments of model responses.

Each criterion will consistently cover the following top-level dimensions of quality:

- **Structure and Presentation:** Checks whether the response is clearly written, logically organized, and easy to understand.
- **Technical Correctness:** Checks whether all claims, methods, formulas and reasoning steps are valid, logically, sound, consistent with established domain knowledge, and sufficiently justified.
- **Completeness and Instruction Following:** Checks that the response fully addresses the question and follows any instructions specified in the questions, adheres to constraints, and stays within scope.

## Required Rubrics

Each task will need to include **at least 5** required criteria. These are criteria that the final answer should always follow. If your question/problem is too elaborate, then you have the option to add more required criteria.

### Sample Required Rubric

#### Mathematics

1. Uses orthogonal invariance of the Frobenius norm to reduce to the diagonal case.
2. Correctly enforces the rank-kkk constraint in the lower-bound argument.

3. Derives the bound  $\sum_{i=k+1}^r \sigma_i^2 \leq \sum_{i=1}^k \sigma_i^2$  correctly.
4. Constructs the truncated SVD and verifies it achieves the bound.
5. Concludes that every minimizer must attain this value.

## Biology

1. Reports a single numeric value for  $r$  with correct units.
2. Correctly rearranges the logistic growth equation.
3. Correctly applies the logarithmic transformation.
4. Correctly estimates the slope using multiple data points.
5. Reports  $r$  within  $\pm 0.005$  hr $^{-1}$  of the reference value.
6. Uses the provided value of  $K$  exactly.

**Rubrics**

▼ Required Criterion 1

**Criterion**

**Top Level Dimension**

Structure and Presentation

Technical Correctness

Completeness

► Required Criterion 2

► Required Criterion 3

► Required Criterion 4

► Required Criterion 5

**Add Criterion**

+ Add Criterion

# Optional Rubrics

Each task will need to include **at least 4** optional criteria. These are criteria that the final answer could follow but are not mandatory. Think of these like nice to haves or criteria that differentiate an excellent sample and a stellar sample.

The screenshot shows a rubric configuration interface. At the top, under 'Rubrics', there is a list of five 'Required Criterion' items. Below this is a 'Add Criterion' button with a '+ Add Criterion' link. A blue-highlighted section contains four 'Optional Criterion' items. This section also has its own 'Add Criterion' button with a '+ Add Criterion' link. At the bottom of the interface, there are three sections: 'Difficulty' with a right-pointing arrow, 'Post Annotation' with a right-pointing arrow, and a 'Submit' button.

## Sample Optional Rubric

### Mathematics

1. Clear notation for  $\Sigma_k \Sigma_k^T$  and truncated SVD.
2. Explicit statement that rank is invariant under orthogonal transformations.

3. Brief comment on non-uniqueness when  $\sigma_k = \sigma_{k+1}$   $\sigma_k = \sigma_{k+1}$ .

## Biology

1. Clearly states modeling assumptions.
2. Uses all provided data points.
3. Rounds the final answer to three decimal places.

# \$ Pay Rate

# Pay Rate

Role / Tier	Short Answer (No Data)	Short Answer (Data)	Long Answer (No Data)	Long Answer (Data)
Core (OA – Accepted)	\$189	\$252	\$252	\$315
Advanced (OA – Accepted)	\$252	\$347	\$347	\$410
Frontier (OA – Accepted)	\$315	\$410	\$410	\$504
Independent Submitter	\$63	\$63	\$126	\$126
Preference Annotator	\$32	\$32	\$32	\$32
Adjudication	\$95	\$95	\$189	\$189



## Prohibited Behaviors

