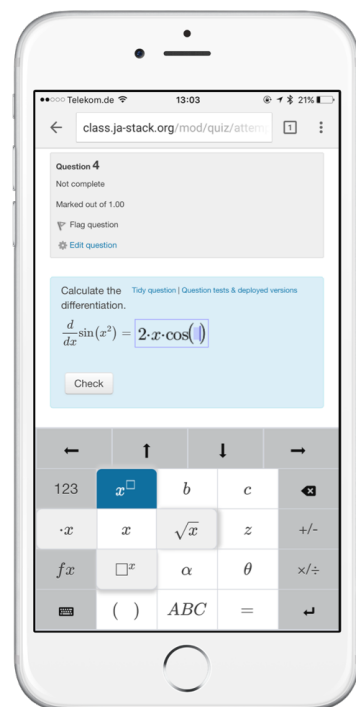


# Sharing experiences using STACK connected from Sakai through LTI

Yasuyuki NAKAMURA (Nagoya University, Japan)  
Takahiro NAKAHARA (Sangensha LLC.)



Special thanks to  
Kako ITO and Kazusa FUJIMOTO

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- Motivation
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- How to access to STACK from Sakai through LTI
  - Preparation as a provider for Moodle
  - Preparation as a consumer for Sakai
- Examples of use of STACK from Sakai
- Some difficulties
- Summary

# Motivation

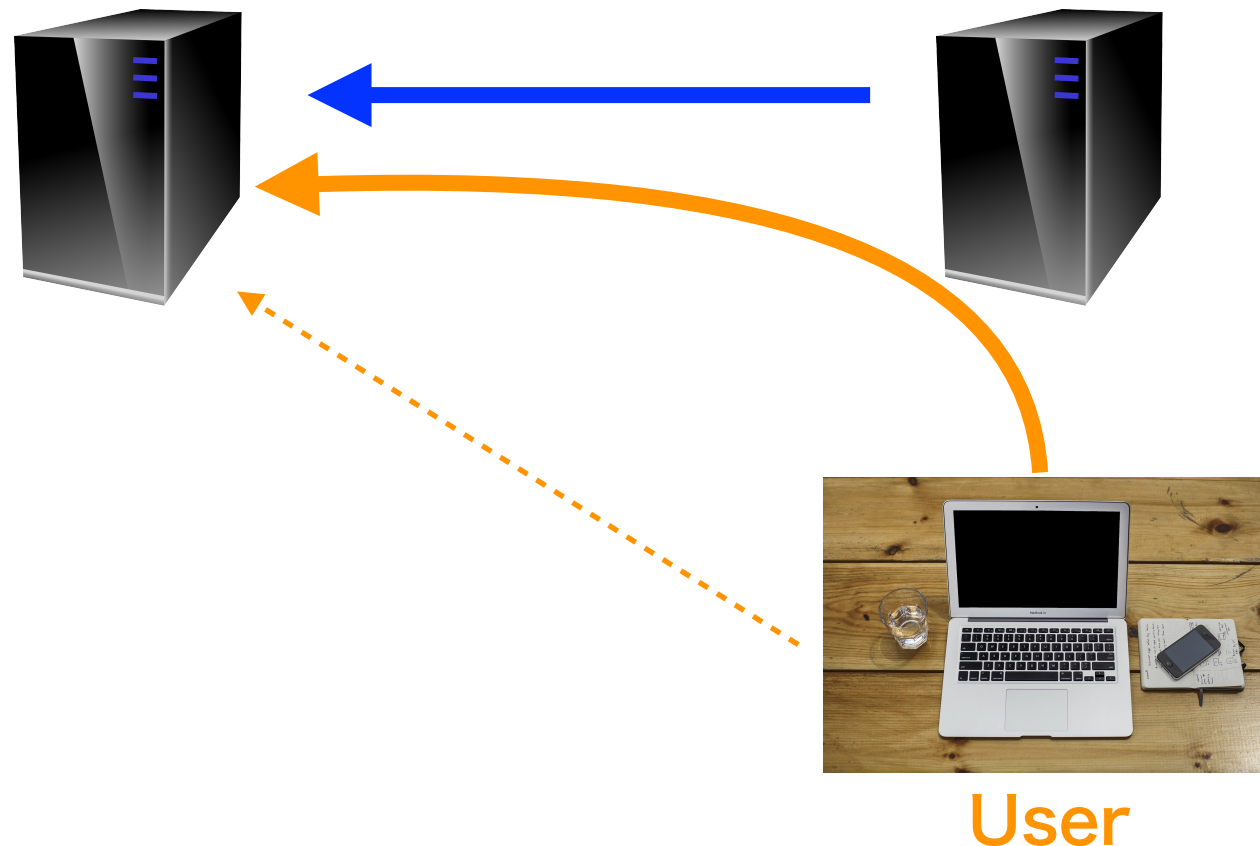
- I have a Calculus class with 70 students and marked assignments by hand for first 4 weeks.
- It takes hours to mark and I would like to automate where I can automate
  - Using e-assessment system for mathematics
- Nagoya Universities' official LMS is Sakai and there is no plugin for e-assessment for mathematics
- I have a Moodle server with STACK outside the university
- I do not want students to have more IDs
- I decided to use STACK from Sakai through LTI

# What is LTI

- Learning Tools Interoperability (LTI) is an education technology specification developed by the IMS Global Learning Consortium.
- It specifies a method for a learning system to invoke and to communicate with external systems.
- For example, LMS may use LTI to host course content and tools provided by external systems on a web site, **without requiring a learner to log in separately on the external systems.**

LTI Provider

LTI Consumer





# Preparation as a provider for Moodle

class.ja-stack.org

[Dashboard](#) / [Site administration](#) / [Plugins](#) / [Authentication](#) / [Manage authentication](#)

Blocks editing on

## Manage authentication

Available authentication plugins

Name	Users	Enable	Up/Down	Settings	Test settings	Uninstall
Manual accounts	1398			<a href="#">Settings</a>		
No login	0					
LTI	109					
CAS server (SSO)	0			<a href="#">Settings</a>	<a href="#">Test settings</a>	<a href="#">Uninstall</a>



class.ja-stack.org

[Dashboard](#) / [Site administration](#) / [Plugins](#) / [Enrolments](#) / [Manage enrol plugins](#)

Blocks editing on

## Manage enrol plugins

Available course enrolment plugins

Name	Instances / enrolments	Version	Enable	Up/Down	Settings	Test settings	Uninstall
Manual enrolments	32 / 1357	2019111800		↓	<a href="#">Settings</a>		
Guest access	32 / 0	2019111800		↑ ↓	<a href="#">Settings</a>		<a href="#">Uninstall</a>
Self enrolment	32 / 0	2019111800		↑ ↓	<a href="#">Settings</a>		<a href="#">Uninstall</a>
Cohort sync	7 / 70	2019111800		↑ ↓	<a href="#">Settings</a>		<a href="#">Uninstall</a>
Publish as LTI tool	4 / 108	2019111800		↑	<a href="#">Settings</a>		<a href="#">Uninstall</a>

# Preparation as a provider for Moodle

My class

[Dashboard](#) / [My courses](#) / [数学入門2020](#) [Published as LTI tools](#)


## Published tools


A tool may be shared with another site by providing either launch details or a registration URL.


[More help](#)


Name	Launch details ?	Registration URL ?	Edit
Course: 数学入門2020	<div>Cartridge URL <input type="text" value="https://class.ja-stack.org/"/></div> <div>Secret <input type="text" value=""/></div> <div>Launch URL <input type="text" value="https://class.ja-stack.org/"/></div>	<input type="text" value="https://class.ja-stack.org/"/>	<a href="#">Delete</a> <a href="#">View</a> <a href="#">Edit</a>
<div>Add</div>			


# Preparation as a consumer for Sakai





View Site As: 


Sites 


Home 


2020年度春学期全学教育科目学期末試験実施等調査-1 


2020年3月23日緊急講習会 


【教養教育院】2020年春学期遠隔授業アンケート教員用01 


Many Body Systems A(2020, Spring2/Thursday2) 


Modern Mathematics and Mechanics(2020, Spring1/Thursday2) 


Information Physics(2020, Fall1/Thursday2) 


物質情報学 4 (2020年度春 1 /水1) 

物質情報学 5 (2020年度春 1 /木1) 

複雑システム系序論 1 (2020年度春 2 /月3) 

数学入門(2020年度春学期/木1) 

物理学実験(2020年度春学期/木3・木4) 

物理学基礎 I (2020年度春学期/水3) 

Announcements

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Forums


Gradebook

Site Info

Messages

Tests & Quizzes

STACK

 SITE INFO

Edit Site Information

Manage Tools

Tool Order

Add Participants

Manage Groups

Link to Parent Site

External Tools

Manage Access

Import from Site

Import from Archive File

User Audit Log

数学入門(2020年度春学期/木1)

Term

Roster(s) with site access

Site URL

Site contact and email

Available to

Modification date

Modified by

Display in Site Browser

Creation date

Appearance

LaTeX

https://ct.nagoya-u.ac.jp/portal/site/2020\_1\_0014107

Sakai Administrator

Site participants only

May 22, 2020 5:04 pm

中村 泰之

Yes ([Tell me more...](#))

Mar 12, 2020 10:06 pm

Enabled for the site

# Preparation as a consumer for Sakai

NUCT

View Site As:

Sites

Home

2020年度春学期全学教育科目学期末試験実施等調査-1

2020年3月23日緊急講習会

【教養教育院】2020年春学期遠隔授業アンケート教員用01

Many Body Systems A(2020, Spring2/Thursday2)

Modern Mathematics and Mechanics(2020, Spring1/Thursday2)

Information Physics(2020, Fall1/Thursday2)

物質情報学 4 (2020年度春 1 /水1)

物質情報学 5 (2020年度春 1 /木1)

複雑システム系序論 1 (2020年度春 2 /月3)

数学入門(2020年度春学期/木1)

物理学実験(2020年度春学期/木3・木4)

物理学基礎 I (2020年度春学期/水3)

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**Site Info**

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STACK

SITE INFO

Installed Tools

Tool Links

Install LTI 1.1 Tool

Below are the external tools that have been added to the system. Select the "Edit" link to revise the launch settings. Select the "Add External Tool to System" link to make additional external tools available.

Title	URL	Site ID	Action
<div>Search by Title</div>	<div>Search by URL</div>	<div>Search by Site ID</div>	
<a href="https://class.ja-stack.org">class.ja-stack.org</a>	<a href="https://class.ja-stack.org/">https://class.ja-stack.org/</a>		<a href="#">Edit</a> / <a href="#">Delete</a>

If you have a key and secret, you must first install the tool using this screen, and then to launch the tool, you need to create a tool configuration for the tool. You can test launch your tool and get a URL for your tool from the tool configuration screen.

# Preparation as a consumer for Sakai

The screenshot shows the Sakai LMS interface with a green header bar containing the 'NUCT' logo. A left sidebar lists various site tools: Announcements, Resources, Assignments, Forums, Gradebook, Site Info (highlighted with a green gear icon), Messages, Tests & Quizzes, and STACK (highlighted with a red box). The main content area is titled 'SITE INFO' with a gear icon. Under the 'External Tool' section, the 'Tool Title (Above the tool)' is set to 'class.ja-stack.org'. The 'Allow tool title to be changed' option is set to 'Do not allow'. A dropdown menu for 'Choose a custom icon' is shown. The '\*Button Text (Text in tool menu)' is set to 'STACK' (highlighted with a red box), with a red arrow pointing from this box to the 'STACK' tool in the sidebar. The 'Allow button text to be changed' option is also set to 'Do not allow'. A large text area for the 'Description' is at the bottom.

NUCT

Announcements

Resources

Assignments

Forums

Gradebook

Site Info

Messages

Tests & Quizzes

STACK

**SITE INFO**

**External Tool**

**\*Tool Title (Above the tool)**

class.ja-stack.org

**Allow tool title to be changed**

☒ Do not allow

☐ Allow

**Choose a custom icon (leave empty to use the default icon)**

**\*Button Text (Text in tool menu)**

STACK

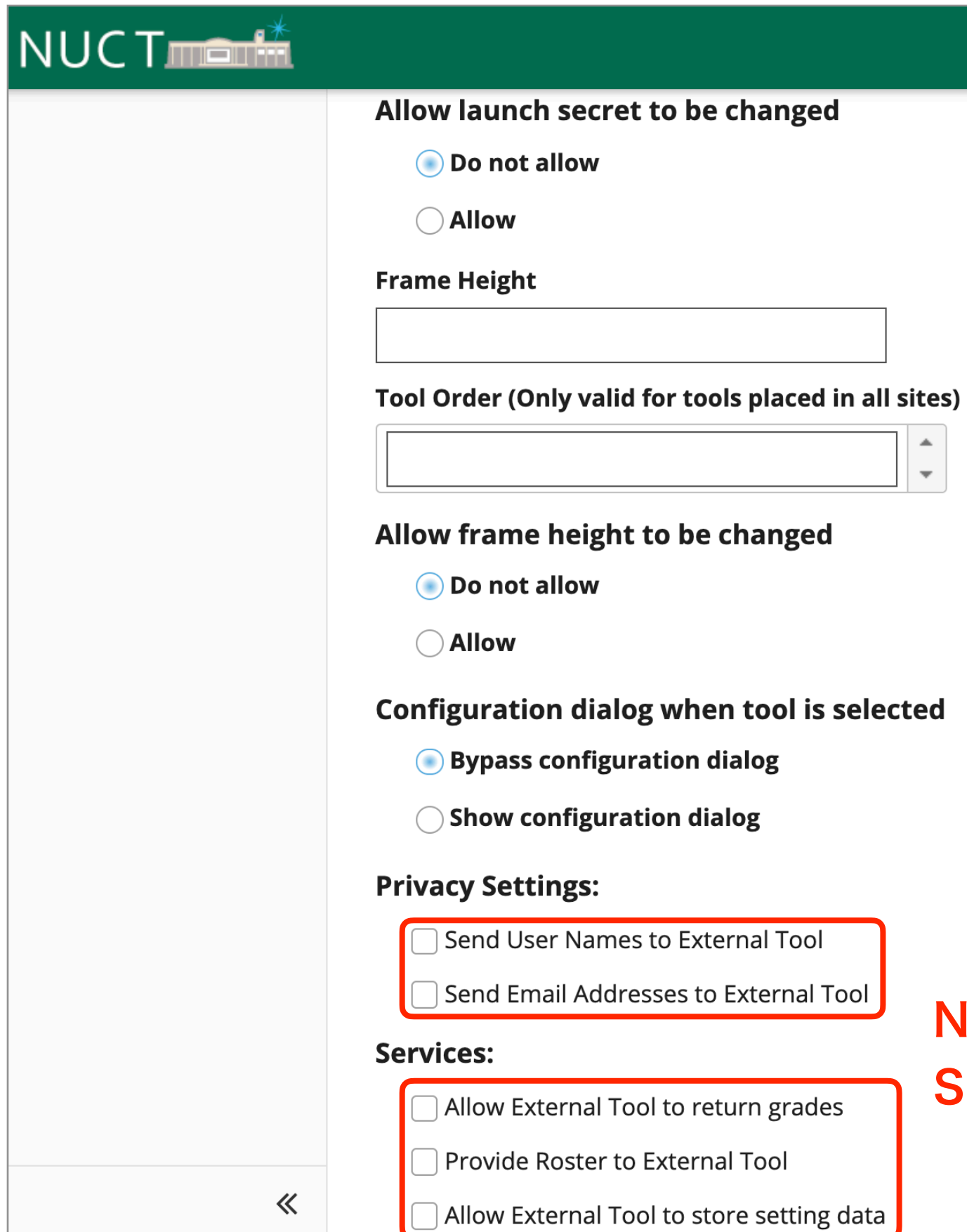
**Allow button text to be changed**

☒ Do not allow

☐ Allow

**Description**

# Preparation as a consumer for Sakai



The screenshot shows the NUCT Sakai configuration interface. The header is a dark green bar with the NUCT logo. The main content area is white and contains several configuration sections. The 'Allow launch secret to be changed' section has two radio buttons: 'Do not allow' (selected) and 'Allow'. The 'Frame Height' section has a text input field. The 'Tool Order (Only valid for tools placed in all sites)' section has a list box. The 'Allow frame height to be changed' section has two radio buttons: 'Do not allow' (selected) and 'Allow'. The 'Configuration dialog when tool is selected' section has two radio buttons: 'Bypass configuration dialog' (selected) and 'Show configuration dialog'. The 'Privacy Settings' section has two checkboxes: 'Send User Names to External Tool' and 'Send Email Addresses to External Tool'. The 'Services' section has three checkboxes: 'Allow External Tool to return grades', 'Provide Roster to External Tool', and 'Allow External Tool to store setting data'. A red box highlights the 'Privacy Settings' and 'Services' sections. A double arrow icon is at the bottom left.

NUCT

**Allow launch secret to be changed**

☒ Do not allow

☐ Allow

**Frame Height**

**Tool Order (Only valid for tools placed in all sites)**

**Allow frame height to be changed**

☒ Do not allow

☐ Allow

**Configuration dialog when tool is selected**

☒ Bypass configuration dialog

☐ Show configuration dialog

**Privacy Settings:**

☐ Send User Names to External Tool

☐ Send Email Addresses to External Tool

**Services:**

☐ Allow External Tool to return grades

☐ Provide Roster to External Tool

☐ Allow External Tool to store setting data

«

Nothing is sent from  
Sakai to Moodle




# Preparation as a consumer for Sakai

Dashboard / My courses / 数学入門2020 / Published as LTI tools

## Published tools

A tool may be shared with another site by providing either launch details or a registration URL.

[More help](#)

Name	Launch details ?	Registration URL ?	Edit
Course: 数学入門2020	<div>Cartridge URL <input type="text" value="https://class.ja-stack.org/"/></div> <div>Secret <input type="text" value="*****"/></div> <div>Launch URL <input type="text" value="https://class.ja-stack.org/"/></div>	<div><input type="text" value="https://class.ja-stack.org/"/></div>	<div>  </div>

Add

NUCT

Tool Status

☒ Enabled

☐ Disabled

\*Launch URL

Allow launch URL to be changed

☒ Do not allow

☐ Allow

Launch Key

Allow launch key to be changed

☒ Do not allow

☐ Allow

Launch Secret

Allow launch secret to be changed

☒ Do not allow

☐ Allow

# Preparation as a consumer for Sakai

📢 Announcements

📁 Resources

📄 Assignments

💬 Forums

📖 Gradebook

⚙️ **Site Info**

✉️ Messages

✅ Tests & Quizzes

🌐 STACK

⚙️ **SITE INFO**

Installed Tools **Tool Links**

Below are the external tools that have links within a site. One installed tool may have many links. Select "Edit" to revise the settings for a particular link. Select the "Create Tool Link" to add a new link.

Export to CSVExport to Excel

1 - 1 (1) 50

Title	URL	Added On	Action
<input type="text" value="Search by Title"/>	<input type="text" value="Search by URL"/>	<input type="text" value="Search by Added On"/>	
class.ja-stack.org	<a href="https://class.ja-stack.org">https://class.ja-stack.org</a>	May 22, 2020 5:04:08 PM	<a href="#">Edit</a> / <a href="#">Delete</a>

If you have a url, key, and secret you need to install a new tool, and then come back and place that tool to be launched in this screen.

📢 Announcements

📁 Resources

📄 Assignments

💬 Forums

📖 Gradebook

⚙️ **Site Info**

✉️ Messages

✅ Tests & Quizzes

🌐 STACK

⚙️ **SITE INFO**

**Create Tool Link**

**\* Select Tool**

✓ ----- select one -----  
class.ja-stack.org

☐ Add Site Link

SaveCancel

📢 Announcements

📁 Resources

📄 Assignments

💬 Forums

📖 Gradebook

⚙️ **Site Info**

✉️ Messages

✅ Tests & Quizzes

**STACK**

⚙️ **SITE INFO**

**Create Tool Link**

**\* Select Tool**

class.ja-stack.org

Choose a custom icon (leave empty to use the default icon)

Tool Order (Only valid for tools placed in all sites)

☒ Add Site Link

SaveCancel



# Access to STACK from Sakai

NUCT : 数学入門(2020年度春学期) ×

ct.nagoya-u.ac.jp/

NUCT

View Site As: Sites

Home2020年度春学期全学教育科目学期末試験実施等調査-12020年3月23日緊急講習会【教養教育院】2020年春学期遠隔授業アンケート教員用01Many Body Systems A(2020,Spring2/Thursday2)Modern Mathematics and Mechanics(2020,Spring1/Thursday2)Information Physics(2020,Fall1/Thursday2)物質情報学 4 (2020年度春 1 /水1)物質情報学 5 (2020年度春 1 /木1)複雑システム系序論 1 (2020年度春 2 /月3)数学入門(2020年度春学期/木1)物理学実験(2020年度春学期/木3・木4)物理学基礎 I (2020年度春学期/水3)

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RESOURCES

Site ResourcesTrashTransfer FilesPermissionsOptionsCheck Quota

All site files / 数学入門(2020年度春学期/木1) Resources

MoveCopyMove to TrashShowHideDisplay Columns

	Title ^	Access	Created By	Modified	Size
	数学入門(2020年度春学期/木1) Resources	Actions			
<input type="checkbox"/>	第0回 (4月16日)	ActionsEntire site	中村 泰之	Apr 18, 2020 10:19 pm	2 items
<input type="checkbox"/>	第1回 (4月23日)	ActionsEntire site	中村 泰之	Apr 23, 2020 12:28 am	7 items
<input type="checkbox"/>	第2回 (4月30日)	ActionsEntire site	中村 泰之	Apr 29, 2020 10:28 am	11 items
<input type="checkbox"/>	第3回 (5月7日)	ActionsEntire site	中村 泰之	May 7, 2020 12:10 am	11 items
<input type="checkbox"/>	第4回 (5月14日)	ActionsEntire site	中村 泰之	May 14, 2020 1:31 am	8 items
<input type="checkbox"/>	第5回 (5月21日)	ActionsEntire site	中村 泰之	May 20, 2020 11:57 pm	7 items

# Access to STACK from Sakai

NUCT : 数学入門(2020年度春学期) x

ct.nagoya-u.ac.jp/

NUCT

View Site As: Sites

Home 2020年度春学期全学教育科目学期末試験実施等調査-1 2020年3月23日緊急講習会 【教養教育院】2020年春学期遠隔授業アンケート教員用01

Many Body Systems A(2020, Spring2/Thursday2) Modern Mathematics and Mechanics(2020, Spring1/Thursday2) Information Physics(2020, Fall1/Thursday2)

物質情報学 4(2020年度春 1/水1) 物質情報学 5(2020年度春 1/木1) 複雑システム系序論 1(2020年度春 2/月3) 数学入門(2020年度春学期/木1)

物理学実験(2020年度春学期/木3・木4) 物理学基礎 I(2020年度春学期/水3)

Announcements Resources Assignments Forums Gradebook Site Info Messages Tests & Quizzes STACK

## Moodle area

class English (en)

### Introduction to Mathematics (Calculus)

### 数学入門2020

Dashboard / My courses / 数学入門2020

アナウンスメント

Hidden from students

### Assignment 20200528

### 課題20200528

問1

2

Examples of use of  
STACK from Sakai

NUCT : 数学入門(2020年度春学期) ×

+

ct.nagoya-u.ac.jp/

NUCT

表示ルールを変更: | 講義サイト一覧

多自由度システム特論A(2020年度春2/木2) | 現代数学と力学特論(2020年度春1/木2) | 情報物理学特論(2020年度秋1/木2) | 物質情報学 4 (2020年度春 1 /水1)

物質情報学 5 (2020年度春 1 /木1) | 複雑システム系序論 1 (2020年度春 2 /月3) | 数学入門(2020年度春学期/木1) | 物理学実験(2020年度春学期/木3・木4)

物理学基礎 I (2020年度春学期/水3)

お知らせ

リソース

課題

フォーラム

成績簿

サイト情報

メッセージ

小テスト

STACK

class English (en)

編集

数学入門2020

Dashboard / My courses / 数学入門2020 / その他 / 問1 (コピー) / Preview

Question 1  
Not complete  
Marked out of 1.0  
Flag question  
Edit question

$\frac{d}{dx} e^{2x-1} =$

2\*exp(2\*x-1)

Your last answer was interpreted as follows:  
$$2 \exp(2x - 1)$$
  
The variables found in your answer were: [x]

Check

PC

Dashboard / My courses / 数学入門2020 / その他 / 問1 (コピー) / Preview

サイト情報

メッセージ

小テスト

STACK

Question 1  
Answer saved  
Mark 1.0 out of 1.0  
Flag question  
Edit question

$\frac{d}{dx} e^{2x-1} =$

2\*exp(2\*x-1)

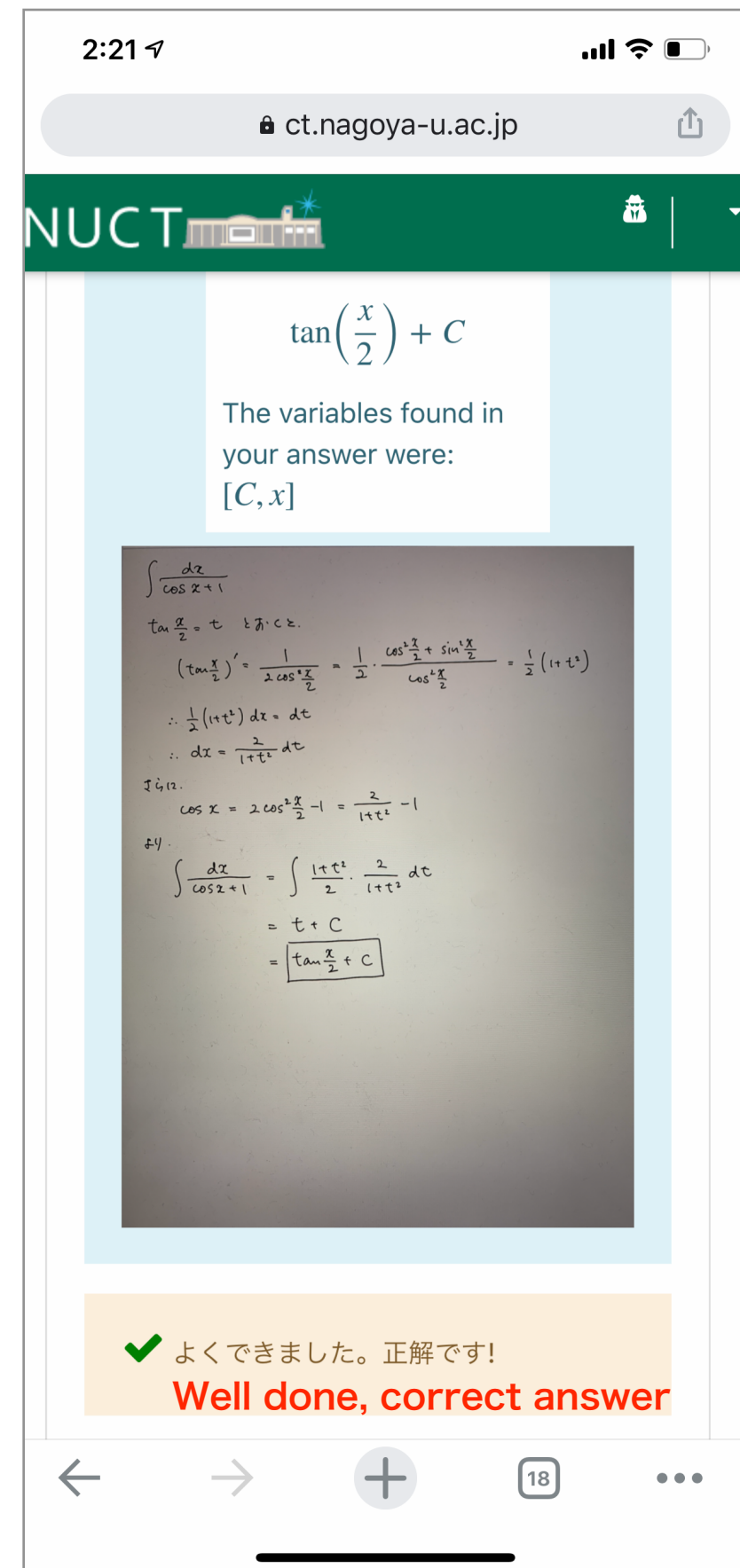
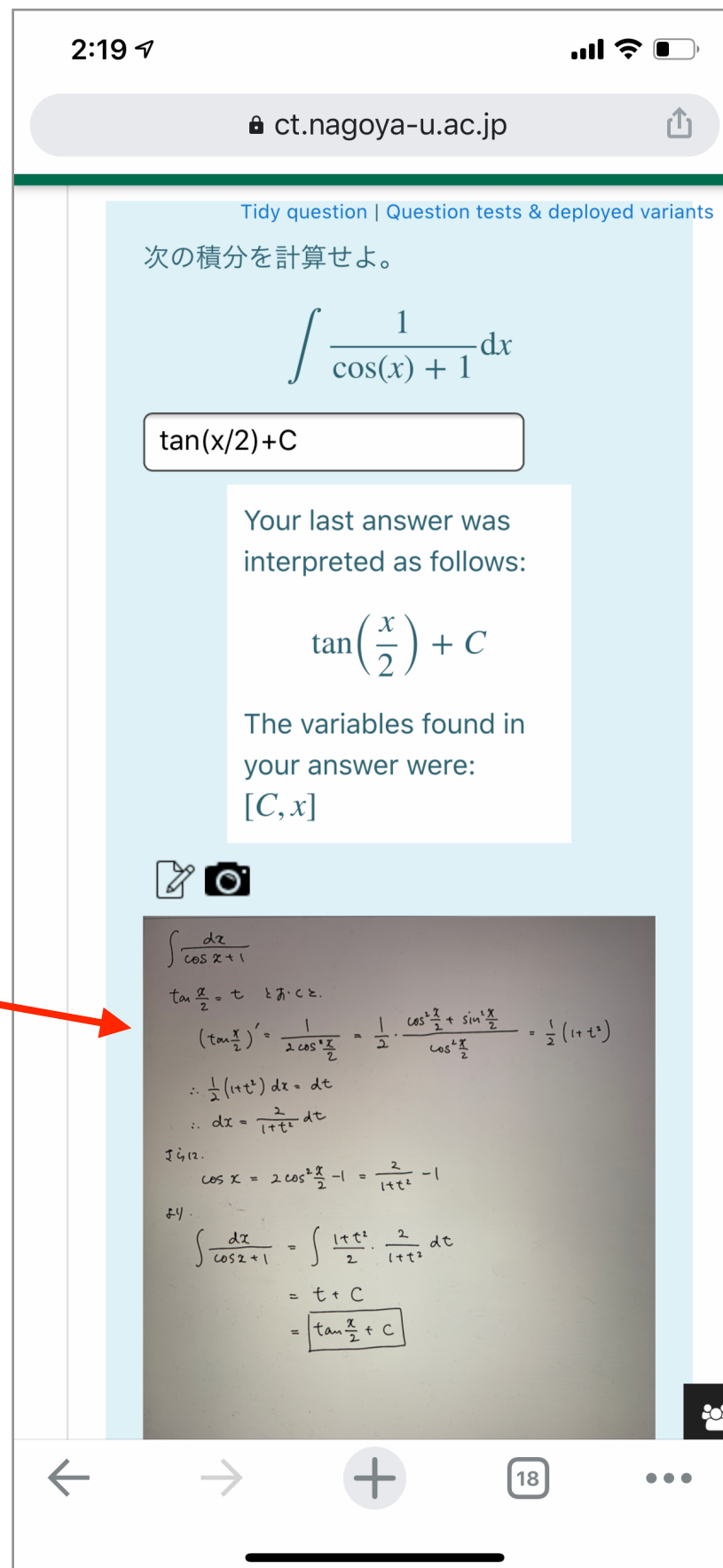
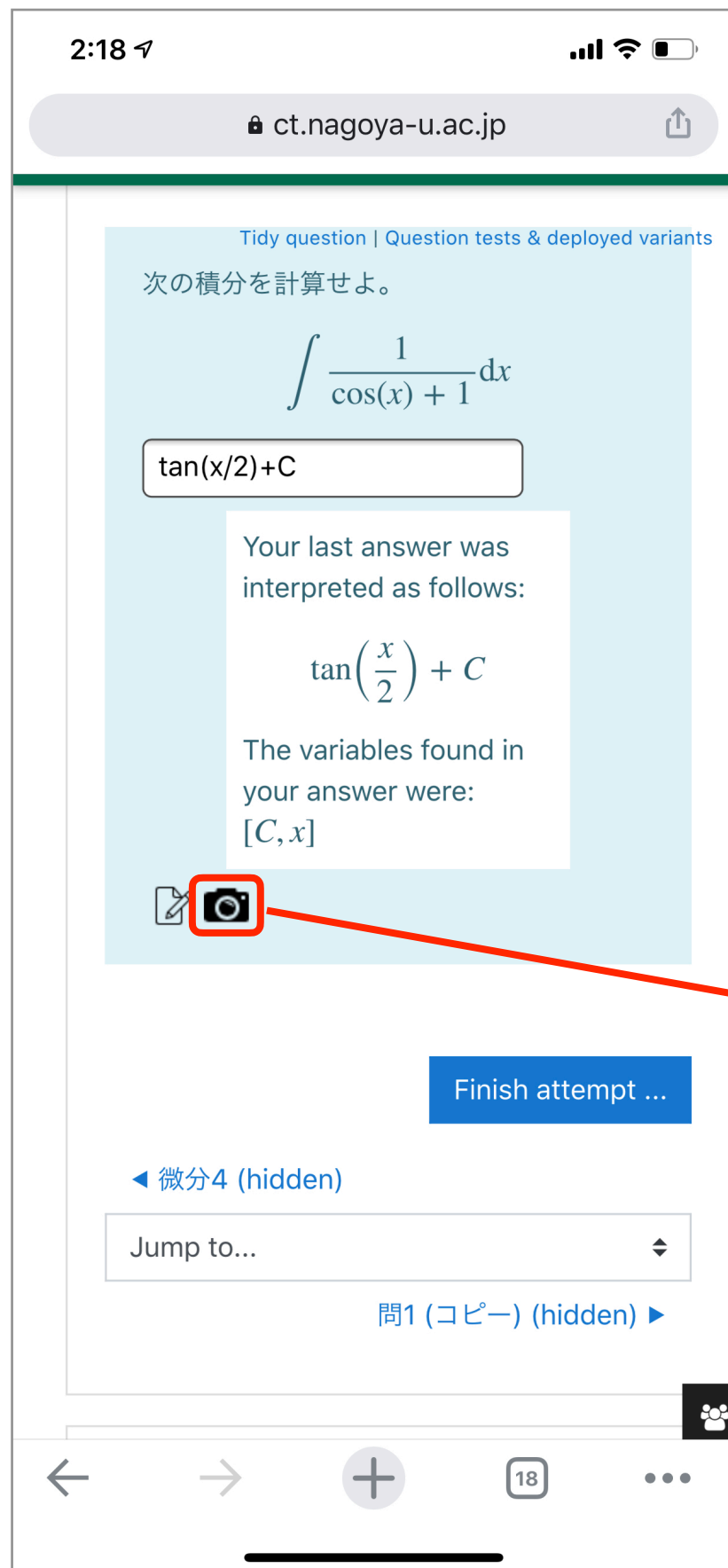
Your last answer was interpreted as follows:  
$$2 \exp(2x - 1)$$
  
The variables found in your answer were: [x]

Check

よくできました。正解です。 Well done, correct answer

Marks for this submission: 1.0/1.0.

# iPhone





## 数学入門2020

Dashboard / My courses / 数学入門2020 / その他 / 問5 (コピー) / Preview

## Question 1

Not yet answered

Marked out of 1.00

Flag question

Edit question

次の積分を計算せよ。

$$\int \frac{1}{\cos(x) + 1} dx$$



$$\int \frac{dx}{\cos x + 1}$$

$$\tan \frac{x}{2} = t \quad \text{とおく。}$$

$$\begin{aligned} \left( \tan \frac{x}{2} \right)' &= \frac{1}{2 \cos^2 \frac{x}{2}} \\ &= \frac{1}{2} \frac{\cos^2 \frac{x}{2} + \sin^2 \frac{x}{2}}{\cos^2 \frac{x}{2}} \\ &= \frac{1}{2} (1 + t^2) \end{aligned}$$

$$\therefore \frac{1}{2} (1 + t^2) dx = dt \rightarrow dx = \frac{2}{1 + t^2} dt$$

したがって、

$$\cos x = 2 \cos^2 \frac{x}{2} - 1 = \frac{2}{1 + t^2} - 1$$

よって、

$$\begin{aligned} \int \frac{dx}{\cos x + 1} &= \int \frac{1}{\frac{2}{1 + t^2} + 1} \cdot \frac{2}{1 + t^2} dt \\ &= \int dt \\ &= t + C \\ &= \boxed{\tan \frac{x}{2} + C} \end{aligned}$$

## 問題 1

未解答

最大得点 1.00

問題をフラグを付ける

問題を編集する

次の積分を計算せよ。

$$\int \frac{1}{\cos(x) + 1} dx$$

あなたの入力した数式は次のとおりです：

$$\tan\left(\frac{x}{2}\right) + C$$

あなたの解答の中で使われている変数は[C, x] です



$$\begin{aligned} \int \frac{dx}{\cos x + 1} \\ \tan \frac{x}{2} = t \quad \text{とおく。} \\ \left( \tan \frac{x}{2} \right)' &= \frac{1}{2 \cos^2 \frac{x}{2}} \\ &= \frac{1}{2} \frac{\cos^2 \frac{x}{2} + \sin^2 \frac{x}{2}}{\cos^2 \frac{x}{2}} \\ &= \frac{1}{2} (1 + t^2) \\ \therefore \frac{1}{2} (1 + t^2) dx &= dt \rightarrow dx = \frac{2}{1 + t^2} dt \\ \text{したがって、} \\ \cos x &= 2 \cos^2 \frac{x}{2} - 1 = \frac{2}{1 + t^2} - 1 \\ \text{よって、} \\ \int \frac{dx}{\cos x + 1} &= \int \frac{1}{\frac{2}{1 + t^2} + 1} \cdot \frac{2}{1 + t^2} dt \\ &= \int dt \\ &= t + C \\ &= \boxed{\tan \frac{x}{2} + C} \end{aligned}$$

iPad

$$\int \frac{1}{\cos(x) + 1} dx$$

あなたの入力した数式は次のとおりです：

$$\tan\left(\frac{x}{2}\right) + C$$

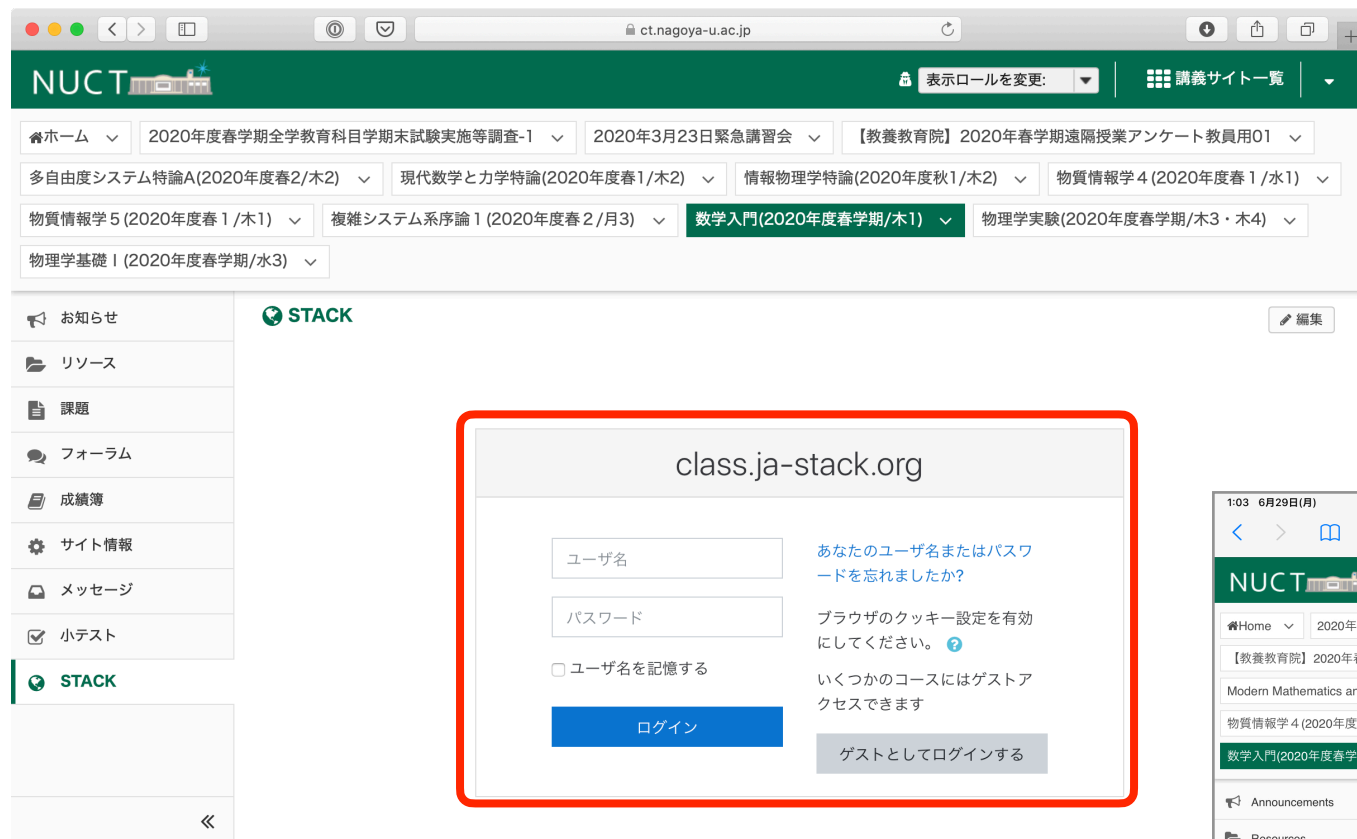
あなたの解答の中で使われている変数は[C, x] です

$$\begin{aligned} \int \frac{dx}{\cos x + 1} \\ \tan \frac{x}{2} = t \quad \text{とおく。} \\ \left( \tan \frac{x}{2} \right)' &= \frac{1}{2 \cos^2 \frac{x}{2}} \\ &= \frac{1}{2} \frac{\cos^2 \frac{x}{2} + \sin^2 \frac{x}{2}}{\cos^2 \frac{x}{2}} \\ &= \frac{1}{2} (1 + t^2) \\ \therefore \frac{1}{2} (1 + t^2) dx &= dt \rightarrow dx = \frac{2}{1 + t^2} dt \\ \text{したがって、} \\ \cos x &= 2 \cos^2 \frac{x}{2} - 1 = \frac{2}{1 + t^2} - 1 \\ \text{よって、} \\ \int \frac{dx}{\cos x + 1} &= \int \frac{1}{\frac{2}{1 + t^2} + 1} \cdot \frac{2}{1 + t^2} dt \\ &= \int dt \\ &= t + C \\ &= \boxed{\tan \frac{x}{2} + C} \end{aligned}$$

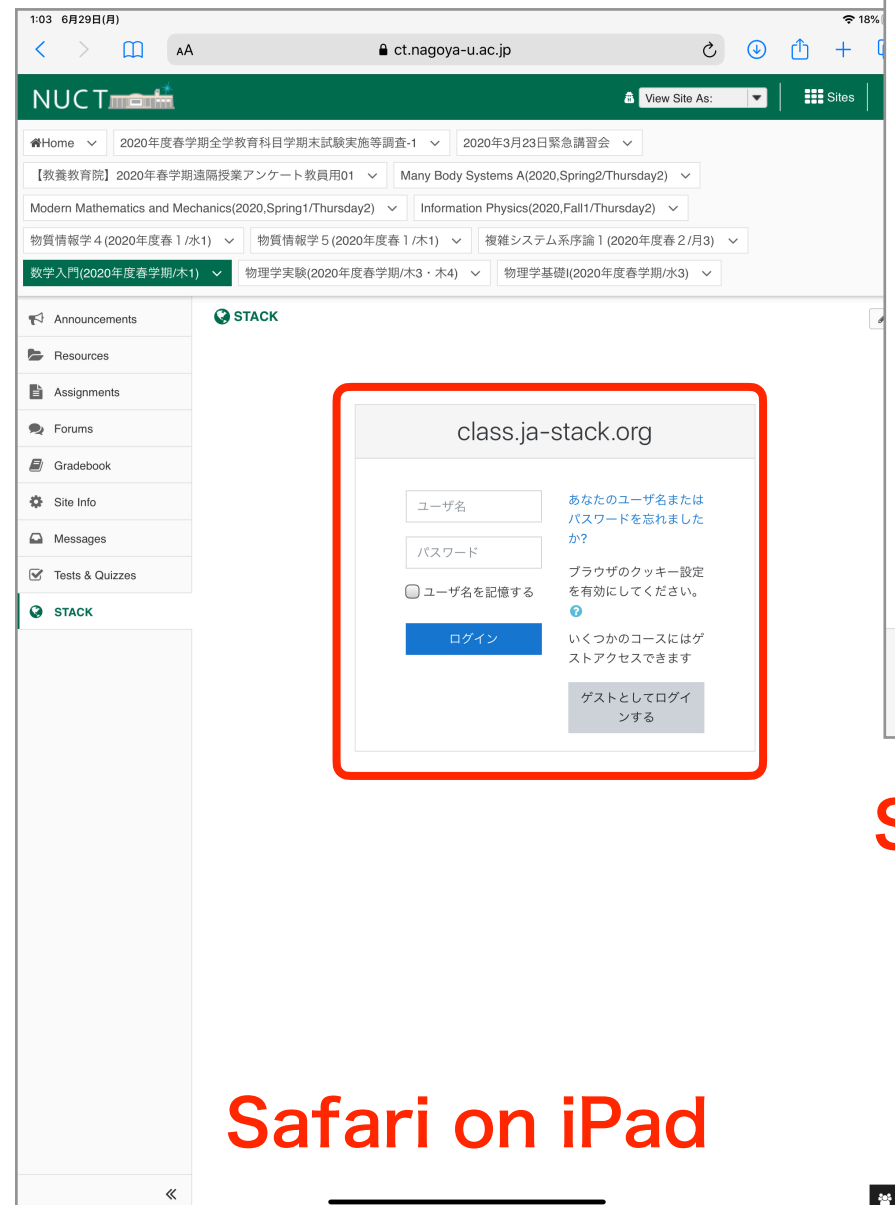
よくできました。正解です！

Some difficulties

# Can not access to STACK from Sakai on several environments



Safari on macOS



Safari on iPad



Safari on iPhone



# Summary of accessibility to STACK from several devices and browsers

	OK	NG
Mac (10.15.4)	Chrome, Firefox	Safari
Windows 10 (1903)	Edge, IE, Chrome, Firefox	
iPad (iPadOS 13.5.1)	Chrome	Safari, Firefox
Chromebook	Chrome	
iPhone (iOS 13.5.1)	Chrome	Safari, Firefox
Android (9.0)	Chrome	

# Student ID on Sakai and Moodle account mapping table

	A	B	C
1	Student ID	Name	STACK
2	03		-c3c7fe930d02 User
3	10		
4	04		
5	10		-f896baf5cc73 User
6	04		cff0d2cfe980 User
7	04		2ff3c73d130b User
8	03		
9	03		-18be8832b6f3 User
10	03		-c18bfd57ac1e User
11	04		
12	04		
13	03		b2836323d756 User
14	04		-345eb7c1b45c User
15	04		e1075576313a User
16	03		-40ecbeae8bcc User
17	04		
18	04		
19	04		
20	10		-b4fc3903f1be User
21	04		-e3b3358e64b3 User
22	03		-d054b5b7c7d5 User
23	04		-8182baecb49a User
24	03		
25	01		4b7892321719 User
26	02		
27	04		
28	04		-8be80bf7aa23

# Summary

- We prepared an environment where students can access to STACK from Sakai that is the official university's LMS
- There are some restriction to access STACK from Sakai; for example, Safari on Apple's device
- There is no student who can not access STACK
- Students are happy to use STACK because of instant feedback
- For grading in the end of semester, results of marking on STACK should be merged to the grade sheet on Sakai by using mapping table between students' ID on Sakai and Moodle account