

# MathE teachers and students Community of Practices



## Guidebook of Good Practices



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Erasmus+ MathE Project  
**2018-1-PT01-KA203-047361**



Project Number: 2018-1-PT01-KA203-047361

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## Introduction

### About the MathE project (aims, partnership, educational resources)

The *MathE - Improve Math Skills in Higher Education*, funded by the European Commission under the Erasmus+ Programme, KA2 - Strategic Partnerships for Higher Education; aims to enhance the quality of teaching Mathematics through digital technologies and to improve teachers' pedagogies and assessment methods with a view to overcoming students' gaps in Mathematics.

The project, coordinated by The Polytechnic Institute of Bragança, Portugal, is being implemented within a partnership made up of technical universities and educational centres as, Limerick Institute of Technology from Ireland, Kaunas University of Technology Lithuania, the University of Genova and Pixel Association from Italy and "Gheorghe Asachi" Technical University of Iasi and EuroEd Foundation from Romania.

The specific objectives are:

- To facilitate the identification of students' gaps in the knowledge of maths to effectively attend their higher education courses.
- To provide Math teachers with the necessary teaching sources so that they can help their students to overcome existing gaps.
- To enhance a transnational sharing of teaching sources, tools and strategies in the field of Mathematics teaching and learning at higher education level

The MathE project makes a significant contribution to innovation in Maths teaching at higher education level by developing, implementing and testing:

- Assessment tools to identify the areas where the students' maths entry skills need to be improved.

Self Need Assesment

Final Assesment



- An Online Math Library, which will be available to students and teachers of higher education institutions to provide them with video, based teaching and learning sources to reinforce specific mathematical topics.

Video Lessons on Maths

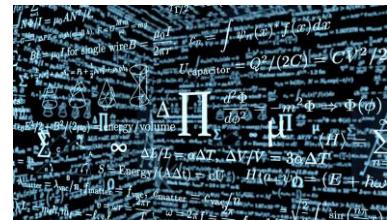
Teaching materials



- A Community of Practice allowing Maths teachers in higher education institutions to share and compare teaching sources, tools and strategies

MathE World Map

Forums



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## About the Guidebook of good practices

The Guide aims to describe how the platform works both from the lecturer's and from the student's point of view and support them to become part of the MathE Community of practice, along with examples of good practices from different countries.

The guide is based on solid research identifying students' main gaps in their mathematics knowledge or skills. The guide enables teachers' and students' access to an innovative toolkit which identifies and solves students' lacunae in Mathematics. The toolkit encourages students' autonomy and stimulates their motivation to study by giving them a more empowering role in their own learning process: students identify their needs, do customized exercises and activities with instant automated answers to meet these needs and finally go through remedial material if necessary. The toolkit allows teachers to elaborate final assessments for their students on the topics they wish to evaluate.

## Benefits for the teachers and students joining the MathE Community of Practices

Students of scientific and economics subjects (more specifically engineering and Economics) at higher education level often lack the basic maths skills to effectively follow their lectures. It is therefore necessary to identify these gaps and to give Maths teachers the sources to provide their students with the necessary skills and competences that they lack.

From the student's perspective, MathE project promotes:

- An increase in students' engagement, motivation and sense of being challenged.
- Digital educational resources that can be used as a work tool, individually or as team work, to increase mathematical knowledge.

From the teacher's perspective, MathE project promotes:

- Motivation and the sense of challenge.
- Digital educational tools for the classroom.
- Resources for the evaluation of the progress of the students' knowledge, that can be used as assessment of the math course unit of some engineering/business course.
- Evaluation and assessment tools.
- Possibilities of discussion among teachers and researchers about good practices in Math teaching.



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## Part 1: MathE usability

### 1.1 Presentation of the MathE Platform

The MathE project propose the MathE Platform, as educational resource, enhancing the quality of teaching and improving pedagogies and assessment methods by facilitating the identification of students' gaps in Math, providing Math teachers with appropriate digital resources and enhancing the transnational sharing of innovative teaching sources.

The MathE Platform can be accessed at the following link: [mathe.pixel-online.org](http://mathe.pixel-online.org)

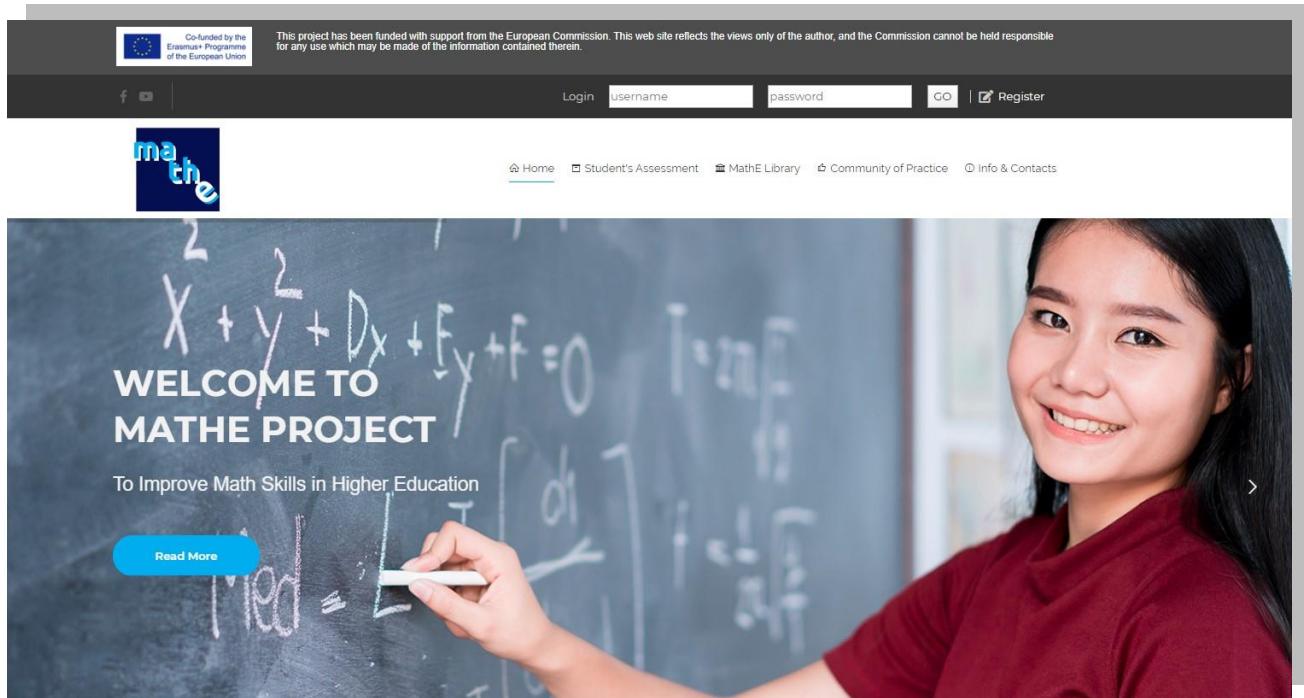


Image 1 – Home page of the MathE Platform

The MathE Platform offers:

- Educational resources for both teachers and students.
- Student's Assessment Toolkit, which allows students to carry out a self-evaluation of their knowledge or a final assessment on selected Math topics.
- A collection of reviewed & specifically created video lessons on several selected Math topics.
- A collection of teaching and learning materials in order to support students in the acquisition of competences on Math selected topics.
- A virtual place to exchange teaching and learning experiences between teachers and students.



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### Motivational aspects for teachers:

The MathE Platform:

- Provides teachers with the necessary ready-made tools to identify and remedy students' gaps;
- Provides teachers with invaluable evaluation and assessment tools;
- Makes teaching more effective and increases teacher's job satisfaction and motivation;
- Enhances the quality of teaching practices which keep students more engaged and motivated;
- Offers more possibilities of exchanges among teachers and researchers about good practices in math teaching;
- Enhances collaboration and knowledge sharing among teachers and researchers across Europe.

### Motivational aspects for students:

The MathE Platform:

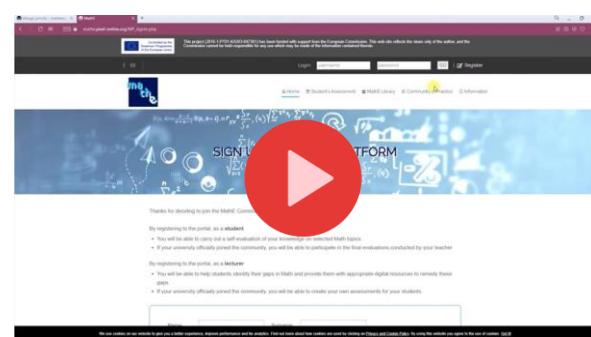
- Creates individual environments which are customised to each student, enabling students to experiment and develop their own learning (students identify their gaps and select activities to remedy these gaps);
- Engages students in their own learning at their pace whenever they want to;
- Engages students in self-directed and more active learning;
- Promotes greater involvement of students with the contents;
- Increases their performance;
- Encourages lifelong learning;
- Facilitates positive interactions;
- Enables students to go through difficult concepts as many times as they want or skip ahead if they need to.

## 1.2 Teachers using the MathE Platform

### 1.2.1 Teacher registration

By registering to the portal, as a teacher/lecturer:

- You will be able to help students identify their gaps in Math and provide them with appropriate digital resources to remedy these gaps.
- If your university officially joined the community, you will be able to create your own assessments for your students.



Video tutorial on how to register



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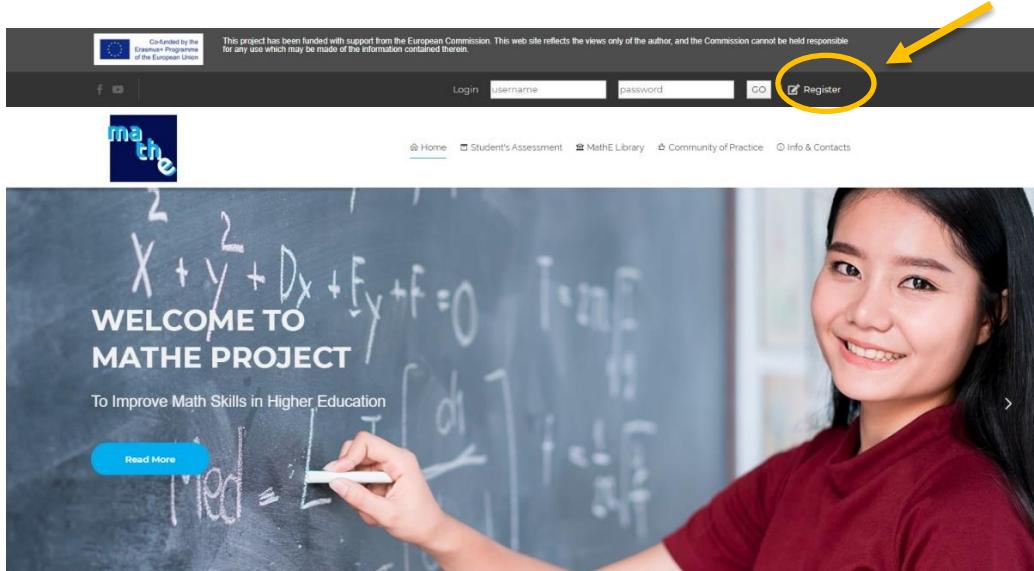


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This section shows how to register step by step:

Step 1: Access the project portal - [mathe.pixel-online.org](http://mathe.pixel-online.org)

Step 2: Click on the “Register” button to sign up to MathE platform



Step 3: You will receive the message “Thanks for deciding to join the MathE Community” and invited to fill in initial data.

- The name and surname will appear on the platform.
- Mention an email address you have access to.
- Specify that you are a lecturer.
- Read carefully the agreement for the use of the personal data.

Joining the community as a lecturer  
I agree with the terms of use of the project portal. I will use the service to help students develop their skills in mathematics and physics. I will not use it for commercial purposes.

Name  Surname   
Email  Email Confirmation   
Password

Please specify if you are a:

STUDENT  
 LECTURER

Confirmation of registration  
Hereby I confirm that I would like to register on the project portal of the Erasmus+ project MathE.

Agreement for electronic use of personal data  
I further agree that my personal data (full name, email) get collected and processed for

- Reporting and audits of the Erasmus+ Portuguese national agency or any other organization indicated by the European Commission.
- Contacting me via email for information material related to the project.
- Statistical purposes

**Proceed**



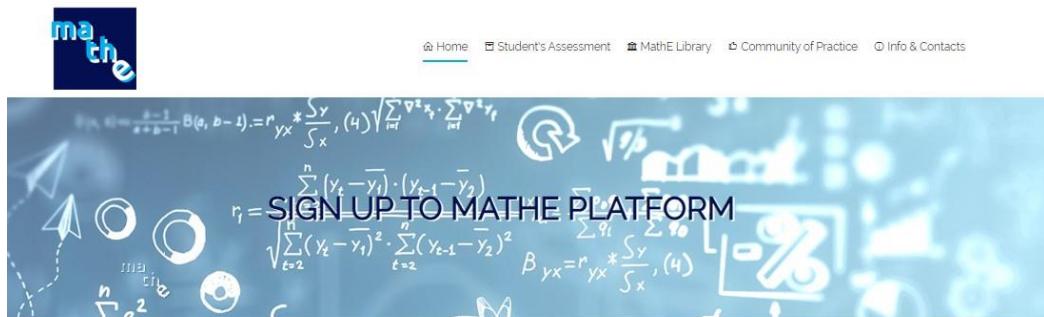
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Step 4: After you clicked on the “Proceed” green button, you will receive a message to check the email mentioned previously, in order to activate your account.



Thank you for your request.

We sent you an email message.

In order to activate your account,  
please click on the link in the message.

Step 5: Check your email and click on the link received, to activate your account.

- The email will be received from this email address “MathE Platform <noreply@pixel-online.org>”. Check in spam, also, if you cannot find the email in Inbox.
- The message received is saying, “Hi, you activated the registration process to the MathE platform. Please verify your email address by clicking on the following link: mathe.pixel-online.org/MP\_confirmEmail.php?code=..... . You will immediately receive another email message with your username and password.”

Step 6: You will be redirected on the project portal and invited to update your profile.

- Fill in the sections about the personal profile. The sections with “\*” are mandatory.

The screenshot shows a web page titled "Update your Profile". On the left, there is a "RESERVED AREA" with links for "Welcome" and "Lecturer". Below these, it says "Thanks for registering to the Mathe Portal. Before start working on the platform, you need to complete your profile." The main form area has a title "YOUR PROFILE" with several input fields:

- \* Name: [Input field]
- \* Surname: [Input field]
- \* Email: [Input field]
- Field of research: [Input field]
- \* Subject taught: [Input field]
- Years of experience: [Input field]
- Profile: [Input field]
- Picture (JPG format): [Input field] Choose File | No file chosen



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- Fill in the sections about the University you belong to. The sections with “\*” are mandatory.

Please choose the University you belong to. If your University is not on the list, please contact Ana Pereira at [mathe@ipb.pt](mailto:mathe@ipb.pt)

\* Name of the University

\* Faculty / Department

City

Address

Confirmation of registration  
Hereby I confirm that I would like to register on the project portal of the Erasmus+ project MathE.

Agreement for electronic use of personal data  
I further agree that my personal data (full name, email) get collected and processed for

- Reporting and audits of the Erasmus+ Portuguese national agency or any other organization indicated by the European Commission.
- Contacting me via email for information material related to the project
- Statistical purposes

**Proceed**

If your University is not on the list, please contact Ana Pereira at [mathe@ipb.pt](mailto:mathe@ipb.pt). After your University will be included on the list, you will be able to finalise the registration process, by clicking on the “Proceed” green button.

Step 7: You are now logged in and you have access to all the resources available or to the option to create and administrate your own resources.

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You are logged in. [Reserved Area](#) [Logout](#)

**RESERVED AREA**

Welcome

Lecturer [Update your Profile](#) [Change Password](#) [Logout](#)

Student Need Assessment [Insert new Question](#) [Manage your Questions](#)

Student Final Assessment [Insert new Question](#) [Manage your Questions](#) [Create new Final Assessment](#) [Manage Final Assessment](#)

Video Reviews [Insert new Video Review](#) [Manage your Video Reviews](#)

Video Lessons [Insert new Video Lesson](#) [Manage your Video Lessons](#)

Teaching Material [Insert new Teaching Material](#) [Manage your Teaching Materials](#)

Users [List of Students](#)

Self Need Assessment  
This toolkit allows students to carry out a self-evaluation of their knowledge on 10 selected Math topics

Final Assessment  
This toolkit provides teachers with the possibility to organize for their students an online test on selected Math topics.

Video Collection  
A collection of reviewed video lessons on selected Math topics.

Teaching Materials  
A collection of teaching and Learning material in order to support students in the acquisition of competences on Math selected topics

Home [Student's Assessment](#) [MathE Library](#) [Community of Practice](#) [Info & Contacts](#)



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## 1.2.2 Addition of questions to the self-assessment database

### About the self-assessment database

The Self Need Assessment is a toolkit, which allows students to carry out a self-evaluation of their knowledge on Math topics. The students' self-need assessment toolkit helps students identify their needs and provides them with plenty of online exercises and activities meant to meet these needs.

For the moment, the self-need assessment toolkit comprises the following topics:

- Analytic Geometry
- Complex Numbers
- Differential Equations
- Differentiation – Derivatives; Implicit Differentiation and Chain Rule; Partial Differentiation
- Fundamental Mathematics – Elementary Geometry; Manipulation of Algebraic Expressions
- Graph Theory
- Integration – Double Integration; Integration Techniques
- Linear Algebra – Eigenvalues and Eigenvectors; Linear Systems; Linear Transformations; Matrices and Determinants; Vector Spaces
- Optimization – Linear Optimization; Nonlinear Optimization
- Probability
- Real Functions of a single variable – Domain, Image and Graphics; Limits and Continuity
- Real Functions of several variable – Limits, Continuity, Domain and Image
- Statistics

The platform is dynamic and new topics can be added over the time.

The assessments are created for 2 levels of difficulty: basic and advanced.

To start the assessment please select the topic and the level.  
The numbers between brackets indicate the number of available questions.

\* Topic  
Select Topic

\* Level  
 Basic    Advanced

START ASSESSMENT



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## How to add questions to the self-assessment database

Being part of the MathE Community, as Math Lecturer, you have the opportunity to create your own questions to be added to the Student Need Assessment.

Video tutorial on how to add questions to the Student Self-Assessment Toolkit

Step 1: After you log in, from the Reserved Area, click on “Insert new Question” from the Student Need Assessment section.

Step 2: Before starting to upload the questions and answers, read carefully the supporting document, to guide you on how to create the contents. (click on the image to access the MathE Platform Help)

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Step 3: Fill in the sections indicated. The sections with “\*” are mandatory.

- The topic must be selected.
- If the subtopics are available, you must indicate with specification.
- Write the question.
- Select the level addressed.
- Write the 4 potential answers, from which the first one is the correct one.
- If needed, you can attach any support documents/images.

Step 4: Send the question for validation. The validation will be done by the group of experts from the MathE project consortium.

\* Answer n. 4 (FALSE) [Preview]

Attachment  
Choose File No file chosen

EXIT SAVE SEND FOR VALIDATION

Step 5: After the validation, your question will be available in the Student Need Assessment.

Step 6: To be able to manage – edit, revise the questions you added, you have to click on “Manage your Question” from the Student Need Assessment section. From this section you can check the status of your questions.

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You are logged in. Reserved Area Logout

Home Student's Assessment MathE Library Community of Practice Info & Contacts

RESERVED AREA

Welcome

Lecturer

Update your Profile Change Password Logout

Student Need Assessment Insert new Question Manage your Questions

Student Final Assessment Insert new Question

Manage Your Questions

Student Need Assessment

Found 0 questions

validation:  
All Status  
IN PROGRESS  
WAITING FOR VALIDATION  
VALIDATED  
NOT VALIDATED



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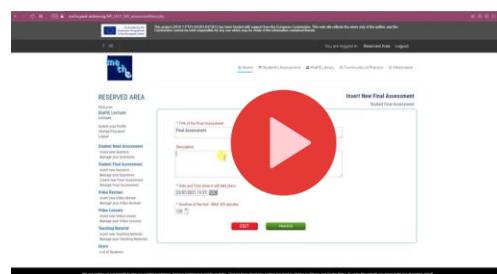


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### 1.2.3 Elaboration of a final assessment

#### About the final assessment database

The MathE Portal provides the lecturers registered on the project with the possibility to create Final Assessments for their students, under the format of online test on selected Math topics. Students can apply when a Final Assessment is available for a course they attend.



Video tutorial on how to create a final assessment

#### How to create a final assessment

The process to create a final assessment is the following one:

Step 1: After you log in, from the Reserved Area, click on “Create new Final Assessment” from the Student Final Assessment section.

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You are logged in | Reserved Area | Logout

**RESERVED AREA**

Welcome

Lecturer  
Update your Profile  
Change Password  
Logout

**Student Need Assessment**  
Insert new Question  
Manage your Questions

**Student Final Assessment**  
Insert new Question  
Manage your Questions  
**Create new Final Assessment** (highlighted with a yellow circle)

**Video Reviews**  
Insert new Video Review  
Manage your Video Reviews

**Video Lessons**  
Insert new Video Lesson  
Manage your Video Lessons

**Teaching Material**  
Insert new Teaching Material  
Manage your Teaching Materials

**Users**  
List of Students

**Self Need Assessment**  
This toolkit allows students to carry out a self-evaluation of their knowledge on 10 selected Math topics

**Final Assessment**  
This toolkit provides teachers with the possibility to organize for their students an online test on selected Math topics.

**Video Collection**  
A collection of reviewed video lessons on selected Math topics.

**Teaching Materials**  
A collection of teaching and Learning material in order to support students in the acquisition of competences on Math selected topics

Step 2: Complete the general information related to the Final Assessment:

- Title of the Final Assessment
- Description
- Date and Time: these refer to the time zone of the University of the lecturer
- Duration of the test, in minutes

This information will be visible for the students when registering to the Final Assessment

Click on the “Proceed” green button after you filled in all the information.



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You are logged in. [Reserved Area](#) [Logout](#)



[Home](#) [Student's Assessment](#) [MathE Library](#) [Community of Practice](#) [Info & Contacts](#)

## RESERVED AREA

Welcome

Lecturer

[Update your Profile](#)  
[Change Password](#)  
[Logout](#)

### Student Need Assessment

[Insert new Question](#)  
[Manage your Questions](#)

### Student Final Assessment

[Insert new Question](#)  
[Manage your Questions](#)  
[Create new Final Assessment](#)  
[Manage Final Assessment](#)

### Video Reviews

[Insert new Video Review](#)  
[Manage your Video Reviews](#)

### Video Lessons

[Insert new Video Lesson](#)  
[Manage your Video Lessons](#)

### Teaching Material

[Insert new Teaching Material](#)  
[Manage your Teaching Materials](#)

### Users

[List of Students](#)

## Insert New Final Assessment

Student Final Assessment

\* Title of the Final Assessment

Description

\* Date and Time when it will take place

29/05/2020 11:32

\* Duration of the test (in minutes)

120

[EXIT](#)

[PROCEED](#)

Step 3: The lecturer should add the questions to the exam choosing from:

- His own questions (if he/she created them)
- The questions available in the MathE database

Status: NOT PUBLISHED

**Algebra**  
The exam refers to the contents of the first semester

Date and Time: 31/07/2019 15:55  
Duration: 120 minutes

The exam is not published and therefore it is not visible for the students. In order to make it visible it is necessary to click on Edit and modify the status.

[edit](#)

| Point | Question   |   |
|-------|--|---|
| 1     | 2.00<br>Topic: Linear Algebra<br>Choose the set of vectors wh...   | <a href="#">delete / change edit question</a><br><a href="#">show answers</a> |
| 2     | 3.00<br>Topic: Linear Algebra<br>Choose two vectors of $V =$ linearly dependent.   | <a href="#">delete / change edit question</a><br><a href="#">show answers</a> |
| 3     | 3.00<br>Topic: Linear Algebra<br>Consider the vector $v = (-$ and $u_2 = (0, 3, -3)$ of $\mathbb{R}^3$ . What is the value of the distance from $v$ to $S$ ? | <a href="#">delete / change edit question</a><br><a href="#">show answers</a> |
| 4     | 2.00<br>Topic: Linear Algebra<br>Assume that $u, v$ and $w$ are vectors in $\mathbb{R}^4$ linearly independent. Choose the right answer.                     | <a href="#">delete / change edit question</a><br><a href="#">show answers</a> |
| 5     | Points assigned to each question   | <a href="#">CHOOSE QUESTION</a>   |



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### Timing

The lecturer:

- must publish (therefore, make visible for the students) the exam at least 1 day before the exam itself
- can modify the exam (date, time, questions) unless the exam is already started

Step 4: The lecturer, by clicking on “Participants” has the possibility to accept or reject the students. This possibility is available until the minute before the assessment starts.

| Final Assessment                                      |   | Subscriptions                                   |
|---|---|---|
| <b>PUBLISHED</b><br>31/07/2019 17:00<br>(120 minutes) | Algebra<br><small>The exam refers to the contents of the first semester</small> | Waiting: 1<br><a href="#">edit participants</a> |

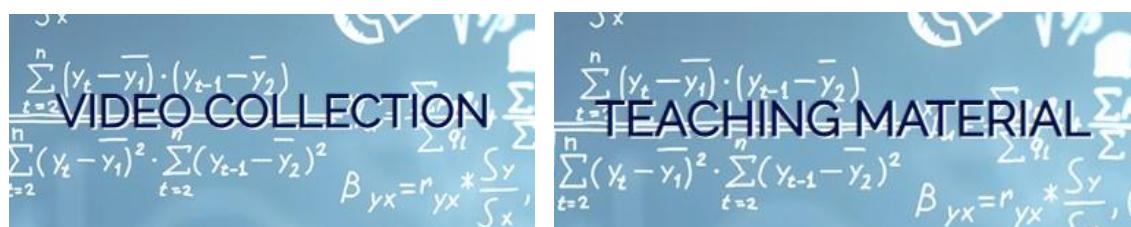
Step 5: The lecturer cannot modify the contents of the assessment after it is started.

| Lecturer          | Title  | Date                                  |                         |
|-------------------|--|---------------------------------------|-------------------------|
| Francesco Pinzani | Università degli Studi di Genova<br><b>Algebra</b><br><small>The exam refers to the contents of the first semester</small> | 30/07/2019<br>h. 16:30<br>120 minutes | <b>START ASSESSMENT</b> |

Step 6: To be able to manage – edit, revise the questions you added, you have to click on “Manage your Question” from the Student Final Assessment section.

### 1.2.4 Inserting teaching resources (videos, lessons and other resources)

The MathE Platform offer a collection of video lessons and teaching materials about several math topics.



Click on the images to access the collections available on the MathE Portal

### How to review other existing video materials

As a lecturer registered on the MathE Platform, you have the possibility to increase the collection of reviewed video lessons on selected Math topics. The main aim of the video lessons is to provide the students with supporting material related to the questions of the self-assessment.



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The process to review a video lesson is the following one:

Step 1: After you log in, from the Reserved Area, click on “Insert New Video Review” from the Video Reviews section.

The screenshot shows the MathE platform interface. On the left, there's a sidebar titled 'RESERVED AREA' containing links for 'Welcome', 'Lecturer' (with 'Update your Profile', 'Change Password', and 'Logout'), 'Student Need Assessment' (with 'Insert new Question' and 'Manage your Questions'), 'Student Final Assessment' (with 'Insert new Question', 'Manage your Questions', 'Create new Final Assessment', and 'Manage Final Assessment'), 'Video Reviews' (with 'Insert new Video Review' highlighted by a yellow arrow and circled), 'Video Lessons' (with 'Insert new Video Lesson' and 'Manage your Video Lessons'), 'Teaching Material' (with 'Insert new Teaching Material' and 'Manage your Teaching Materials'), and 'Users' (with 'List of Students'). The main content area is titled 'Insert New Video Review' under 'Student Need Assessment'. It contains fields for 'Title of the Lesson', 'Author of the Lesson', 'Description' (with a note about 20-50 words), 'Link of the Video' (with a note about YouTube link or Internet address), 'Screen shoot (JPG)' (with a file upload button), 'Language(s)' (with options for English, Italian, Lithuanian, Portuguese, Romanian, and Other), and two buttons at the bottom: 'ABORT' (red) and 'Proceed' (green).

Step 2: Fill in the listed sections with details on the video you previously selected. The sections with “\*” are mandatory.

- Title of the lesson
- Author of the lesson
- Description - Please describe the main contents of the lesson using 20 to 50 words.
- Link of the video - Please indicate the last 11 characters of the YouTube link. If the video is not on YouTube, please insert the Internet address.
- Screen shoot (JPG) - If the video is not on YouTube, please upload a screen shoot of the video in JPG format.
- Language(s) - Multiple choices, if the case.

Step 3: Verify the contents uploaded and when ready, click on the “Proceed” green button. The review will be sent for validation to the Platform hosts.



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Step 4: After the approval, your reviewed video will be part of the MathE Platform Collection of videos.

The screenshot shows the MathE Platform interface. At the top, there's a navigation bar with links for Home, Student's Assessment, MathE Library, Community of Practice, and Info & Contacts. Below the navigation, a section titled "Video" displays four video thumbnails. Each video entry includes a thumbnail image, the title, the creator, a brief description, and a link to the video on YouTube.

- Calculation of Orthogonal Projections**  
Vectors mini course  
With this video you can understand the graphical representation and the calculation of orthogonal projections and scalar projections of vectors.  
[https://youtu.be/2C5w\\_M8nNWg](https://youtu.be/2C5w_M8nNWg)
- Plane and its Equation**  
Designmate Pvt. Ltd - Official  
This video helps learners to understand the concept of normal to a plane and explains how to find the vector and Cartesian equations of a given plane under various conditions.  
<https://youtu.be/841Oxh3vNrQ>
- Determining the Distance Between a Line and a Point**  
Mathispower4u  
This video presents a geometric meaning of the formula for calculating the distance between a Line and a point.  
<https://youtu.be/TByHlsZN4vw>
- Equations of a straight line in space**  
Neha Agrawal  
This video presents graphical and analytical representations for calculating the distance between skew lines.  
<https://www.youtube.com/embed/YWiaqExQ56g>

Step 5: To be able to manage – edit, revise the videos you added, you have to click on “Manage Your Video Reviews” from the Video Reviews section. From this section you can check the validation status of your reviewed videos.

This screenshot shows the "Manage Your Video Reviews" section. On the left, there's a "RESERVED AREA" sidebar with links for Welcome, Lecturer, Update your Profile, Change Password, and Logout. Under "Student Need Assessment", there are links for Insert new Question and Manage your Questions. Under "Student Final Assessment", there is a link for Insert new Question. A yellow arrow points from the "RESERVED AREA" towards the validation status dropdown menu in the main section. The main section has a search bar, a validation status dropdown menu (with "All Status" selected), and buttons for "ALL" and "FILTER". It also displays a message "No one video reviews" and the text "Found 0 video reviews".

### How to create your own video lessons

As a lecturer registered on the MathE Platform, you have the possibility to create and upload your own video lessons for your students on the topics selected by the project. The main aim of the video lessons is to provide the students with supporting material related to the questions of the self-assessment.

The process to create a video lesson is the following one:



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Step 1: After you log in, from the Reserved Area, click on “Insert New Video Lesson” from the Video Lessons section.

The screenshot shows the MathE website interface. At the top, there is a banner with the European Union flag and text stating: "Co-funded by the Erasmus+ Programme of the European Union" and "This project has been funded with support from the European Commission. This web site reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein." Below the banner, there is a navigation bar with links for "Home", "Student's Assessment", "MathE Library", "Community of Practice", "Info & Contacts", "You are logged in.", "Reserved Area", and "Logout".

The main content area is titled "RESERVED AREA". On the left, there is a sidebar with various links: "Welcome", "Lecturer" (with sub-links "Update your Profile", "Change Password", "Logout"), "Student Need Assessment" (with sub-links "Insert new Question", "Manage your Questions"), "Student Final Assessment" (with sub-links "Insert new Question", "Manage your Questions", "Create new Final Assessment", "Manage Final Assessment"), "Video Reviews" (with sub-links "Insert new Video Review", "Manage your Video Reviews"), "Video Lessons" (with sub-links "Insert new Video Lesson", "Manage your Video Lessons" - this link is circled in yellow and has a yellow arrow pointing to it), "Teaching Material" (with sub-links "Insert new Teaching Material", "Manage your Teaching Materials"), and "Users" (with sub-link "List of Students").

The right side of the screen shows the "Insert New Video Lesson" form. It contains fields for "Title of the Lesson", "Author of the Lesson", "Description" (with a note: "Please describe the main contents of the lesson using 20 to 50 words"), "Video" (with a note: "Please indicate the last 11 characters of the YouTube link"), and "Language(s)" (with options: English, Italian, Lithuanian, Portuguese, Romanian, Other). At the bottom of the form are two buttons: "ABORT" (red) and "Proceed" (green).

Step 2: Record the video lesson. For the recording process, it is recommend following the examples from the already available videos.

These are some basic instructions for the video recording. While producing the video, please respect the following rules:

- Be sure to use a good video camera (better 2) in order to have HD quality.
- Pay attention to the quality of the audio (use a microphone) and of the good light.
- Use a tripod for the video camera or be sure to put it in a stable position.
- While recording do not move the video camera and do not zoom in or zoom out (unless you are working with an expert).
- The length of the video must up to 10 minutes.
- The speaker must not read the lesson.
- The video must be uploaded on YouTube.

Instructions for presenting scientific contents. Some apps useful to do videos: Microsoft Whiteboard (window); Docery (ipad); Adobe Connect; Panopto.



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Insert in the beginning of the video a slide with the title of the video lesson (3-5 seconds) including:

- Project logo
- Erasmus+ logo with disclaimer
- Project number: 2018-1-PT01-KA203-047361



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Step 3: On the platform, fill in the listed sections with details on the video. The sections with “\*” are mandatory.

- Title of the lesson
- Author of the lesson
- Description - Please describe the main contents of the lesson using 20 to 50 words.
- Video - Please indicate the last 11 characters of the YouTube link.
- Language(s) - Multiple choices, if the case.

Step 3: Verify the contents uploaded and when ready, click on the “Proceed” green button. The review will be sent for validation to the Platform hosts.

Step 4: After the approval, your video will be part of the MathE Platform Collection of videos.

Step 5: To be able to manage – edit, revise the videos you added, you have to click on “Manage Your Video Lessons” from the Video Lesson section. From this section you can check the validation status of your videos.

RESERVED AREA

Welcome

Lecturer

Update your Profile  
Change Password  
Logout

Student Need Assessment  
Insert new Question  
Manage your Questions

Student Final Assessment

Validation:

All Status

All Status

IN PROGRESS

WAITING FOR VALIDATION

VALIDATED

NOT VALIDATED

No one video lessons

Manage Your Video Lessons

Student Need Assessment

Found 0 video lessons

ALL FILTER

Video tutorial on how to insert Video Reviews and Video Lessons



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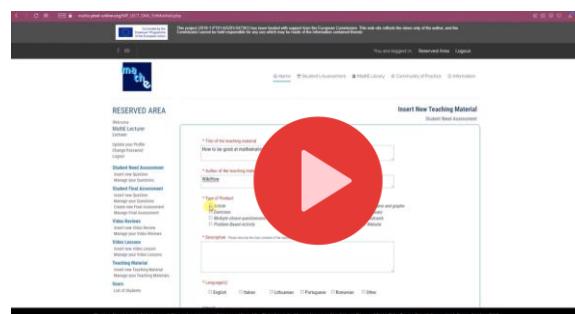


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## How to add new teaching materials

As a lecturer registered on the MathE Platform, you have the possibility to add or create new teaching materials for your students on the topics selected by the project. The main aim of the teaching materials is to provide the students with supporting material related to the questions of the self-assessment.

The teaching materials can be under different formats:  
Article; Slides; Gamification; Multiple choice questionnaire; Diagrams and graphs; Exercises; Problem Based Activity; Glossary; Notes; Blog; Website; Podcasts.



Video tutorial on how to add new teaching materials

### The process to add a teaching material is the following one:

Step 1: After you log in, from the Reserved Area, click on “Insert New Teaching Material” from the Teaching Material section.

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You are logged in. Reserved Area Logout

Home Student's Assessment MathE Library Community of Practice Info & Contacts

**RESERVED AREA**

Welcome

Lecturer

Update your Profile  
Change Password  
Logout

**Student Need Assessment**

Insert new Question  
Manage your Questions

**Student Final Assessment**

Insert new Question  
Manage your Questions  
Create new Final Assessment  
Manage Final Assessment

**Video Reviews**

Insert new Video Review  
Manage your Video Reviews

**Video Lessons**

Insert new Video Lesson  
Manage your Video Lessons

**Teaching Material**

Insert new Teaching Material  
Manage your Teaching materials

**Insert New Teaching Material**

Student Need Assessment

\* Title of the teaching material

\* Author of the teaching material

\* Type of Product

Article    Blog  
 Exercises    Gamification  
 Multiple choice questionnaire    Notes  
 Problem Based Activity    Slides  
 Diagrams and graphs  
 Glossary  
 Podcasts  
 Website

\* Description Please describe the main contents of the teaching material using 20 to 50 words

Step 2: Fill in the listed sections with details on the teaching material. The sections with “\*” are mandatory.

- Title of the teaching material
- Author of the teaching material
- Type of Product – select from the list. Multiple choices, if the case.



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- Description - Please describe the main contents of the teaching material using 20 to 50 words.
- Language(s) - Multiple choices, if the case.
- Upload the created teaching material or provide the Link – if it is available on the internet.

Step 3: Verify the contents uploaded and when ready, click on the “Proceed” green button. The review will be sent for validation to the Platform hosts.

Step 4: After the approval, your teaching material will be part of the MathE Platform Collection of Teaching materials.

Step 5: To be able to manage – edit, revise the videos you added, you have to click on “Manage Your Teaching Materials” from the Teaching Materials section. From this section you can check the validation status of your teaching material.

RESERVED AREA

Welcome  
Lecturer  
Update your Profile  
Change Password  
Logout

**Student Need Assessment**  
Insert new Question  
Manage your Questions

Home Student's Assessment MathE Library Community of Practice Info & Contacts

Manage Your Teaching Materials

Student Need Assessment

Found 0 teaching material

No one teaching material

Search by: Validation:

All Status

All Status

IN PROGRESS

WAITING FOR VALIDATION

VALIDATED

NOT VALIDATED

ALL FILTER



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## 1.3 Students using the MathE Platform

### 1.3.1 Student registration

By registering to the portal, as a student:

- You will be able to carry out a self-evaluation of your knowledge on selected Math topics and thus to identify your gaps.
- You will be able to access remedial exercises and resources to improve your knowledge in Mathematics.
- If your university officially joined the community, you will be able to participate in the final evaluations conducted by your teacher.

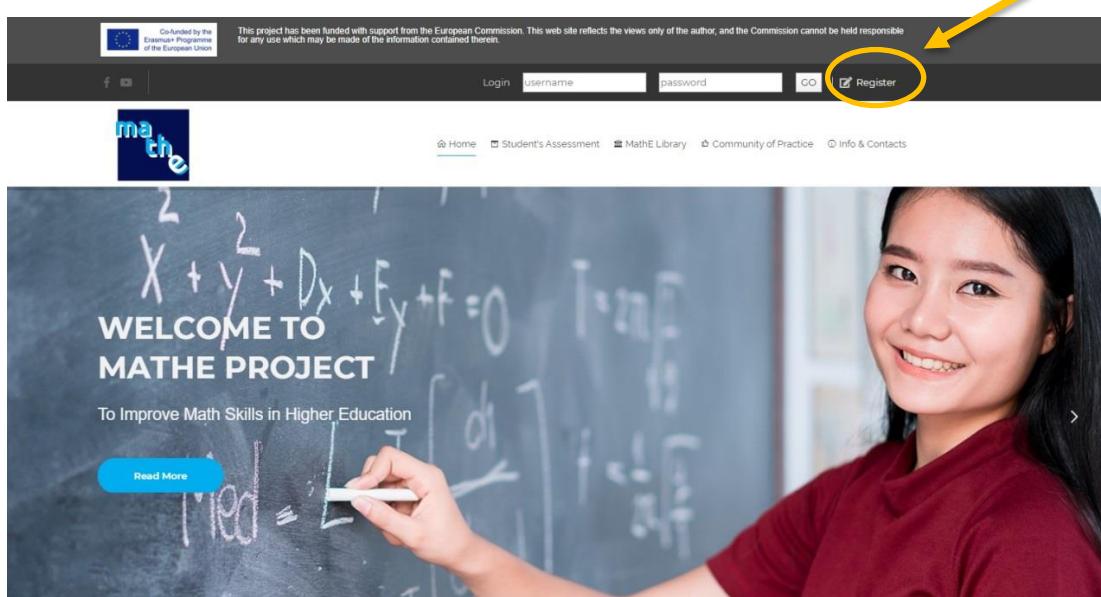


Video Tutorial on how to register on the MathE Platform

This section shows how to register step by step:

Step 1: Access the project portal - [mathe.pixel-online.org](http://mathe.pixel-online.org)

Step 2: Click on the “Register” button to sign up to MathE platform



Step 3: You will receive the message “Thanks for deciding to join the MathE Community” and invited to fill in initial data.

- The name and surname will appear on the platform.
- Mention an email address you have access to.
- Specify that you are a student.
- Read carefully the agreement for the use of the personal data.



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The screenshot shows the registration page for the MathE platform. It includes fields for Name, Surname, Email, and Password. Below these, there's a question: "Please specify if you are a:" followed by two radio buttons: "STUDENT" (which is selected and highlighted with a red circle) and "LECTURER". There are also sections for "Confirmation of registration" and "Agreement for electronic use of personal data", both of which require acceptance. At the bottom is a green "Proceed" button.

Step 4: After you clicked on the “Proceed” green button, you will receive a message to check the email mentioned previously, in order to activate your account.



Step 5: Check your email and click on the link received, to activate your account.

- The email will be received from this email address “MathE Platform <noreply@pixel-online.org>”. Check in spam, also, if you cannot find the email in Inbox.
- The message received is saying, “Hi, you activated the registration process to the MathE platform. Please verify your email address by clicking on the following link: mathe.pixel-online.org/MP\_confirmEmail.php?code=..... . You will immediately after receive another email message with your username and password.”

Step 6: You will be redirected on the project portal and invited to update your profile.



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- Fill in the sections about the personal profile. The sections with “\*” are mandatory.

The screenshot shows the 'Your Profile' section of the Mathe platform. At the top, there is a banner from the European Commission Erasmus+ Programme. Below it, a navigation bar includes links for Home, Student's Assessment, MathE Library, Community of Practice, Info & Contacts, and a 'Logout' link. The main area is titled 'RESERVED AREA' and contains a 'Welcome' message. To the right, the 'Your Profile' form is displayed, requiring input for Name, Surname, Email, USN (University Student Number), Profile, and a Picture (JPG format). A 'Choose File' button is provided for the picture upload.

- Fill in the sections about the University you belong to. The sections with “\*” are mandatory.

The screenshot shows the 'University' registration section. It asks for the name of the university (mandatory) and faculty/department. It also includes fields for degree (Bachelor, Master, PHD, Other), study programme, city, and address. Below these, there are sections for confirmation of registration (checkbox for agreeing to register on the project portal), agreement for electronic use of personal data (checkbox for accepting data collection for reporting, audits, contact, and statistical purposes), and a 'Proceed' button at the bottom.

If your University is not on the list, please contact Ana Pereira at [mathe@ipb.pt](mailto:mathe@ipb.pt). After your University will be included on the list, you will be able to finalise the registration process, by clicking on the “Proceed” green button.

Step 7: You are now logged in and you have access to all the resources available.



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You are logged in. Reserved Area Logout



[Home](#) [Student's Assessment](#) [MathE Library](#) [Community of Practice](#) [Info & Contacts](#)

## RESERVED AREA

Welcome

[Update your Profile](#)  
[Change Password](#)  
[Logout](#)

**Student Final Assessment**  
[List of Final Assessment](#)



### Self Need Assessment

Test your knowledge on several Math topics!



### Final Assessment

Look for the online exam organized by your lecturers.



### Video Collection

Check the videos on several Math topics.



### Teaching Materials

A collection of teaching and Learning material in order to support students in the acquisition of competences on Math selected topics

## 1.3.2 Student assessment Toolkit

### About the self-assessment database

The Self Need Assessment is a toolkit, which allows students to carry out a self-evaluation of their knowledge on Math topics. The students' self-need assessment toolkit helps students identify their needs and provides them with plenty of online exercises and activities meant to meet these needs.

For the moment, the self-need assessment toolkit comprises the following topics:

- Analytic Geometry
- Complex Numbers
- Differential Equations
- Differentiation – Derivatives; Implicit Differentiation and Chain Rule; Partial Differentiation
- Fundamental Mathematics – Elementary Geometry; Manipulation of Algebraic Expressions
- Graph Theory
- Integration – Double Integration; Integration Techniques
- Linear Algebra – Eigenvalues and Eigenvectors; Linear Systems; Linear Transformations; Matrices and Determinants; Vector Spaces
- Optimization – Linear Optimization; Nonlinear Optimization
- Probability
- Real Functions of a single variable – Domain, Image and Graphics; Limits and Continuity
- Real Functions of several variable – Limits, Continuity, Domain and Image



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- Statistics

The platform is dynamic and new topics can be added over the time.

The assessments are created for 2 levels of difficulty: basic and advanced.

*Click on the image to access the Self Need Assessment*

## How to carry out the Self Need Assessment

Step 1: Access the Self Need Assessment - [https://mathe.pixel-online.org/STAS\\_SNA.php](https://mathe.pixel-online.org/STAS_SNA.php)

*Video tutorial on how to access the Self Need Assessment*

Step 2: In order for the student to identify his/her weak points students are invited to select a certain topic and the level of the questions.

Step 3: Click on the “START ASSESSMENT” green button and follow the questions, one by one.



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**mathE** toolkit allows students to choose from selected Math topics.

- [Home](#)
- [Student's Assessment](#)
- [MathE Library](#)
- [Community of Practice](#)
- [Info & Contacts](#)

**Self Need Assessment**

### Question 1

Topic: Analytic Geometry  
Level: Basic

Let the vectors  $u = (1, 3, 2)$ ,  $v = (-1, 1, 2)$  and  $w = (0, 1, 1)$  of  $\mathbb{R}^3$  and be the scalar triple product  $u \cdot (v \times w)$ . Choose the correct answer.

Choose the right answer or skip to the next question.

Answer 1:

$u \cdot (v \times w) = 0$  and the vector  $v \times w$  is normal to vector  $u$

Answer 2:

$u \cdot (v \times w) = 0$  and  $u \times v$  and  $w$  are coplanar vectors

Answer 3:

$u \cdot (v \times w) = (-1, 1, 1)$  and  $u \times v$  and  $w$  are coplanar vectors

Answer 4:

$u \cdot (v \times w) = 1$  and the vector  $v \times w$  is normal to vector  $u$

Answer 5:

I DON'T KNOW



- [Home](#)
- [Student's Assessment](#)
- [MathE Library](#)
- [Community of Practice](#)
- [Info & Contacts](#)

### Question 2

Topic: Analytic Geometry  
Level: Basic

Consider the circumference C which contains the points  $A = (-1, 3)$  and  $B = (1, 1)$  and whose string  $[AB]$  corresponds to one of its diameters.  
A cartesian equation of C is:

Choose the right answer or skip to the next question.

Answer 1:

$(x + 1)^2 + (y - 3)^2 = 2$

Answer 2:

$x^2 + (y - 2)^2 = \sqrt{2}$

Answer 3:

$(x + 1)^2 + (y - 3)^2 = \sqrt{2}$

Answer 4:

$x^2 + (y - 2)^2 = 2$

Answer 5:

I DON'T KNOW

**Skip** **Confirm**

In answering to the questions, you have to take into consideration the following:

- Read carefully the task of the question and the 4 answers available.
- From the 4 answers, only one answer is correct.
- If you are not sure on the correct answer, you can select the 5<sup>th</sup> answer "I DON'T KNOW"
- Each answer must be confirmed, to move to the other question.
- If you are not certain on the answer, you can skip the question and move to other one.

Step 4: After you answered to all the questions, you will receive the summary of your answers. You will have the possibility to change your options or answer to the questions you skipped or answered with "I DON'T KNOW".

This is the list of the questions together with the answers you chose. Please check them and decide to confirm or to change the answer. The questions you skipped do not indicate the answer; in order to proceed, it is necessary to choose an answer.

#### Question 1

Let the vectors  $u = (1, 3, 2)$ ,  $v = (-1, 1, 2)$  and  $w = (0, 1, 1)$  of  $\mathbb{R}^3$  and be the scalar triple product  $u \cdot (v \times w)$ . Choose the correct answer.

Answer 1:

$u \cdot (v \times w) = 0$  and the vector  $v \times w$  is normal to vector  $u$

Answer 2:

$u \cdot (v \times w) = (-1, 1, 1)$  and  $u \times v$  and  $w$  are coplanar vectors

Answer 3:

**CONFIRM AND PROCEED**

Step 5: After you checked again all your answers, click on the green button.



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Step 6: You will receive an automatically evaluation of the answers provided.



The number of correct answers is 3 on a total number of 7 questions.  
Your performance is not good and it would be advisable to go back to the theory

### Question 1

Let the vectors  $u = (1, 3, 2)$ ,  $v = (-1, 1, 2)$  and  $w = (0, 1, 1)$  of  $\mathbb{R}^3$  and be the scalar triple product  $u \cdot (v \times w)$ .  
Choose the correct answer.

Your answer is WRONG:



$u \cdot (v \times w) = 0$  and  $u \times v$  and  $w$  are coplanar vectors

[Report an error](#)

The correct answer is:



$u \cdot (v \times w) = 0$  and the vector  $v \times w$  is normal to vector  $u$

You might want to have a look at



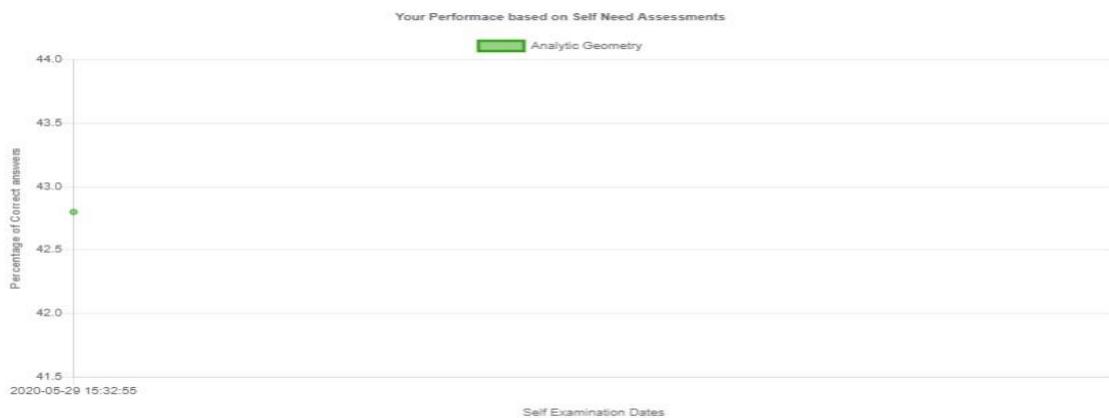
Plane and its Equation

Designmate Pvt. Ltd. - Official

This video helps learners to understand the concept of normal to a plane and explains how to find the vector and Cartesian equations of a given plane under various conditions.

- You will receive the summary evaluation of the numbers of correct and incorrect answers, along with specific recommendations.
- You will receive for each question, the correct and the wrong answers.
- You will be guided to improve your knowledge on the wrong answers, by accessing additional resources on the topic of the questions, like video lessons or teaching materials.

Step 7: You have the possibility to carry out various tests and evaluate your performance. In the home page of your Reserved Area, you can check anytime your performance.



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### 1.3.3 Student final assessment

#### About the final assessment database

The platform also provides students with a final assessment tool specially created for them by their lecturers, under the format of online test on selected Math topics.

For the moment, the self-need assessment toolkit comprises the following topics:

- Analytic Geometry
- Complex Numbers
- Differential Equations
- Differentiation – Derivatives; Implicit Differentiation and Chain Rule; Partial Differentiation
- Fundamental Mathematics – Elementary Geometry; Manipulation of Algebraic Expressions
- Graph Theory
- Integration – Double Integration; Integration Techniques
- Linear Algebra – Eigenvalues and Eigenvectors; Linear Systems; Linear Transformations; Matrices and Determinants; Vector Spaces
- Optimization – Linear Optimization; Nonlinear Optimization
- Probability
- Real Functions of a single variable – Domain, Image and Graphics; Limits and Continuity
- Real Functions of several variable – Limits, Continuity, Domain and Image
- Statistics

#### How to carry out the Student final assessment

Step 1: Access the Final Assessment [https://mathe.pixel-online.org/STAS\\_FA.php](https://mathe.pixel-online.org/STAS_FA.php)



Video tutorial on how to carry out the final assessment

The student, by clicking on the menu on "Final Assessment", access to the list of Final Assessments available in the institution he/she belongs to. Students can apply when a Final Assessment is available for a course they attend. In order to see the list of the available final assessments, you need to be log in.



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[Home](#) / [Student's Assessment](#)

This toolkit allows teachers to elaborate Final Assessments for their students on the topics they wish to evaluate. Students can apply when a Final Assessment is available for a course they attend. In order to see the list of the available final assessments, please log in.

| Lecturer       | Title   | Date                                 | Server time 20-07-2021 10:49:00 |                    |
|----------------|---|--------------------------------------|---------------------------------|--------------------|
| MathE Lecturer | Technical University Gheorghe Asachi Iasi<br>Final assessment!<br><i>This is the final assessment</i> | 26/07/2021<br>h. 12:00<br>20 minutes | START AT 12:00                  | ASK TO PARTICIPATE |

Step 2: In order to participate in the final assessment the student must:

- Click on the button “Ask to participate”

### Timing

The student can “ask to participate” in the exam until the day before the exam itself.

- Click on “Confirm”

[Home](#) / [Student's Assessment](#)

Ask to participate

Do you want to subscribe to this assessment?

Lecturer:  
MathE Lecturer  
Title:  
Final assessment!  
Description:  
This is the final assessment  
Date:  
26/07/2021 h. 12:00  
Duration:  
20 minutes

[Exit](#) [Confirm](#)

Step 3: Receive the accept for the assessment.

The lecturer, who created the assessment, has the possibility to accept or reject the students. This possibility is available until the minute before the assessment starts.

The student visualizes the information in the list of assessments.



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| Lecturer          | Title  | Date                                  |          |
|-------------------|--|---------------------------------------|----------|
| Francesco Pinzani | Università degli Studi di Genova<br><b>Algebra</b><br><i>The exam refers to the contents of the first semester</i> | 31/07/2019<br>h. 17:00<br>120 minutes | ACCEPTED |

Step 4: The day of the final assessment the student visualizes the time when the assessment is going to start.

| Lecturer          | Title  | Date                                  |                |
|-------------------|--|---------------------------------------|----------------|
| Francesco Pinzani | Università degli Studi di Genova<br><b>Algebra</b><br><i>The exam refers to the contents of the first semester</i> | 30/07/2019<br>h. 17:00<br>120 minutes | START AT 17:00 |

Step 5: The minute that the assessment is planned, the student can start it by clicking on "Start Assessment".

| Lecturer          | Title  | Date                                  |                  |
|-------------------|--|---------------------------------------|------------------|
| Francesco Pinzani | Università degli Studi di Genova<br><b>Algebra</b><br><i>The exam refers to the contents of the first semester</i> | 30/07/2019<br>h. 16:30<br>120 minutes | START ASSESSMENT |

Step 6: Answering the questions, the students has 3 options:

- Choose the answer he/she thinks is the correct one
- Skip the question
- Choose "I do not know"

Step 7: Once the student has chosen an answer to all questions, he/she has the possibility to change the answer to all of them and it is compulsory for him/her to choose one.

Step 8: Students get automatic feedback, which gives them control over their learning process and motivates them to continue with their learning.



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## 1.4 MathE Library

### Collection of reviewed video lessons on Math topics

The collection offers students and teachers of higher education institutions video based teaching and learning resources which reinforce specific mathematical topics. Thus, the platform provides students with remedial material to help them bridge the existing gaps in their knowledge. The main aim of the video lessons is to provide students with supporting material related to the questions of the self-assessment.

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You are logged in. Reserved Area Logout

Home Student's Assessment MathE Library Community of Practice Info & Contacts

**Video**

- Calculation of Orthogonal Projections  
Vectors mini course  
With this video you can understand the graphical repn  
[https://youtu.be/2C5w\\_M8nNWg](https://youtu.be/2C5w_M8nNWg)
- Plane and its Equation  
Designmate Pvt. Ltd. - Official  
This video helps learners to understand the concept o conditions.  
<https://youtu.be/8410xh3vNqQ>
- Determining the Distance Between a Line and a Point  
Mathispower4u  
This video presents a geometric meaning of the formula  
<https://youtu.be/TByHizZN4vw>
- Equations of a straight line in space  
Neha Agrawal  
This video presents graphical and analytical representation  
<https://www.youtube.com/embed/YVwiwpExO5g>

### Collection of teaching materials on Math topics

The collection offers students and teachers of higher education institutions teaching materials in the acquisition of competences on Math selected topics by the project. The main aim of the teaching materials is to provide the students with supporting material related to the questions of the self-assessment. The teaching materials are under different formats: Article; Slides; Gamification; Multiple choice questionnaire; Diagrams and graphs; Exercises; Problem Based Activity; Glossary; Notes; Blog; Website; Podcasts.



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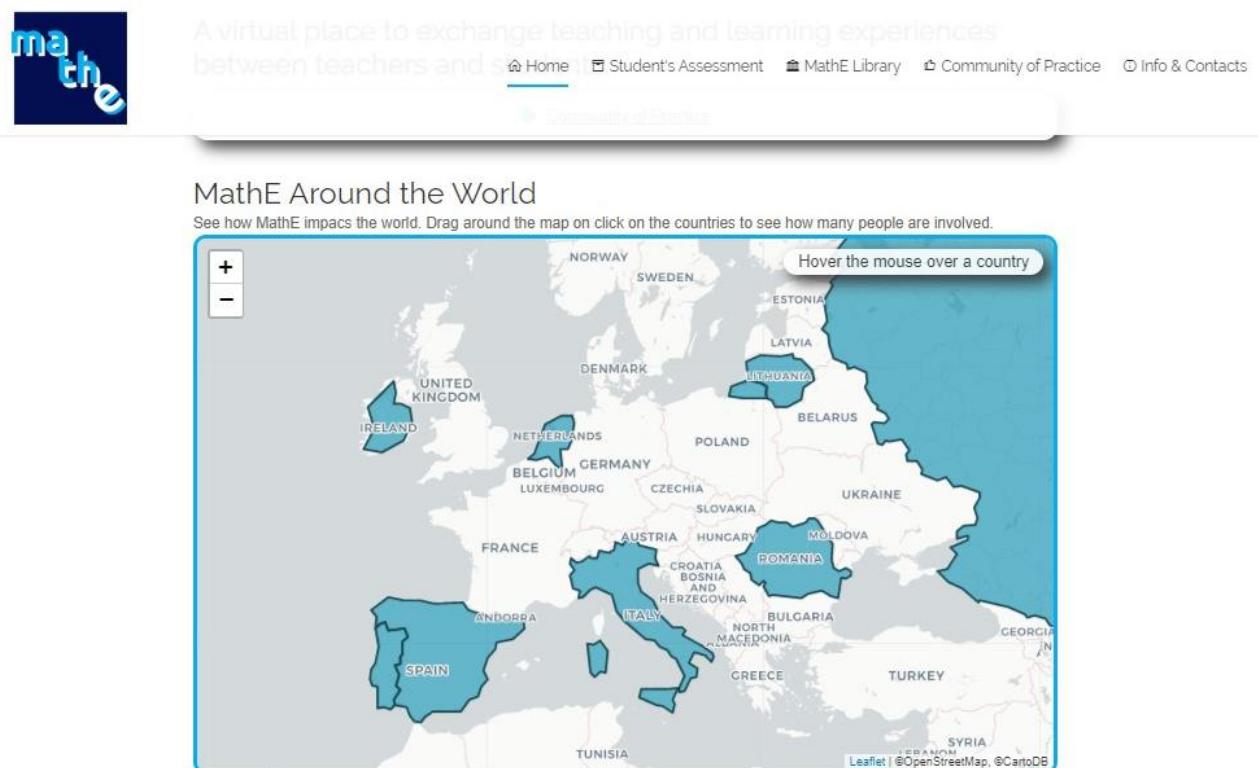
## 1.5 Community of Practice

The MathE teachers and students Community of Practices is considering the following objectives:

- Promote the exchange of teaching/learning experiences among math teachers and students.
- Share innovative teaching tools and active learning tools, in order to motivate students to learn math.
- Share experiences related to the MathE portal.
- Share the best practices in and out of the classroom.
- Discuss some difficulties about specific issues

## MathE Around the World

The virtual map shows how MathE impacts the world. Drag around the map or click on the countries to see how many people and institutions are involved.



*Click on the image to access the Map*



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## MathE Community (A virtual place to exchange teaching and learning experiences between lecturers and students)

- Lecturers' Community – offer the opportunity to teachers from all around the world to share experiences about: Innovative Tools (E-Learning, Video based learning; MOOCs; etc.); Active Learning Tools (Problem based learning; Inquiry based learning; etc.); Experiments.

Welcome to MathE Lecturers' Forum

Start a Discussion

Latest

All Discussions

Tags

Experiments using MathE

Motivational tips in Math ...

Scientific Publication in M...

Math Teaching Tools

Math Activities Using Acti...

Event

Any recommendations?

Math Books

On-line teaching tools

Mathematical Movies and Books

Geometric representation of the solution of a 2X2 / 3X3 linear system

Math Teaching Tools

Scientific Publication in Math

Motivational tips in Math Sub

Mathematics

Linear Algebra

Statistics

*Click on the image to access the Lecturers' Forum*

- Students' Community – offer the opportunity to students from all around the world to share experiences about: Questions; Experiments; Comments; Problems; while carrying out the assessments on the MathE Platform.

Welcome to MathE Student Forum

Can't Start Discussion

Latest

All Discussions

Following

Tags

Analytic Geometry

Complex Numbers

Differential Equations

Differentiation

Fundamental Mathematics

Graph Theory

Integration

Linear Algebra

Numerical Methods

Summer Reading

Suggest a discussion

Online tools to solve linear systems?

Statistics

Geometric representation of the solution of a 2X2 / 3X3 linear system

Suggestions

Fundamental Mathematics

Linear Algebra

Statistics

*Click on the image to access the Students' Forum*



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## Tips on how to use the Lecturers'/Students' Forum

- Select Topic/Subtopic -> all comments appear
- Select Topic/Subtopic and keyword -> all comments appear
- No selection -> All comments
- A user can post a comment in the forum associated to a discussion of: a general issue; a topic/subtopic content; topic/subtopic and keyword area
- Teachers can answer/comment in the Teacher and Student Forums'
- Students can participate only in the Student Forum
- Admin can delete comments
- Admin can eliminate a user (black list)

The Lecturers' forum has the following topics:

- Experiments using MathE
- Motivational tips in Math Subjects
- Scientific Publication in Math Educational
- Math Teaching Tools
- Math Activities Using Activity-Based Learning

[Start a Discussion](#)

- [All Discussions](#)
- [Tags](#)
- [Experiments using MathE](#)
- [Motivational tips in Math ...](#)
- [Scientific Publication in M...](#)
- [Math Teaching Tools](#)
- [Math Activities Using Acti...](#)
- [Event](#)

The Students' forum has the following topics:

- Analytic Geometry
- Complex Numbers
- Differential Equations
- Differentiation
- Fundamental Mathematics
- Graph Theory
- Integration
- Linear Algebra
- Numerical Methods
- Optimization
- Probability
- Real Functions of a single variable
- Real Functions of several variables
- Set Theory
- Statistics
- Suggestions

[Can't Start Discussion](#)

- [All Discussions](#)
- [Following](#)
- [Tags](#)
- [Analytic Geometry](#)
- [Complex Numbers](#)
- [Differential Equations](#)
- [Differentiation](#)
- [Fundamental Mathematics](#)
- [Graph Theory](#)
- [Integration](#)
- [Linear Algebra](#)
- [Numerical Methods](#)
- [Optimization](#)
- [Probability](#)
- [Real Functions of a single ...](#)
- [Real Functions of several ...](#)
- [Set Theory](#)
- [Statistics](#)
- [Suggestions](#)



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## Part 2: MathE experimentation

Examples of good practices related to the use of the MathE platform in the project partner countries.

### 2.1 Case Studies Using MathE Platform in Portugal

#### Case Study 1 - Using MathE with international students that arrive late

##### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Ana I. Pereira   |
| University     | Instituto Politécnico de Bragança  |
| Country        | <input type="checkbox"/> Ireland <input type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input checked="" type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught | Linear Algebra and Analytic Geometry   |

##### DESCRIPTION

|                                   |  |
|-----------------------------------|--|
| Topic                             | Linear Algebra   |
| Sub-topic                         | Matrices and Determinants  |
| Students involved                 | 30   |
| Sections of the platform          | <input checked="" type="checkbox"/> Self-Need Assessment<br><input type="checkbox"/> Final Assessment<br><input checked="" type="checkbox"/> Video Collection<br><input checked="" type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice  |
| Description of the experience     | <i>Usually, IPB, receive new international students after the beginning of the math unit courses. In some situations, some math topics already were presented in the classroom. To overcome this situation, all new students perform a self-assessment on the MathE platform. If they do not have a satisfactory mark they need to analyse the teaching material present in the platform and contribute with other materials to increase the MathE material.</i> |
| Added value of the MathE Platform | After validating the new material founded by the students, the teacher submits it to the MathE Platform.   |



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### Case Study 2 -

#### LECTURER INFORMATION

|                |   |
|----------------|---|
| Name           |   |
| University     |   |
| Country        | <input type="checkbox"/> Ireland <input type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught |   |

#### DESCRIPTION

|                                   |  |
|-----------------------------------|--|
| Topic                             |  |
| Sub-topic                         |  |
| Students involved                 |  |
| Sections of the platform          | <input type="checkbox"/> Self-Need Assessment<br><input type="checkbox"/> Final Assessment<br><input type="checkbox"/> Video Collection<br><input type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice |
| Description of the experience     | <i>Please describe the experience context, the main advantages and the experience impact.</i>  |
| Added value of the MathE Platform |  |

## 2.2 Case Studies Using MathE Platform in Ireland

### Case Study 1 - Statistics

#### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Dr Rita Scully   |
| University     | Limerick Institute of Technology   |
| Country        | <input checked="" type="checkbox"/> Ireland <input type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught | Measurement and Mathematics  |



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## DESCRIPTION

|                                   |  |
|-----------------------------------|--|
| Topic                             | Probability  |
| Sub-topic                         | Probability  |
| Students involved                 | 1st Year Quantity Surveying  |
| Sections of the platform          | <input type="checkbox"/> Self-Need Assessment<br><input type="checkbox"/> Final Assessment<br><input checked="" type="checkbox"/> Video Collection<br><input type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice  |
| Description of the experience     | <p><i>A number of the videos on Probability augmented class material that had been covered.</i></p> <p><i>I played 3 videos from the MathE website</i></p> <p><i>And &amp; Or rule</i></p> <p><i>Probability, Sample Spaces, and the Complement Rule</i></p> <p><i>And</i></p> <p><i>Intro to Conditional Probability</i></p> <p><i>We discussed the content and paused at various point to allow the material that had been covered to be discussed and practiced.</i></p> <p><i>This provided students with additional resources and alternative notes on a topic area they are studying</i></p> |
| Added value of the MathE Platform | The platform provided a high quality source of additional resources to the specific topic area.<br><br>Students can access these material for further review and practice  |

## Case Study 2 - Statistics

### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Dr Rita Scully   |
| University     | Limerick Institute of Technology   |
| Country        | <input checked="" type="checkbox"/> Ireland <input type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught | Interior Surveying and Quantification  |



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## DESCRIPTION

|                                   |  |
|-----------------------------------|--|
| Topic                             | Statistics   |
| Sub-topic                         | Statistics   |
| Students involved                 | 2nd Year Interior Design   |
| Sections of the platform          | <input type="checkbox"/> Self-Need Assessment<br><input type="checkbox"/> Final Assessment<br><input checked="" type="checkbox"/> Video Collection<br><input checked="" type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice   |
| Description of the experience     | <p><i>A number of the videos on Statistics augmented class material that had been covers.</i></p> <p><i>I played 2 videos from the MathE website</i></p> <p><i>Range, variance and standard deviation</i></p> <p><i>And</i></p> <p><i>Mean, median and mode</i></p> <p><i>We discussed the content and paused at various point to allow the material that had been covered to be discussed and practiced.</i></p> <p><i>We also worked through some teaching materials</i></p> <p><i>Basic Definitions and Concepts of Statistics</i></p> <p><i>and</i></p> <p><i>Use of statistical tables</i></p> <p><i>This provided students with additional resources and alternative notes on a topic area they are studying</i></p> |
| Added value of the MathE Platform | The platform provided a high quality source of additional resources to the specific topic area.<br><br>Students can access these material for further review and practice  |



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## 2.3 Case Studies Using MathE Platform in Italy

### Preparatory Test before Exam

| <b>Topic</b>                    | <b>Sub-topic</b>   |
|---------------------------------|--|
| <i>Linear Algebra</i>           | <i>Linear Systems, Matrix and Determinants, Vector Spaces, Complex numbers</i> |
| <b>Sections of the platform</b> | <b>Students involved</b>   |
| <i>Self-Need Assessment</i>     | <i>Mathematics, Physics and Statistic</i>                                      |

#### DESCRIPTION OF THE EXPERIENCE

Three weeks before the exam we asked the students to use the Self-Need Assessment tool on the MathE Portal to perform a self-evaluation in order to pass the exam. We gave them all the necessary guidelines about the portal and the Self-Need Assessment tool, asking them to select only questions about Linear Algebra, in particular Linear Systems, Matrices and Determinants, Vector Spaces and Complex Numbers, since these were the only topics they needed to test for the exam. We warned them that the question would be in English. All along the self-evaluation activity (that lasted for one week) we have been available for eventual problems with the portal or with the translation and explanation of the questions, but we only got positive feedback from the students.

#### ADDED VALUE OF THE MATHE PLATFORM

It was very simple to use the portal for the students, and it let us have a better control on the preparation status of the students, since the outcome of the various tests was available for us to analyse. It was important for us to have the possibility to check the type of questions that were more problematic for the students, in order to suggest them how to prepare better for the actual exam. Having this test in a unique portal, the questions being more or less of the same level of those we could have asked in the exam, and all in the same form, it was very helpful and made our work easier.



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## Case Study 2 - Admission test

### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Arvid Perego, Emanuela De Negri  |
| University     | Università di Genova   |
| Country        | <input type="checkbox"/> Ireland <input checked="" type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught | Linear Algebra   |

### DESCRIPTION

|                                   |   |
|-----------------------------------|---|
| Topic                             | Linear Algebra  |
| Sub-topic                         | Linear Systems, Matrix and determinants, Vector Spaces, Complex Numbers   |
| Students involved                 | Mathematics, Physics and Statistic  |
| Sections of the platform          | <input type="checkbox"/> Self-Need Assessment<br><input checked="" type="checkbox"/> Final Assessment<br><input type="checkbox"/> Video Collection<br><input type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice   |
| Description of the experience     | <i>We used the Final Assessment Tool to create a test to admit students to the written exam: only the students who passed the test could go to the written exam. We created the test in the Final Assessment by assembling several questions already on the MathE Portal that we translated in Italian in order to avoid possible confusion in understanding the questions. The students had one-hour time to solve the test.</i> |
| Added value of the MathE Platform | It was much easier for us to create the test than using other portals, since we could use questions already existing on the MathE Platform and that were already tested by others, so we didn't have to lose time in testing them by our own. Having questions covering much of the program of the first semester course we were teaching, we could create a reliable test in order to admit students to the oral exam.           |

## 2.4 Case Studies Using MathE Platform in Lithuania

### Case Study 1 - MathE as a tool to actively gain math skills

### LECTURER INFORMATION



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Project Number: 2018-1-PT01-KA203-047361

|                |  |
|----------------|--|
| Name           | Kristina Sutiene, Ausra Zvironiene   |
| University     | Kaunas University of Technology  |
| Country        | <input type="checkbox"/> Ireland <input type="checkbox"/> Italy <input checked="" type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught | Mathematics 1  |

#### DESCRIPTION

|                                   |  |
|-----------------------------------|--|
| Topic                             | Linear Algebra   |
| Sub-topic                         | Matrices and Determinants  |
| Students involved                 | Chemistry faculty, first course  |
| Sections of the platform          | <input checked="" type="checkbox"/> Self-Need Assessment<br><input checked="" type="checkbox"/> Final Assessment<br><input type="checkbox"/> Video Collection<br><input type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice   |
| Description of the experience     | <p><i>Some students have been experiencing difficulties during the math course. Therefore, they have been suggested to improve their topic related skills by solving self-assessment tests in MathE platform.</i></p> <p><i>Moreover, students have been invited to take a final assessment quiz through MathE platform, but their earned points have been used as additional points during the final math exam. So, it was a good way to motivate them, and thereby improve their skills.</i></p> |
| Added value of the MathE Platform | Some improvement in the system have been implemented based on students' feedback.  |

#### Case Study 2 - Preparation for interim settlement using a self-need assessment test

#### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Lina Dindienė  |
| University     | Kaunas University of Technology  |
| Country        | <input type="checkbox"/> Ireland <input type="checkbox"/> Italy <input checked="" type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input type="checkbox"/> Romania |
| Subject taught | Mathematics  |

#### DESCRIPTION



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|                                   |  |
|-----------------------------------|--|
| Topic                             | Statistics   |
| Sub-topic                         | -  |
| Students involved                 | 80 students  |
| Sections of the platform          | <input checked="" type="checkbox"/> Self-Need Assessment<br><input checked="" type="checkbox"/> Final Assessment<br><input type="checkbox"/> Video Collection<br><input type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice   |
| Description of the experience     | <i>I gave the students a self need assessment and a final assessment test during the lectures. In this way, they prepared for the future mid-term examination, as the topics of statistics coincided with the topics of our module. The form and simplicity of the self need assessment was enjoyed by the students, so they willingly performed it. In this way, students found out which statistical subtopics are incompletely mastered. Thus, students were significantly better prepared for the final assessment than students who did not take the self need assessment test.</i> |
| Added value of the MathE Platform | A quick and easy way for students to test their knowledge of a topic, identify gaps, and find literature to learn a specific point. Teachers and lecturers save time by taking self-need and final assessments. In the platform they can create self-need and final tests for each group separately by time, thus providing more similar and standardized examination.   |

## 2.5 Case Studies Using MathE Platform in Romania

### Case Study 1 - Using MathE for remarkable results at Math National and International Contests

#### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Marcel Roman, Radu Strugariu, Daniela Roșu   |
| University     | "Gheorghe Asachi" Technical University of Iasi   |
| Country        | <input type="checkbox"/> Ireland <input type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input checked="" type="checkbox"/> Romania |
| Subject taught | Linear Algebra, Geometry, Mathematical Analysis  |

#### DESCRIPTION

|           |  |
|-----------|--|
| Topic     | Linear Algebra, Differential Equations, Analytic Geometry, Real functions of several variables, Optimization |
| Sub-topic | Eigenvalues and eigenvectors, Linear transformations, Limits, continuity,                                    |



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|                                   |   |
|-----------------------------------|---|
|                                   | domain and images, Nonlinear optimization   |
| Students involved                 | Students from Faculty of Automatic Control & Computer Engineering   |
| Sections of the platform          | <input type="checkbox"/> Self-Need Assessment<br><input type="checkbox"/> Final Assessment<br><input checked="" type="checkbox"/> Video Collection<br><input checked="" type="checkbox"/> Teaching Sources<br><input type="checkbox"/> Community of Practice              |
| Description of the experience     | <i>We used the MathE teaching resources and video materials in the preparation of students for SEEMOUS 2020, Thessaloniki, Greece and Internet Mathematical Olympiad, organized by Ariel University, Israel, with very good results (6 medals in these competitions).</i> |
| Added value of the MathE Platform | It was helpful to use so many materials and videos to complete and to perfect the preparation of our students. A variety of methods and types of the mentioned topics was used in order to understand very well the proposed subjects.                                    |

### Case Study 2 - Increasing success in Math exams

#### LECTURER INFORMATION

|                |  |
|----------------|--|
| Name           | Marcel Roman   |
| University     | "Gheorghe Asachi" Technical University of Iasi   |
| Country        | <input type="checkbox"/> Ireland <input type="checkbox"/> Italy <input type="checkbox"/> Lithuania <input type="checkbox"/> Portugal <input checked="" type="checkbox"/> Romania |
| Subject taught | Linear Algebra, Differential Equations, Analytic Geometry  |

#### DESCRIPTION

|                          |   |
|--------------------------|---|
| Topic                    | Linear Algebra, Analytic Geometry   |
| Sub-topic                | Eigenvalues and eigenvectors, Linear transformations, Analytic Geometry   |
| Students involved        | Students from Faculty of Civil Engineering and Faculty of Electronics, Telecommunications and Information Technology  |
| Sections of the platform | <input checked="" type="checkbox"/> Self-Need Assessment<br><input type="checkbox"/> Final Assessment<br><input checked="" type="checkbox"/> Video Collection<br><input checked="" type="checkbox"/> Teaching Sources |



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|                                   |   |
|-----------------------------------|---|
|                                   | <input type="checkbox"/> Community of Practice  |
| Description of the experience     | <p><i>For preparing of the exams of Linear Algebra &amp; Analytic Geometry the students used the MathE teaching resources and video materials.</i></p> <p><i>Also, using Self-Need Assessment from MathE platform they increased their skills in solving problems and in the same time, they could evaluate the progress of learning.</i></p> |
| Added value of the MathE Platform | According to my records from the previous years, I remarked a bigger number of students passing the exam in the first examination session and also, better results reflected in their final grades. So, the use of MathE platform was the cause of these better results.  |

## MathE contacts

The project partners are available to provide you with any information you may need. Do not hesitate to contact us!

### FURTHER INFORMATION

For further information please contact:

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