



SOWISO

To enhance e-learning and digital assessment within the programs of FSE to decrease workload and to improve quality of education



Content

- > Introduction to SOWISO at FSE
- > Experience for yourselves
- > Discussion



university of
 groningen

faculty of science
 and engineering

professional development
 & innovation in education

SOWISO at FSE

Implementation of an online mathematics and science learning environment



What is SOWISO

- > Online learning environment
- > Mathematics and science
- > Personalized feedback
- > Adaptive learning
- > (Peer) interaction
- > Tests
- > Learning analytics

Linear equation with a single unknown

Find the unique value of x for which $8 \cdot x + 2 = -4$ is true.

Give your answer in the form $x = \dots$ and simplify as much as possible.

Tip

Remember to first subtract 2 on both sides of the equation.

$-\frac{6}{8}$

✘ The variable x should occur in your reply.

$x = \frac{6}{8}$

✘ Make sure to double check the signs in your calculation.

$x = -\frac{6}{8}$

✔ The fraction can be further simplified. Try to divide the numerator and the denominator by the same integer.

$x = -\frac{3}{4}$

✔ Awesome

↻ Redo



Why is SOWISO chosen

- > Replacement 'Medal'
- > After brief comparative research
 - Pro: personalized feedback, ability for multiple steps in answer, automatic grading, integration Nestor, user friendly, platform independent, export results
- > E-learning pilot (17-18)
- > SVM project (18-19) continues the pilot

	Medal	Wiris	Sowiso
Wiskundige editor voor antwoorden			
Checkt stappen in antwoord	✓	✓	✓
Controleert automatisch	✓	X	✓
Herkent equivalente antwoorden (0.5 en ½)	✓	✓	✓
Student ziet direct feedback (training)	X	✓	✓
Student krijgt achteraf feedback (toetsing)	✓	✓	✓
Gebruikersvriendelijk	✓	✓	✓
Technische ondersteuning	X	✓	✓
Resultaten exporteren naar Excel	X	?	✓
Gebruikersgemak op afstand	✓	✓	✓
Integratie met Nestor	X	✓	✓
Gratis?	X	✓	✓
	X	X	X

Skip pros - cons

pros - cons



SOWISO pros and cons - pros

- > Standard courses for
 - Calculus (basic (for high school), for social sciences, for math and physics)
 - Linear Algebra
 - Statistics (with Excel and R)
- > Create your own content
 - Theory in LaTeX (standard in FSE for document preparation)
 - Exercises and feedback
- > Automatic feedback and grading
- > Platform independent
- > Learning analytics
- > Multi language



SOWISO pros and cons - cons

- › Standard courses might use different notation
- › Creating exercises can be
 - time consuming
 - complex
- › A lot of teacher options needs investment time
- › Students need to click a lot

[Back to Why](#)



SOWISO in Class – Blended Learning

- > As replacement of book:
 - full support with theory, examples, exercises, and tests
- > As practice tool:
 - more exercises to practice, personalized feedback
- > As preparation:
 - practice skills and basic exercises at home, go in-depth in tutorials and lectures
- > As math support in non-math classes:
 - use SOWISO for math background, focus in class on the main topic of the class
- > As assessment tool:
 - Formative tests
 - Homework
 - Summative tests

...
A.o. in course
Biostatistics

...
A.o. in course
Farmacokinetics

•
A.o. in course
Mechanics &
Relativity

•
In course Calculus
(Basic Math Skills
test)



Elements in SOWISO

- > Exercises
 - Different types
 - 'unlimited' versions and repeats
- > Theory
 - Texts
 - Video/knowledge clips, Slide show
 - Interactive geogebra applet
- > Test (summative, formative)
 - Multiple choice, open ended, strategy, text, ...
 - Automatic grading
 - Connection to grade center
- > Forum
- > Reports



Examples of elements

Student view

Chapters

- BMS Algebra
- BMS Linear formulas and Equations
- BMS Systems of linear equations
- BMS Quadratic equations
- BMS Functions
 - Power functions
 - Transformations of power functions
 - Equations with power functions
- Higher degree polynomials
 - Polynomials
 - Equations with polynomials

CLASS

Basic math skills >

Education day >

Farmacokinetiek Iib WBFA16003.2b >

KIB_AV103_S_2018-2019-Architectures of Intelligence >

Linear Algebra Overview Course >

PAULA

PROGRESS: 15% SCORE: 84%

TESTS none

Theory and exercises

BMS Functions: Power functions

Equations with power functions

Solve $2x^4 + 4 = 5$ for x .

Give your answer in the form $x = x_1$ or $x = x_1 \vee x = x_2$ for suited numbers x_1 and x_2 .

$x^4 = \frac{1}{2}$ ✓ You are heading in the right direction. Eliminate the power.

$x = \left(\frac{1}{2}\right)^{\frac{1}{4}}$ ✗ No, your answer contains one correct solution, but there is

$x = 2^{-\frac{1}{4}} \vee x = -2^{-\frac{1}{4}}$

Check Theory Solution

Feedback rules



Roles in SOWISO

- > Student
- > **Teacher**
- > Author
- > Manager
- > Admin

The screenshot shows the 'Teacher' role interface in SOWISO. The top navigation bar includes 'HOME', 'FORUM', 'REPORT', 'AUTHOR', 'TEACHER', 'ROLE', and 'LANGUAGE'. The main content area is titled 'Teacher' and features a 'Manage' dropdown menu and a 'help' icon. Below this, there is a dropdown menu for the course 'Demonstration, presentation and practice (workshop)'. A horizontal menu contains 'Users', 'Groups', 'Course material', 'Tests', 'Messages', and 'Settings'. A search bar labeled 'search user or group' is present, along with a search bar for 'search user'. The 'Users' section is divided into 'TEACHERS 1' and 'STUDENTS 2'. The 'TEACHERS' list includes 'Paula Beukers' with an 'author' role. The 'STUDENTS' list includes two 'guest' users with 'student' roles and delete icons. An 'ADD USER' button is visible, and a red error message 'No results found' is displayed.



The screenshot shows the 'REPORT' role interface in SOWISO. The top navigation bar includes 'HOME', 'FORUM', 'REPORT', 'AUTHOR', 'TEACHER', 'ROLE', and 'LANGUAGE'. The main content area is titled 'Home' and features a search bar and icons for 'Demonstration, presentation and practice (workshop)'. Below this, there is a horizontal menu with 'Content', 'Tests', and 'Dashboard'. The 'Student' section is titled 'Summary' and displays a table of student performance. The table has columns for 'Introduction to demo class', 'Variables and fractions', and 'Linear equations'. The rows show 'guest' users with progress bars. A 'Show 10 students' dropdown is at the bottom left, and a pagination control '1-2 of 2' with a '1' button is at the bottom right.



Roles in SOWISO

- > Student
- > **Teacher**
- > Author
- > Manager
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Modify course contents

The screenshot displays the SOWISO Teacher interface. At the top, a navigation bar includes links for HOME, FORUM, REPORT, AUTHOR, TEACHER (active), ROLE, and LANGUAGE. Below this, the page title is "Teacher" with a "Manage" dropdown and a "help" icon. A search bar contains the text "Demonstration, presentation and practice (workshop)". A secondary navigation bar includes "Users", "Groups", "Course material" (active), "Tests", "Messages", and "Settings". A blue button labeled "Import chapters from another class" is visible. The main content area features two search bars, each with a "search" placeholder. The left search bar is associated with a tree view of course material under the selected course. The tree structure is as follows:

- Demonstration, presentation and practice (workshop)
 - Introduction to demo class
 - Variables and fractions
 - Variables
 - Variables
 - Variables
 - Variables
 - Sum and product of variables
 - Sum and product of variables
 - Sum and product of variables
 - Substitution
 - Substitution
 - Substitution
 - Simplification
 - Simplification
 - Simplification
 - Simplification with algebraic rules
 - Simplification with algebraic rules
 - Simplification with algebraic rules
 - BMS_diagnostic_Algebra_Variables
 - Calculating with fractions

The right search bar is associated with a list of course materials:

- Advanced Calculus
- Analyse 1 *
- Basic math skills
- Calculus
- Calculus Social Sciences
- College Calculus - Old
- Complex numbers
- Differential equations
- Education day
- HdW_Aol: Architectures of Intelligence
- HdW_Logic: Introduction to Logic
- Introduction to programming
- Linear Algebra
- Linear Algebra (copy of SW Lin Alg)
- Linear Algebra for IEM
- Linear Algebra Overview Course



Roles in SOWISO

- > Student
- > Teacher
- > **Author**
- > Manager
- > Admin

The screenshot shows the 'Author environment' interface. At the top, there is a navigation bar with 'university of groningen' and menu items: HOME, FORUM, REPORT, **AUTHOR**, TEACHER, ROLE, and LANGUAGE. Below the navigation bar, the page title is 'Author environment'. There are icons for a search function (x²), a map, and a globe. A secondary navigation bar contains tabs: Exercises (selected), Set, Packages, Exam, Theory, Slideshow, Subchapter, Chapter, Course, Feedback templates, Tags, and Glossary. Below this is a search bar with a 'Search' button and a 'Reset' button. The main content is a table of exercises.

New	Internal name	Type	Status	Set	Group	Show	Reset
	<input type="text" value="Search"/> <small>advanced search</small>	<input type="text" value="Select"/>	<input type="text" value="Select"/>	<input type="text" value="Search"/>	<input type="text" value="Select"/>	<input type="text" value="20"/>	
ID	Internal name	Type	Status	Set	Group	Options	
42848	Introductie 2 - variabelen - 3	open	✓	35010	RUG		
42847	Introductie 2 - variabelen - 2	open	✓	35010	RUG		
42846	Introductie 2 - variabelen - 1	open	✓	35010	RUG		
42767	Draft - Coordinate rep Linear map_copy_1	open	✗	34945	RUG FSE Linear Algebra		
42752	Draft - Coordinate rep two Linear maps	open	✗	34946	RUG FSE Linear Algebra		
42750	Draft - Coordinate rep Linear map	open	✗	34945	RUG FSE Linear Algebra		



SOWISO team and tasks

- › Part of PIE-team in USSE
- › Started out with 1 staffmember and a few TA's
- › Currently 4 people (\pm 3 fte) and 1 TA
- › Identify suitable courses (with deputy and curriculum commity)
- › Develop in cooperation with teachers
- › Create exercises
- › Write theory (both team and teacher)
- › Train/coach teachers in using SOWISO

Contact us at SOWISO@rug.nl



Procedure for new courses

- > Consult teacher
 - In what way will SOWISO be used?
 - What is required? Theory, exercises, tests
 - New or existing content?
- > Fit in planning
 - When will the course run?
 - Development in period before (or earlier)
- > Develop
 - Teacher delivers exercises and notes
 - Team creates materials in SOWISO
- > Team or teacher updates link to SOWISO in Nestor



SOWISO integrated in Nestor

- › In Nestor course create a link to the SOWISO course
- › Students access SOWISO through link in Nestor
 - If student account doesn't exist it is automatically created
 - The student is automatically enrolled into the class in SOWISO
- › Tests in SOWISO
 - Automatically graded
 - Option to amend grades before showing to student
 - Reports – download results
 - Option to automatically return grade to grade center ('exam')



Evaluation

- › Specific questions on use of SOWISO in Course evaluation
 - Response rate not very high
 - Overall feeling positive
- › Individually with teacher
 - Teachers want to continue using SOWISO
 - Discuss positive experience and to be improvement



Some numbers (1819 semester I)

- > ± 1100 (distinct) students used SOWISO in semester I
- > ± 500 students took the Basic Math Skills test (wk1) in SOWISO in the Aletta Jacobs hall
- > 10 courses made use of SOWISO
- > 6 courses made use of standard SOWISO packages
- > Hundreds of exercises created by the SOWISO team for 4 courses
- > 2 full classes (theory and exercises) created by the SOWISO team for 2 courses
- > 2 courses used (summative) tests in SOWISO
- > All web classes and matching classes make use of SOWISO (math test and full content)



Goal achieved?

- › Just first steps to achieve goal
- › *To enhance e-learning and digital assessment*
 - ✓ Several courses use SOWISO (e.g. E-learning)
 - No increase yet in digital assessment
- › *to decrease workload and to improve quality of education*
 - First year workload is not decreased
 - ✓ Students can study and practice extra if needed
 - ✓ Personalized feedback on practice exercises



Future

- > Consolidate
 - Improve courses within SOWISO
 - Improve/expand use of SOWISO within course
- > Extend digital testing
- > Support new Courses
 - Uniformity
 - if used in one course then use in all similar courses
 - On teacher request
 - By suggestion of SOWISO team
- > Interest other faculties

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Experience SOWISO

As a student



How to access SOWISO

- > Access the demo class as a guest:

<https://cloud.sowiso.nl/auth/guest/r7PMUHb1>

- > Verify you're not a robot ;-)
- > Don't create a profile (there is no need to)





Demo class

The screenshot displays a learning management system interface. The top navigation bar includes the University of Groningen logo, a 'HOME' button, a 'FORUM' button, a 'REPORT' button, a 'CREATE A PROFILE' button, and a 'PROFILE' dropdown menu. The main content area is divided into two columns. The left column shows a course menu with the following items: 'Introduction to demo class' (expanded), 'Variables and fractions', 'Linear equations', and 'Statistics Chapter 2: Correlation'. The 'Introduction to demo class' section is further detailed with a list of four items: '1 Foreword', '2 Entering formulas', '3 Basic input', and '4 Working with variables'. The right column shows a user profile for 'GUEST' with 'PROGRESS: 0%' and 'SCORE: 0%' displayed in circular gauges. Below the profile, there is a 'TESTS' section with a link to 'SVM mini symposium demo test'. The test details are as follows:

START	11/06/2019, 09:00
END	11/06/2019, 21:00
ATTEMPTS	0/2



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Discussion



Discussion

- > Questions about SOWISO and possibilities within SOWISO?
- > Can SOWISO be useful for other faculties besides FSE?
- > What opportunities are there for SOWISO?
- > ...