User's Manual

CZZZ

Version 1.25.1

Worksheet Generator
for Mathematics, Physics and Chemistry

Windows 7® - Windows 8® - Windows 10®

VAXA SOFTWARE

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Introduction

Worksheet Generator for Mathematics, Physics and Chemistry is a Windows® software to create, save, load and print worksheets of Mathematics, Physics and Chemistry for educational purposes.

Please, read this manual carefully to learn all the capabilities of the software.

Terms of use

In no event shall VaxaSoftware be liable to anyone for direct, indirect, special, collateral, incidental, or consequential damages by the use or impossibility of use of the software, nor by the effects in the operation of other software or the operating system.

Before the installation we recommended to make backup of your data and create a restoration point.

You will be able freely to evaluate the software during the time that considers necessary. Passed this period of evaluation you would have or to register it or uninstall it.

To register the software, please see the option "REGISTER APPLICATION" in the help menu of the software.

After paying the registry fee you will receive by email the REGISTRATION KEY of the software.
Once registered the software, it will be able to use the options that were disabled until that moment.

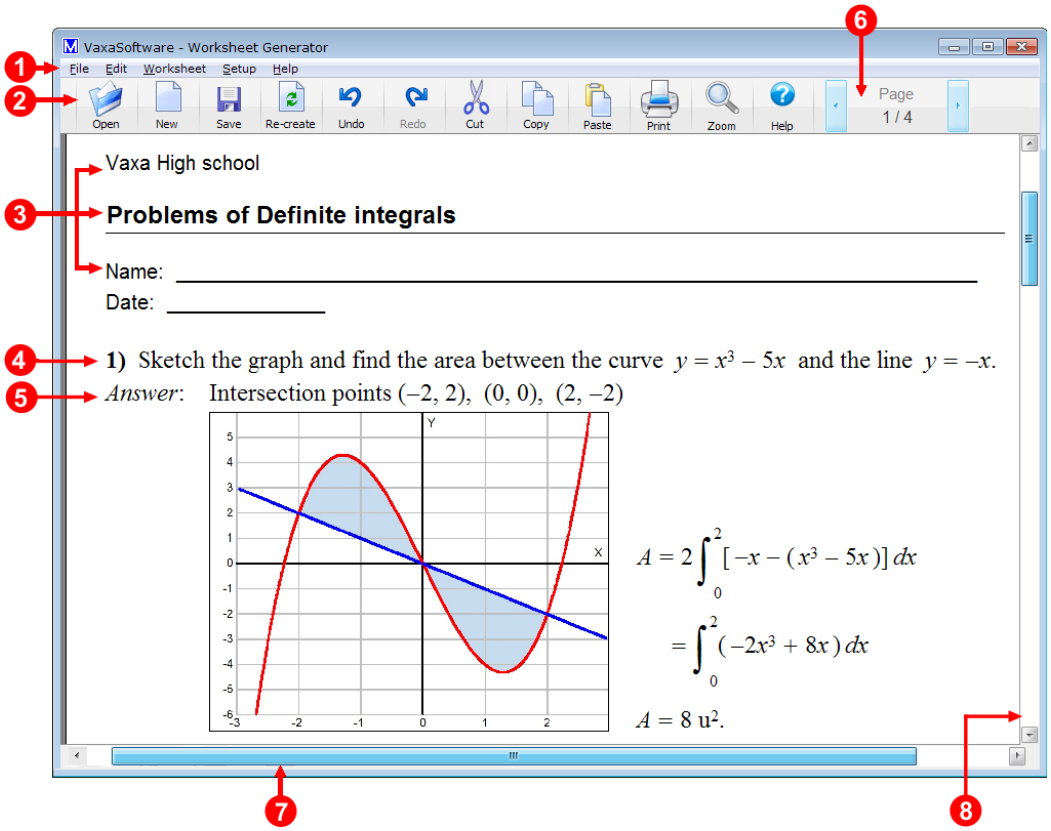
The REGISTRATION KEY is UNIQUE for EACH COMPUTER.

You cannot use the same REGISTRATION KEY for multiple computers.

You can freely distribute unaltered copies of the installation system of the software to other users.
You cannot decompile the software nor use no type of reverse engineer for its analysis or modification.
You cannot use part or the totality of the software to create a new software.

Design, products, specifications, and prices are for information purposes only. VaxaSoftware reserves the right to change or modify design, products, specifications, and prices at any time without prior notice.

Main window



1 Menu bar

It contains the menus: **File**, **Edit**, **Worksheet**, **Setup** and **Help**.

File menu

New worksheet... menu
Opens the **Wizard** window that will help us create a new worksheet.

Open... menu
Opens the dialog window to select and open a worksheet file (*. col).

Create custom worksheets for a group of students... menu
Allows us create custom worksheets for a group of students based on the current document. The list of students must be a text file with one name per line.

Save menu
Saves the current worksheet. If the worksheet is new or has been re-created, will be saved as a new file and we asked for a file name and a path to save it.

Save as... menu
Shows the dialog window to select a path and a filename (*. col) to save the current worksheet.

Print... menu
Opens the **Print** window. In it we can select the printer destination and specify the pages we want to print and the number of copies.

Print all worksheets from a folder... menu
Allows us print the worksheets from a folder.

<**List of recent files>** menu
Lists recent files opened or saved. To open a file click on its name.

Exit menu
Closes the application.

Edit menu

Undo menu
Undoes last action.

Redo menu
Returns to the state before last Undo.

Cut menu
Copies selected problem into the clipboard and deletes it.

Copy menu
Copies selected problem into the clipboard.

Paste menu
Inserts the problem from the clipboard into the worksheet.

Delete menu
Erases the selected problem.

Move to menu
Moves the selected problem to another position.

Move to the beginning menu
Moves to the top the selected problem.

Move to the end menu
Moves to the end the selected problem.

Move up menu
Moves up one position the selected problem.

Move down menu
Moves down one position the selected problem.

Activate extra spacing menu
Shows additional space after the statement of the selected problem or shows additional space between the items of the selected exercise that has this option.

Disable extra spacing menu
Hide the additional space after the statement of the selected problem or hide the additional space between the items of the selected exercise that has this option.

◆ **Note**
The extra spacing only applies to problems or exercises that have this option.

Re-create problem menu
Re-creates the selected problem.
The created problem will be of the same type but with other data and/or statement.
The new problem replaces the selected one.

Insert another similar problem menu
Creates another problem of the same type that the selected one.
The created problem will be of the same type but with other data and/or statement.
The new problem will be inserted in the position of the selected one.

Edit... menu
Opens the **Edit** window. In it we can modify the current exercise and insert new exercises.

Worksheet menu

Re-create worksheet menu
Creates another worksheet and replaces the current worksheet.
The new re-created worksheet will be of the same type of problems but with other data and/or statements.

◆ **Note**
This new re-created worksheet is assumed as a new file.

No answers menu
Hides the answers of the problems.

Answers after each problem menu
Puts the answers of each problem after the statement of each one.

Answers together at the end menu
Puts the answers of problems all together at the end of the worksheet.

Answers on a separate page menu
Puts the answers of problems together in new pages at the end of the worksheet.

Activate extra spacing globally menu
Shows additional space after the statement of each problem of the worksheet or shows additional space between the items of each exercise of the worksheet that has this option.

Disable extra spacing globally menu
Hide the additional space after the statement of each problem of the worksheet or hide the additional space between the items of each exercise of the worksheet that has this option.

◆ **Note**
The extra spacing only applies to problems or exercises that have this option.

Worksheet properties... menu
Opens the **Worksheet properties** window to change general properties of the current worksheet.
➔ See **Worksheet properties** window for further details.

Setup menu

Show Editing buttons menu
Shows / hides editing buttons: **Undo, Redo, Cut, Copy** and **Paste.**

Zoom menu
Allows us set size of the current worksheet.
The following settings are available:

- **Fit to window's width**
- **50%**
- **75%**
- **100%**
- **150%**
- **200%**.

Worksheet properties... menu
Opens the **Worksheet properties** window to change general properties of the current worksheet.
➔ See **Worksheet properties** window for further details.

Application setup... menu
Opens the **Application setup** window to change properties of the software.
➔ See **Application setup** window for further details.

Help menu

User's Manual (PDF document)... menu
Shows this manual.

Application registration menu
Shows the **Registration form** window to register the application.

Disabled functions in the non-registered version menu
Shows the list of disabled functions when the application is not registered.

Home page: www.vaxasoftware.com... menu
Connects to **VaxaSoftware** home page.
An active Internet connection and a browser are required.

Contact us... menu
Connects to **VaxaSoftware** contact page.
An active Internet connection and a browser are required.

Updates menu

Check now... menu
The software connects to Internet to check for updates.
An active Internet connection is required.

Ckecking period... menu
Allows us to adjust the period between checks for updates.
The following settings are available:
- **Once a day.**
- **Once a week.**
- **Once a month.**

About... menu
Shows the **Splash** window with the version and description of the application.

2 Buttons bar

Open button
➔ See **File / Open** menu for further details.

New button
➔ See **File / New worksheet** menu for further details.

Save button
➔ See **File / Save** menu for further details.

Re-create button
This button can either re-creates a selected problem or the whole worksheet.

1) If nothing is selected the whole worksheet is re-created.
The new worksheet replaces the old one and is considered as a new file.
The new re-created worksheet has the same type of problems but with other data and/or statements.

2) If there is a selected problem a new problem is re-created.
This new problem replaces the old selected one. The new problem is similar type but with other data and/or statements.

Undo button
➔ See **Edit / Undo** menu for further details.

Redo button
➔ See **Edit / Redo** menu for further details.

Cut button
➔ See **Edit / Cut** menu for further details.

Copy button
➔ See **Edit / Copy** menu for further details.

Paste button
➔ See **Edit / Paste** menu for further details.

Print button
➔ See **File / Print** menu for further details.

Zoom button
➔ See **View / Zoom** menu for further details.

Help button
➔ See **Help** menu for further details.

3 Educational center, title, and additional text

Shows us the Educational Center, the title of the worksheet, and additional text
We can change these items clicking on the **Worksheet / Worksheet properties...** menu.

➔ See **Worksheet properties** window for further details.

4 Statement of the problem

Problem number and its statement.

➔ We can select a problem clicking on it with the main button of the mouse.
Then we can edit it using the **Edit** menu options.
Also we can access the **Edit** menu options clicking the secondary button of the mouse when a problem is selected.

➔ See **Edit** menu for further details.

We can change the style of the problems number (initial number, prefix, suffix and color).
To change the problem number properties we access the properties of the worksheet clicking on the **Worksheet / Worksheet properties...** menu.

5 Answer of the problem

Shows us the answer of the problem.
The answer of a problem can be hided / shown and changed of place.

➔ See **Worksheet** menu for further details.

6 Page scroll bar

Shows us the number of the current page and the total pages of the worksheet.

We can press buttons on the left and right side of the page number to access to the previous or next page. Also we can press **Page Up** and **Page Down** cursor keys.

To access to the first page we can press the **Home** cursor key, to access to the end one we press the **End** cursor key.

◆ **Note:**
Page numbers shown are ordinals numbers. If our pages are numbered and the first number isn't 1 then the page number that appears on the page does not match that shown in the bar.

Example:
If the first page of our worksheet is numbered from 15 to 18 the displayed numbers will be the following:
Page 15 is shown as **Pag. 1/4** .
Page 16 is shown as **Pag. 2/4** .
Page 17 is shown as **Pag. 3/4** .
Page 18 is shown as **Pag. 4/4** .

7 Horizontal scroll bar

Allows us move current page horizontally if that does not fit entirely in the window.
Also we can press **Left** ← and **Right** → cursor keys.

8 Vertical scroll bar

Allows us move current page vertically if that does not fit entirely in the window.
Also we can press **Up** ↑ and **Down** ↓ cursor keys.

Wizard window

The **Wizard window** allows us select the subject, topics, types and amount of problems we want create.

We have two ways to start the **Wizard** window:

1) Clicking on the **File / New worksheet** menu in the **Main** window.
2) Clicking on the **New** button in the **Main** window.

We can move through the **Wizard** window pressing **Back** and **Next** buttons.
To close the **Wizard** window click on **Cancel** button.

The **Wizard** window has the following panels:

- **Welcome** panel
- **Select the subject** panel
- **Types of documents** panel
- **Select topics, types and amount of problems** panel
- **Problem numbers / Page numbers** panel
- **Position of the answers / Sorting method** panel
- **Educational center, title, and additional text** panel

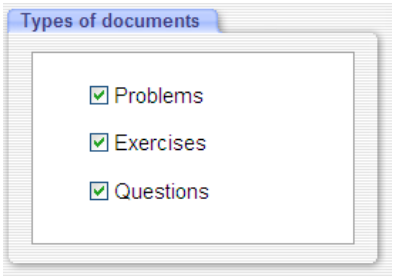
Welcome panel

Gives us a brief description of the Wizard.

Select the subject panel

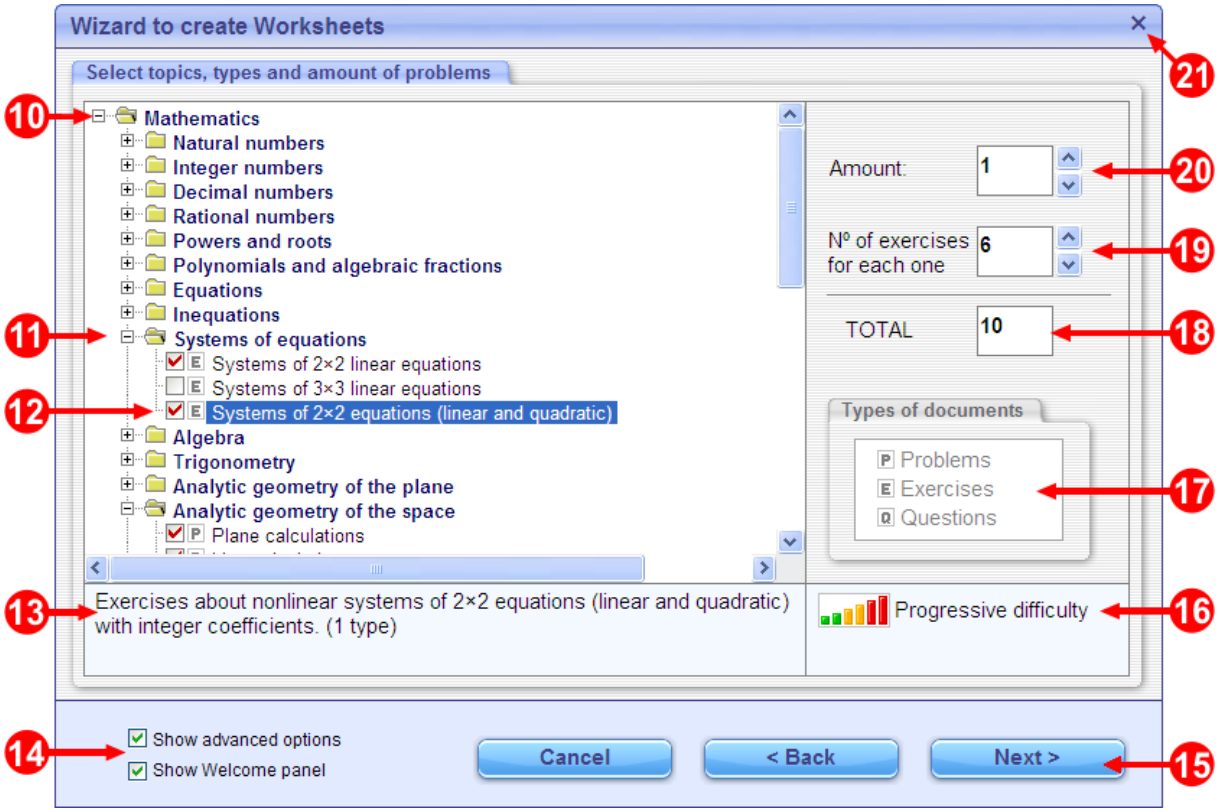
Allows us select the subject of the problems we want create.

Types of documents panel



Lets us filter the types of documents: **Problems, exercises** or **questions**.

Select topics, types and amount of problems panel



10 **Subject** folder

Displays the name of the subject previously selected.

11 **Topic** folder

Displays the name of the topic.

12 **Type of document mark: Problem, Exercise, Question**

Shows the name and type of document according to the mark to the left of each name:
[P] Problems, **[E]** Exercises, **[Q]** Questions.

13 **Description of the current problem**

Displays extended information about the problem, exercise or question selected.

14 **View options**

Allows us show or hide panels of the **Wizard** window:

Show advanced options
When this option is activated we can access the followings panels:
- **Types of documents** panel.
- **Problem numbers / Page numbers** panel.
- **Position of the answers / Sorting method** panel.

Show Welcome panel
When this option is activated the Welcome panel of the **Wizard** window is shown.

15 Buttons

Cancel button
Closes the **Wizard** window.

Back button
Shows previous panel of the **Wizard** window.

Next button
Shows next panel of the **Wizard** window.

16 **Difficulty level** mark

Indicates the difficulty level of the selected problem. The difficulty level may be:
Progressive difficulty:

★☆☆ **Low difficulty**

★★☆ **Medium difficulty**

★★★ **High difficulty**

◆ **Note**
The **Difficulty Progressive** function does not work if the worksheet is created when the **Unsorted** option is activated in the ➔ **Sorting method** panel.

17 Legend about **Types of documents**

Shows the type of document according to the mark to the left of each:
[P] Problems, **[E]** Exercises, **[Q]** Questions.

18 **Total amount of documents (problems)**

Shows the total number of documents (problems, exercises and questions) selected.

◆ **Note**
We cannot create more than 500 problems in a single worksheet.
If we need more than 500 problems, we have to distribute them in various worksheets with 500 or less problems in each one.

19 **Amount of elements in each exercise or question**

If the document type is exercise or question, we can specify the number of items we want to create within each.
The elements are sorted alphabetically from **a** to **z** (26 elements is the maximum amount).
The default amount is 6.
The minimum amount is 2.
The maximum amount is generally 26.

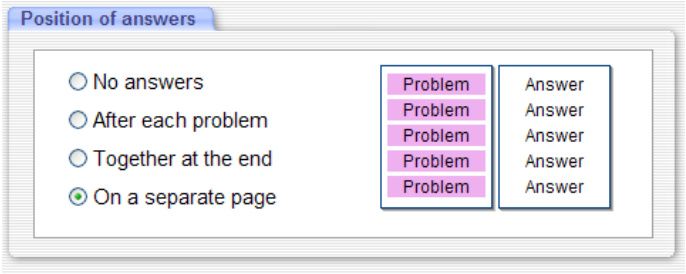
20 **Amount of problems (exercise or question)**

It allows us specify the amount of problems we want to create of the selected type.
The default amount is 1.
The maximum amount is 99.

21 **Close** button

Closes the **Wizard** window.

Position of answers / Sorting method panel



Position of answers
Specifies four options for the position of the answers:

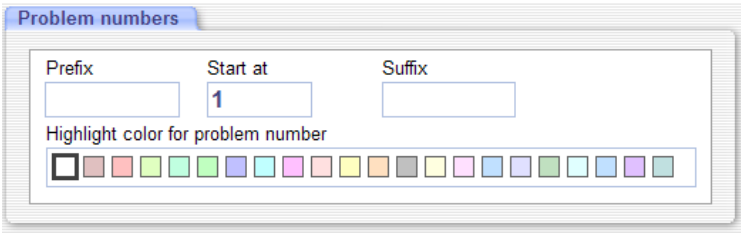
- **No answers**
- **Answers after each problem**
- **Answers together at the end**
- **Answers on a separate page**

➔ See **Worksheet** menu for further details.

Sorting method
Allows us sort the problems by topics or randomly (unsorted).

◆ **Note**
The **Difficulty Progressive** function does not work if **Unsorted** option is activated.

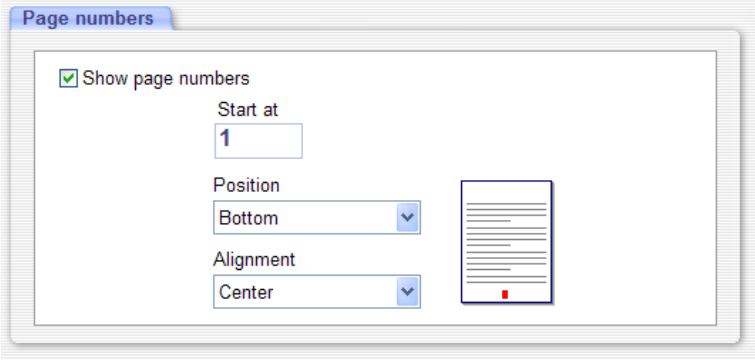
Problem numbers / Page numbers panel



Problem numbers
Sets the following four properties for the number of the problems:

Prefix:	Text that appears to the left of the number of each problem. Default is empty.
Suffix:	Text that appears to the right of the number of each problem. Default is a close parenthesis.
Start at:	Initial problem number (default is 1).
Highlight color:	Background color of the problem number text (default is white).

◆ **Note**
The initial number must be less than 2000.



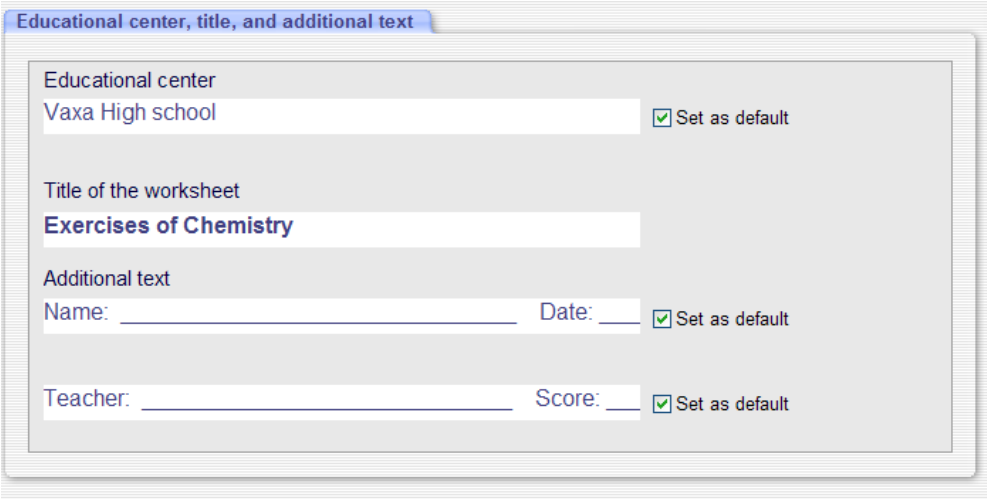
Page numbers
Sets the position of page number and its initial value:

Show page numbers: Click on this option to turn on/off page numbering.
Start at: Specifies the initial number (default is 1).
Position: Sets the placement of the page number:
- **Up**
- **Down**.

Alignment: Specifies the alignment of the page number:
- **Left**
- **Center**
- **Right**
- **Inside**
- **Outside**

◆ **Note**
The initial number must be less than 2000.

Educational center, title, and additional text panel



Allows us specify the text that leads all the pages of the worksheet.

Allows us specify **Educational Center**, **Title of the Worksheet**, and **Additional text**.
These lines of text will appear in the header of each page of the worksheet.

Set as default option:
Sets as default the corresponding text so that it is automatically included in the subsequent worksheets without the need to rewrite it.

Worksheet properties window

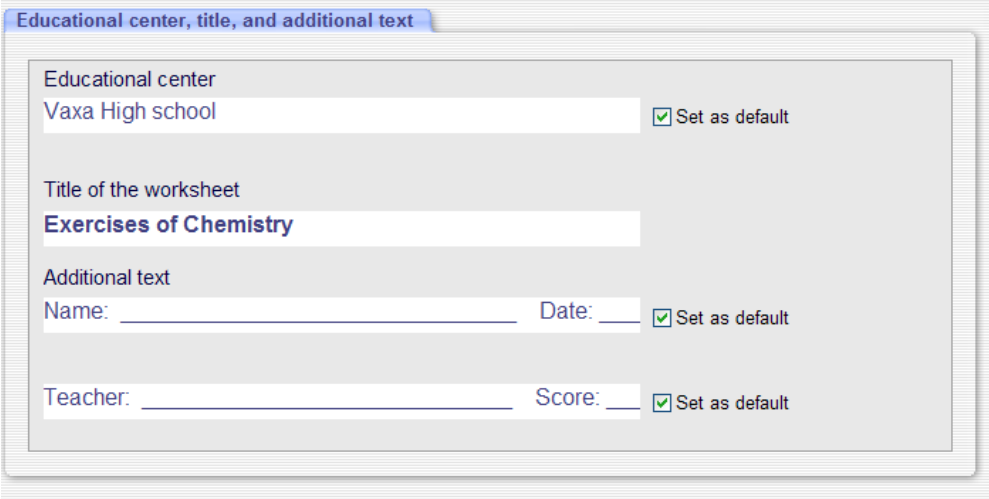
The **Worksheet properties** window allows us modify the properties of the current worksheet.

To access the **Worksheet properties** window click on **Worksheet / Worksheet properties...** menu in the **Main** window.

This window has the following panels:

- **Educational center, title, and additional text** panel
- **Sorting method** panel
- **Position of answers** panel
- **Problem numbers** panel
- **Page numbers** panel

Educational center, title, and additional text panel



Allows us specify the text that leads all the pages of the worksheet.

Allows us specify **Educational Center**, **Title of the Worksheet**, and **Additional text**.
These lines of text will appear in the header of each page of the worksheet.

Set as default option:
Sets as default the corresponding text so that it is automatically included in the subsequent worksheets without the need to rewrite it.

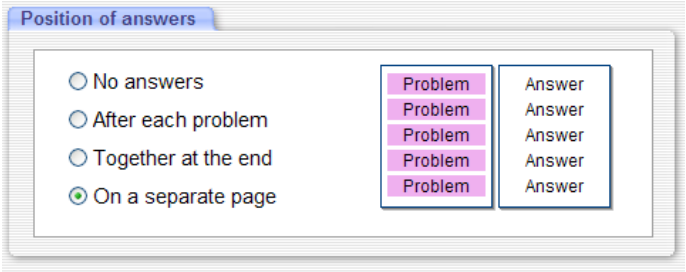
Sorting method panel

Allows us sort the problems by topics or randomly (unsorted).

◆ **Note 1**
We cannot re-sort a worksheet that was created with the **Unsorted** option activated.

◆ **Note 2**
The **Difficulty Progressive** function does not work if **Unsorted** option is activated.

Position of answers panel

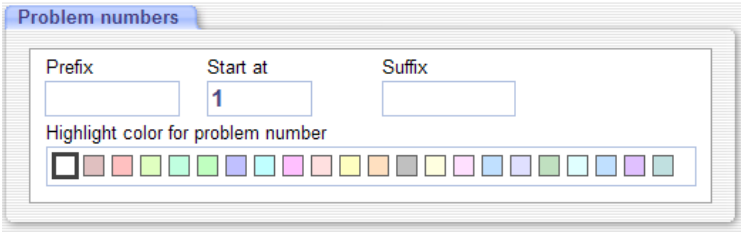


Specifies four options for the position of the answers:

- **No answers**
- **Answers after each problem**
- **Answers together at the end**
- **Answers on a separate page**

➔ See **Worksheet** menu in **Main** windows for further details.

Problem numbers option

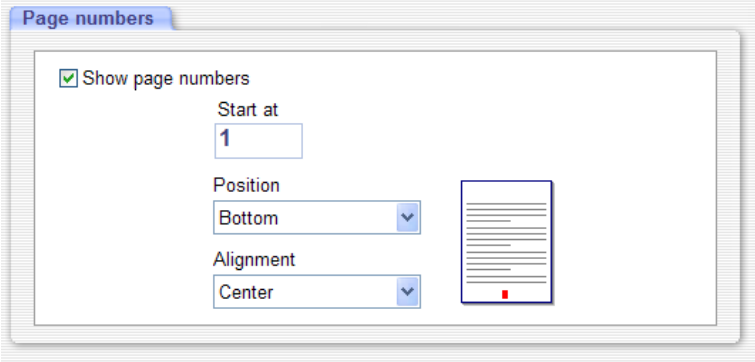


Sets the following four properties for the number of the problems:

Prefix: Text that appears to the left of the number of each problem. Default is empty.
Suffix: Text that appears to the right of the number of each problem. Default is a close parenthesis.
Start at: Initial problem number (default is 1).
Highlight color: Background color of the problem number text (default is white).

◆ **Note**
The initial number must be less than 2000.

Page numbers panel



Sets the position of page number and its initial value:

Show page numbers: Click on this option to turn on/off page numbering.
Start at: Specifies the initial number (default is 1).
Position: Sets the placement of the page number:
- **Up**
- **Down**.

Alignment: Specifies the alignment of the page number:
- **Left**
- **Center**
- **Right**
- **Inside**
- **Outside**

◆ **Note**
The initial number must be less than 2000.

Application setup window

The **Application setup** window allows you to modify various parameters of the application.

To access this window click on the **Setup / Application setup...** menu in the **Main** window.

This window has the following panels:
- **Educational Center, title, and additional text.**
- **Educational system.**
- **Problems numbers.**
- **Page Numbers.**
- **Position of answers.**
- **Sorting method.**
- **Decimal and list separators.**
- **Multiplication and division signs.**
- **Scientific notation.**
- **Notation for intervals.**
- **Notation for statistics.**
- **Currency.**
- **Geometrical optics: Sign convention for mirrors.**
- **Geometrical optics: Sign convention for lenses.**
- **Wizard window options.**
- **Editing buttons.**

Shortcut keys

List of keyboard shortcuts available in the **Main** window.

Ctrl + N	New worksheet
Ctrl + O	Open
Ctrl + S	Save
Ctrl + P	Print
Ctrl + F4	Exit
Alt + F4	Exit
Ctrl + R	Re-create worksheet
Ctrl + Z	Undo
Ctrl + Y	Redo
Ctrl + X	Cut
Ctrl + C	Copy
Ctrl + V	Paste
Del	Delete
Ctrl + E	Re-create selected problem
Ctrl + I	Insert a similar problem to the selected one
F1	Help / User's Manual (PDF document...)
F2	Move up selected problem
F3	Move down selected problem
F4	Open **Worksheet Properties** window
Up arrow	Move down current page
Down arrow	Move up current page
Left arrow	Move right current page
Right arrow	Move left current page
Page Up	Access to previous page
Page Down	Access to next page
Home	Access to first page
End	Access to last page

List of subjects, topics and types of problems

◆ **Note**
<R> Only available in the registered version.
Blue text: New in this version.

Mathematics

Natural numbers
- Addition of natural numbers
- Subtraction of natural numbers
- Multiplication of natural numbers I
- Multiplication of natural numbers II
- Division of natural numbers I
- Division of natural numbers II
- Division of natural numbers III
- Combined operations without parentheses
- <R> Combined operations with parentheses
- Rounding natural numbers
- Expanding natural numbers in powers of 10
- Writing expanded numbers (in powers of 10) in standard notation
- Repeated multiplications as powers
- Powers as repeated multiplications
- Simplifying powers of natural numbers I
- Simplifying powers of natural numbers II
- Convert numbers to roman numerals I
- Convert numbers to roman numerals II
- Convert roman numerals to decimal numbers I
- Convert roman numerals to decimal numbers II
- Converting from other bases to base 10
- Converting from base 10 to other base

Divisibility
- Finding set of divisors of a number
- Prime factorization of a number
- Gcm of natural numbers
- Lcm of natural numbers

Integer numbers
- Addition and subtraction of integer numbers
- Combined operations without parentheses
- <R> Combined operations with parentheses
- Simplifying powers of integers numbers I. Positive exponents
- Simplifying powers of integers numbers II. Negative exponents

Decimal numbers
- Addition and subtraction of decimal numbers
- Multiplication of decimal numbers
- Division of decimal numbers
- Rounding decimal numbers (I)
- Rounding decimal numbers (II)
- Combined operations without parentheses
- <R> Combined operations with parentheses

Mathematics (*continued*)

Rational numbers
<R> Placing fractions on the Number Line
<R> Identifying fractions on the Number Line
Fraction of shaded shapes I
Fraction of shaded shapes II
Simplifying fractions
Reduce to a common denominator
Sorting fractions
Addition-subtraction of fractions with like denominators
Addition-subtraction of fractions with unlike denominators
Multiplication and division with fractions
<R> Combined operations with parentheses
Improper fractions to mixed numbers
Mixed numbers to improper fractions
Identifying mixed numbers of shaded shapes
Addition of mixed numbers
Converting decimal numbers to fractions
Addition and subtraction of repeating decimal numbers
Simplifying powers of rational numbers I
Simplifying powers of rational numbers II

Real numbers
<R> Intervals I
<R> Intervals II
<R> Intervals III
<R> Intervals IV
<R> Placing real numbers on the Number Line
Rounding real numbers
Convert from standard notation into scientific notation
Convert from scientific notation into standard notation
Multiplication and division in scientific notation
Addition and subtraction in scientific notation

Unit conversion
Mass conversion (metric)
Length conversion (metric)
Time conversion
Area conversion I (metric)
<R> Area conversion II: Square meter and hectare
<R> Volume conversion I: (metric)
<R> Volume conversion II (metric)
<R> Volume conversion III (metric)
Temperature conversion I (Celsius - Fahrenheit)
<R> Temperature conversion II (Celsius - Fahrenheit - Kelvin)
<R> Length conversion (metric - imperial)
<R> Mass conversion (metric - imperial)
Convert radians to degrees
Convert degrees to radians

Sexagesimal system
Time and clock (I)
Time and clock (II)
Time addition without carrying
Time addition with carrying
Angle addition without carrying
Angle addition with carrying
Time subtraction
Angle subtraction
Multiplication by a whole number
Division by a whole number
Complementary and supplementary angle calculation
Angle calculation in triangles and other shapes

Powers and roots

Simplifying powers of natural numbers I
Simplifying powers of natural numbers II
Simplifying powers of integers numbers I. Positive exponents
Simplifying powers of integers numbers II. Negative exponents
Simplifying powers of rational numbers I
Simplifying powers of rational numbers II
Calculation of square roots in your head
Finding square roots using the square root algorithm I
Finding square roots using the square root algorithm II
Writing radicals as rational exponents
Writing rational exponents as radicals
Extracting factors from radicals
Root rationalization I: (monomial)
Root rationalization II: (binomial)
Root rationalization III: (n-th roots)
Addition and subtraction of square roots
Addition and subtraction of cube roots
Simplifying n-th roots
<R> Expanding square roots expressions

Proportions and percentages

Finding an unknown quantity in a proportion
Percentages: Direct calculations

Polynomials

Monomials: Coefficient and degree
Monomials: Addition and subtraction
Monomials: Multiplication
Monomials: Division
Monomials: Powers
Polynomials: Addition and subtraction
<R> Square binomials and difference of two squares I
<R> Square binomials and difference of two squares II
<R> Polynomials: Multiplication and power
<R> Binomial theorem
<R> Polynomials: Division I: Long division
<R> Polynomials: Division II: Synthetic division
<R> Polynomials: Division III: With parameters
Factoring polynomials I: Greatest Common Factor
<R> Factoring polynomials II: $(a+b)^2$, $(a-b)^2$, a^2-b^2
<R> Factoring polynomials III: $(a+b)^2$, $(a-b)^2$, a^2-b^2
<R> Factoring polynomials IV: Ruffini's rule

Algebraic fractions

<R> Algebraic fractions I: Simplifying algebraic fractions
<R> Algebraic fractions II: Multiplications and divisions
<R> Algebraic fractions III: Additions and subtractions
<R> Algebraic fractions IV: Combined operations

Sequences and progressions

Exercises with sequences
<R> Arithmetic progressions I
<R> Arithmetic progressions II
<R> Geometric progressions I
<R> Geometric progressions II
<R> Geometric progressions III

Mathematics (*continued*)

Exponentials and logarithms
- Exponential expression to logarithmic expression
- Logarithmic expression to exponential expression

<R> Simplifying logarithms
<R> Evaluate logarithms from another one
<R> Evaluate logarithms from two other known
<R> Evaluate logarithms without using a calculator
<R> Evaluate logarithms using the logarithm change of base rule
<R> Finding the base of logarithms
<R> Exponential equations
<R> Logarithmic equations
<R> Systems of 2×2 exponential equations
<R> Systems of 2×2 logarithmic equations

Equations. Introduction
<R> Simplifying linear and quadratic expressions
<R> Verifying solutions to equations

Equations. Linear
- Linear equations with integer coefficients. Integer solutions
- Linear equations with integer coefficients. Rational solutions
- Linear equations with rational coefficients. Integer solutions
- Linear equations with rational coefficients. Rational solutions

<R> Linear equations word problems (integer coefficients)
<R> Linear equations word problems (rational coefficients)

Equations. Quadratic
- Incomplete quadratic equations. Integer solutions
- Incomplete quadratic equations. Rational solutions
- Incomplete quadratic equations. Real solutions
- Complete quadratic equations. Integer solutions
- Complete quadratic equations. Rational solutions
- Complete quadratic equations. Real solutions

<R> Quadratic equations. Constants in the denominator. Integer solutions
<R> Quadratic equations. Constants in the denominator. Rational solutions
<R> Quadratic equations. Constants in the denominator. Real solutions
<R> Quadratic equations. Unknown in the denominator. Integer solutions
<R> Quadratic equations. Unknown in the denominator. Rational solutions
<R> Quadratic equations. Unknown in the denominator. Real solutions

Equations. Other types
- Equations in factored form

<R> Biquadratic equations. Integer solutions
<R> Biquadratic equations. Rational solutions
<R> Biquadratic equations. Real solutions
<R> Triquadratic equations
<R> Cubic equations (degree 3)
<R> Quartic equations (degree 4)
<R> Equations involving roots (1 square root)
<R> Equations involving roots (2 square roots)
<R> Exponential equations
<R> Logarithmic equations
<R> Trigonometric equations

Systems of linear equations
- Systems of 2×2 linear equations. Integer solutions
- Systems of 2×2 linear equations. Rational solutions

<R> Systems of 2×2 linear equations. Rational coefficients
<R> Solving system of 2×2 linear equations by graphing. Integer solutions
<R> Systems of 3×3 linear equations. Integer solutions
<R> Systems of 3×3 linear equations. Rational solutions
<R> System of 2×2 linear equations word problems
<R> Systems of 4×4 linear equations

Systems of non-linear equations
<R> Systems of 2×2 equations (linear and quadratic)
<R> Systems of 2×2 equations (linear and irrational)
<R> Systems of 2×2 exponential equations
<R> Systems of 2×2 logarithmic equations

Inequalities
Linear inequalities in 1 variable with integer coefficients
Linear inequalities in 1 variable with rational coefficients
<R> Absolute value inequalities
<R> Quadratic inequalities
<R> Rational inequalities
<R> Inequalities in 2 variables

Systems of inequalities
<R> Systems of 2 linear inequalities in 1 variable
<R> Systems of 2 linear inequalities in 2 variables

Matrices, determinants and systems of equations
Additions and subtractions of matrices
<R> Multiplication of matrices
Determinants 2×2 (without parameters)
Determinants 3×3 (without parameters)
<R> Determinants 4×4 (without parameters)
<R> Determinants (with parameters)
<R> Rank of matrices (without parameters)
<R> Rank of matrices (with parameters)
Inverse matrix 2x2 (without parameters)
<R> Inverse matrix 3x3 (without parameters)
<R> Inverse matrix (with parameters)
Matricial equations I
Matricial equations II: type AX+B=C
<R> Systems of 2×2 matricial linear equations
Discuss and solve systems of 3×3 linear equations (without parameters)
<R> Discuss and solve systems of 3×3 linear equations (with parameters)
<R> Cayley-Hamilton Theorem: Powers of a matrix
<R> Cayley-Hamilton Theorem: Inverse and powers of a matrix

Vector space
<R> Diagonalization of 2x2 matrices: Eigenvalues
<R> Diagonalization of 3x3 matrices: Eigenvalues
<R> Diagonalization of 2x2 matrices: Eigenvalues and eigenvectors
<R> Diagonalization of 3x3 matrices: Eigenvalues and eigenvectors
<R> Diagonalization of linear transformations from R^3 to R^3
<R> Coordinates of a 2D_vector relative to a given basis
<R> Coordinates of a 3D_vector relative to a given basis
<R> Change of basis matrix for R^2 vectors
<R> Change of basis matrix for R^3 vectors

Basic geometry I. Plane shapes
Pythagorean theorem I
<R> Pythagorean theorem II
Similarity I. Ratios of lengths
Similarity II. Ratios of areas
<R> Plane shapes I: straight line segments
<R> Plane shapes II: straight line segments
<R> Plane shapes III: curved line segments
<R> Plane shapes IV: curved line segments

Basic geometry II. Solid shapes
<R> Solid shapes I: plane surfaces
<R> Solid shapes II: plane surfaces
<R> Solid shapes III: curved surfaces
<R> Solid shapes IV: curved surfaces

Mathematics (*continued*)

Trigonometry
- Convert radians to degrees
- Convert degrees to radians
- <R> Solving triangles
- <R> Solving plane shapes.
- Trigonometric values from another one
- <R> Reducing to the corresponding acute angle
- <R> Trigonometric values from two other known
- <R> Trigonometric identities
- <R> Trigonometric equations

Complex numbers
- Plotting complex numbers on the complex plane
- Identifying complex numbers on the complex plane
- Adding and subtracting complex numbers
- Multiplying and dividing complex numbers in cartesian form
- Rectangular (cartesian) to polar conversion
- Polar to rectangular (cartesian) conversion
- Multiplying and dividing complex numbers in polar form
- <R> Powers of complex numbers
- <R> Root extraction of complex numbers
- <R> Calculation of a parameter
- <R> Complex equations
- <R> Complex equations + plotting answers

Plane analytic geometry
- Points I: Graphing points on the coordinate plane (first quadrant)
- Points II: Identifying points on the coordinate plane (first quadrant)
- Points III: Graphing points on the coordinate plane
- Points IV: Identifying points on the coordinate plane
- <R> Vectors I: Plotting vectors on the coordinate plane
- <R> Vectors II: Identifying vectors on the coordinate plane
- Vectors III
- <R> Vectors IV
- <R> Lines I
- <R> Lines II

Conic sections
- <R> Circle
- <R> Ellipse centered at the origin
- <R> Ellipse not centered at the origin
- <R> Hyperbola centered at the origin
- <R> Hyperbola not centered at the origin
- <R> Parabola. Vertex at the origin
- <R> Parabola. Vertex is not at the origin
- <R> Matching equation of conic sections to their graphs

Analytic geometry of Space
- Vectors
- Plane calculations
- <R> Line calculations
- <R> Alignment, coplanarity and distance of points
- <R> Relative position of planes and lines (without parameter)
- <R> Relative position of planes and lines (with parameter)
- <R> Relative position of two lines (without parameters)
- <R> Relative position of two lines (with parameters)

Limits
- Limits involving rational functions
- <R> Limits involving roots
- <R> Limits involving subtraction of roots
- <R> Limits of powers
- <R> Limits using L'Hôpital's rule

Mathematics (*continued*)

Derivatives

Average rate of change of a function
Finding derivatives at a point using the Limit Definition (I)
Finding derivatives at a point using the Limit Definition (II)
<R> Finding derivatives of functions using the Limit Definition (I)
<R> Finding derivatives of functions using the Limit Definition (II)
<R> Derivative of functions I: No Chain rule - No Trigonometry
<R> Derivative of functions II: No Chain rule - Trigonometry
<R> Derivative of functions III: No Chain rule - No Trigonometry
<R> Derivative of functions IV: No Chain rule - Trigonometry
<R> Derivative of functions V: Chain rule - No Trigonometry
<R> Derivative of functions VI: Chain rule - Trigonometry
<R> Derivative of functions VII: Chain rule - No Trigonometry
<R> Derivative of functions VIII: Chain rule - Trigonometry
<R> Derivative of functions IX: Generalized power rule
<R> Implicit differentiation
<R> First-order partial derivatives
<R> Second order partial derivatives
Tangent line to a curve at a point
<R> Tangent line to a curve and parallel to a given line
Normal line to a curve at a point
<R> Optimization

Study of functions

Domain of a function I
Domain of a function II
Domain of a function III
<R> Inverse functions
<R> Function composition I
<R> Function composition II
<R> Finding coefficients of functions involving derivatives (I)
<R> Finding coefficients of functions involving derivatives (II)
<R> Asymptotes I: Vertical
<R> Asymptotes II: Horizontal
<R> Asymptotes III: Oblique
<R> Asymptotes IV: Vertical, horizontal and oblique
<R> Maxima and minima of a function
<R> Monotonicity and extrema
<R> Inflection points of a function
<R> Concavity and inflection points
<R> Continuity I: Piecewise functions (without parameters)
<R> Continuity II: Piecewise functions (with 1 parameter)
<R> Continuity III: Piecewise functions (with 2 parameters)
<R> Derivability I: Without parameter
<R> Derivability II: With parameters
<R> Analyze function using the graph of its derivative I
<R> Analyze function using the graph of its derivative II
<R> Analyze function using the graph of its derivative III

Mathematics (*continued*)

Graphing functions

Matching linear functions to their graphs
<R> Matching quadratic functions to their graphs
<R> Matching cubic functions to their graphs
<R> Matching functions to their graphs
Formula of a linear function given its graph
<R> Properties of a piecewise function given its graph I
<R> Properties of a piecewise function given its graph II
<R> Formula of a piecewise function given its graph
Basic I: Linear
Basic II: Quadratic
<R> Basic III: Piecewise functions. Linear and constant
<R> Basic IV: Piecewise functions. Linear and quadratic
<R> Basic V: Exponential (non base e)
<R> Basic VI: Exponential (base e)
<R> Basic VII: Logarithmic
<R> Basic VIII: Simple rational
<R> Basic IX: Square root
<R> Advanced I: Cubic polynomial
<R> Advanced II: Rational
<R> Advanced III: Exponential
<R> Advanced IV: Logarithmic

Indefinite integrals

Integration by direct method I. Without trigonometry
Integration by direct method II. With trigonometry
<R> Integration by substitution I. Without trigonometry
<R> Integration by substitution II. With trigonometry
<R> Integration by parts I
<R> Integration by parts II
<R> Integration by parts III
<R> Integrals of rational functions I
<R> Integrals of rational functions II
<R> Integrals of rational functions III
<R> Integrals of rational functions IV
<R> Integrating powers of trigonometric functions (I)
<R> Integrating powers of trigonometric functions (II)
<R> Integration by trigonometric substitution
<R> Integrals of trigonometric functions sin(mx)·cos(nx)

Definite integrals

<R> Definite integrals
<R> Area between a curve and the X axis. Basic - No graphs
<R> Area between a curve and the X axis. Basic - With graphs
<R> Area between a curve and the X axis. Advanced - No graphs
<R> Area between a curve and the X axis. Advanced - With graphs
<R> Area between two curves - No graphs
<R> Area between two curves - With graphs
<R> Parameters calculation using definite integrals
<R> Find function by integration of its first derivative
<R> Find function by integration of its second derivative
<R> Volumes of revolution
<R> Improper integral (I)
<R> Improper integral (II)
<R> Double integral (I)
<R> Double integral (II)

Numerical integration

<R> Rectangle rule
<R> Trapezoidal rule
<R> Simpson's rule

Mathematics (*concluded*)

Vector calculus
<R> Gradient
<R> Divergence
<R> Curl
<R> Directional derivative

Differential equations
<R> Separable
<R> Linear equations
<R> Homogeneous equations
<R> Exact equations
<R> Second order homogeneous linear equations with constant coefficients
<R> Bernoulli equations
<R> IVP / Separable
<R> IVP / Linear equations
<R> IVP / Homogeneous equations
<R> IVP / Bernoulli equations
<R> IVP / Second order homogeneous linear equations with constant coefficients

Descriptive statistics
Pie charts
One-variable statistics: Ungrouped data (I)
One-variable statistics: Ungrouped data (II)
<R> One-variable statistics: Grouped data (I)
<R> One-variable statistics: Grouped data (II)
<R> One-variable statistics: Grouped data (III)
<R> Two-variable statistics: Linear regression analysis

Probability
Probability I: Coins
<R> Probability II: Dice
<R> Probability III: Marbles
<R> Probability IV: Cards
Normal distribution I: N(0,1)
Normal distribution II: Standardizing
<R> Normal distribution III: Word problems
<R> Normal distribution IV: Word problems of sample means

Recreational mathematics
Crack the code

◆ **Note**
<R> Only available in the registered version.
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Physics

Unit conversion
- Mass conversion (metric)
- Length conversion (metric)
- Time conversion
- Area conversion I (metric)

<R> Area conversion II: Square meter and hectare
<R> Volume conversion I: (metric)
<R> Volume conversion II (metric)
<R> Volume conversion III (metric)

- Temperature conversion I (Celsius - Fahrenheit)

<R> Temperature conversion II (Celsius - Fahrenheit - Kelvin)
<R> Length conversion (metric - imperial)
<R> Mass conversion (metric - imperial)

- Convert radians to degrees
- Convert degrees to radians

Vector calculus
<R> Gradient
<R> Divergence
<R> Curl

Kinematics: Motion in 1 dimension
- Velocity unit conversion
- Motion with constant velocity
- Motion with constant acceleration

<R> Meeting and pursuit

Kinematics: Motion in 2 dimensions
<R> Objects launched horizontally
<R> Objects launched obliquely
<R> Uniform circular motion
<R> Tangential and normal components of the acceleration

Dynamics
- Block on a horizontal surface

<R> Dynamics of two or three objects connected by cords
<R> Hooke's Law word problems
<R> Centripetal force

Pressure and hydrostatics
- Basic pressure calculations

<R> Static fluid pressure
<R> Pascal's principle (hydraulic lift)
<R> Archimedes' principle

Work, energy, power and momentum
<R> Momentum and collisions
<R> Work done by constant force
- Kinetic Energy and Potential Energy I

<R> Kinetic Energy and Potential Energy II
<R> Spring force and spring energy
<R> Specific heat
<R> Specific and latent heat

Gravitational field
- Basic calculations

<R> Gravitational field and force for multiple point masses
<R> Orbits I: Kepler's third law
<R> Orbits II: Kinematics and dynamics

Physics (*concluded*)

Electric field
- Basic calculations
- Electric force and field for multiple point charges
- <R> Electric potential and work

Electric circuits
- Basic calculations
- <R> Resistors in series and parallel combination
- <R> Capacitors in series and parallel combination
- <R> Power and energy consumed by resistors
- <R> Energy stored in capacitors
- <R> Kirchoff's Laws I
- <R> Kirchoff's Laws II
- <R> Kirchoff's Laws III
- <R> Diode current limiting resistor
- <R> Passive Low/High Pass Filters (RL and RC)
- Series RL, RC, RLC AC circuits (I)
- <R> Series RL, RC, RLC AC circuits (II)

Magnetic field
- <R> Magnetic field/force of straight wires
- <R> Motion of charges in magnetic fields
- <R> Magnetic induction
- <R> Transformers

Simple Harmonic Motion (S.H.M.)
- <R> Kinematics of Simple Harmonic Motion
- <R> Dynamics of Simple Harmonic Motion
- Energy of Simple Harmonic Motion

Mechanical waves
- <R> Wave equation in one dimension

Sound
- <R> Doppler Effect
- <R> Sound Intensity and Sound Level

Optics
- <R> Light and electromagnetic waves
- Refraction
- <R> Geometric optics: Spherical mirrors
- <R> Geometric optics: Thin lenses

Special relativity
- <R> Special relativity

Quantum mechanics
- <R> Photoelectric effect
- <R> Emission spectrum of hydrogen atom

Nuclear physics
- <R> Nuclear reactions
- Nuclear mass and binding energy
- <R> Nuclear disintegration

◆ **Note**
<R> Only available in the registered version.
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Chemistry

Units and chemical formulae

Grams and moles conversions
Grams, moles, molecules, and atoms conversions
<R> Percent composition
<R> Determining empirical formula
<R> Determining empirical and molecular formula (without combustion)
<R> Determining empirical and molecular formula (with combustion)
Mass conversion (metric)
Length conversion (metric)
Time conversion
Area conversion I (metric)
<R> Area conversion II: Square meter and hectare
<R> Volume conversion I: (metric)
<R> Volume conversion II (metric)
<R> Volume conversion III (metric)
Temperature conversion I (Celsius - Fahrenheit)
<R> Temperature conversion II (Celsius - Fahrenheit - Kelvin)
<R> Length conversion (metric - imperial)
<R> Mass conversion (metric - imperial)

Gases

Problems of ideal gases I
<R> Problems of ideal gases II
<R> Problems of ideal gases III (Dalton's Law)

Solutions

Aqueous solutions I
<R> Aqueous solutions II
<R> Aqueous solutions III
<R> Aqueous solutions IV: Dilutions
<R> Colligative properties of solutions (I)
<R> Colligative properties of solutions (II)

Stoichiometry of chemical reactions

Balancing chemical equations
Simple stoichiometry of reactions I (pure reagents)
Simple stoichiometry of reactions II (impure reagents)
<R> Simple stoichiometry of reactions III
<R> Simple stoichiometry of reactions IV
<R> Percent yield of reaction
<R> Limiting reagents in stoichiometry

Thermochemistry

<R> Specific heat
<R> Specific and latent heat
Internal energy and enthalpy
<R> Enthalpy of reaction
<R> Hess's Law
<R> Average bond enthalpies
<R> Gibbs free energy and spontaneity
<R> Born-Haber Cycle

Chemical kinetics

Basic calculations in chemical kinetics
<R> Rate law of reaction
<R> Arrhenius Equation
<R> Potential energy diagram

Chemistry (*continued*)

Gas phase equilibria
Basic calculations
Le Châtelier's principle
<R> Calculation of the equilibrium constant
<R> Calculation of composition at equilibrium

Acid-base equilibria
<R> Completing acid-base equations
<R> Acidic, basic and amphoteric compounds
Strong acids and bases
<R> Weak acids I
<R> Weak acids II
<R> Weak bases I
<R> Weak bases II
<R> Aqueous solutions of salts (acidic, basic or neutral)
<R> Salt hydrolysis
<R> Buffer solutions
<R> Acid-base titrations

Solubility equilibria
<R> Solubility product constant and solubility in pure water
<R> Solubility in the presence of a common-ion

Redox reactions
Basic concepts and calculations
<R> Balancing redox half-reactions in acidic solution
<R> Balancing redox half-reactions in basic solution
<R> Balancing oxidation-reduction equations in an acidic medium
Balancing oxidation-reduction equations in a basic medium
<R> Balancing oxidation-reduction equations in acidic or basic medium
<R> Stoichiometry of redox reactions
<R> Redox titrations
<R> Galvanic cell
<R> Electrolysis I
<R> Electrolysis II

Atomic structure
<R> Number of protons, neutrons, and electrons for atoms
<R> Number of protons, neutrons, and electrons for ions
<R> Number of protons, neutrons, and electrons for atoms and ions
Quantum numbers I
Quantum numbers II
Quantum numbers III
Quantum numbers IV
<R> Electron configuration, group #, and period #
<R> Electron configuration, periodic properties, formula and type of bond
<R> Ranking elements/ions according to radius
<R> Light: Frequency, wavelength, and energy
<R> Photoelectric effect
<R> Emission spectrum of hydrogen atom
<R> Average atomic mass and isotopic abundances
<R> Nuclear reactions
Nuclear mass and binding energy
<R> Nuclear disintegration

Molecular structure
<R> Lewis dot structure
<R> Lewis dot structure and molecular geometry

Chemistry (*continued*)

Nomenclature of inorganic compounds

W: Elements
N: Elements
W: Monoatomic ions
N: Monoatomic ions
W: Oxides
N: Oxides
W: Peroxides
N: Peroxides
W: Oxides and peroxides
N: Oxides and peroxides
W: Hydrides
N: Hydrides
W: Hydroxides
N: Hydroxides
<R> W: Hydrogen halides and their salts. Nonmetal-nonmetal salts
<R> N: Hydrogen halides and their salts. Nonmetal-nonmetal salts
<R> W: Oxyacids
<R> N: Oxyacids
<R> W: Neutral salts derived from oxyacids
<R> N: Neutral salts derived from oxyacids
<R> W: Acid salts derived from oxyacids
<R> N: Acid salts derived from oxyacids
<R> W: Polyatomic ions
<R> N: Polyatomic ions

Organic nomenclature. Hydrocarbons

D: Linear and branched chains of alkanes
N: Linear and branched chains of alkanes
<R> D: Linear and branched chains of alkenes
<R> N: Linear and branched chains of alkenes
<R> D: Linear and branched chains of alkenes and alkynes
<R> N: Linear and branched chains of alkenes and alkynes
<R> D: Cycloalkanes/alkenes/alkynes and benzene derivatives
<R> N: Cycloalkanes/alkenes/alkynes and benzene derivatives

Organic nomenclature. Oxygen-containing

<R> D: Alcohols
<R> N: Alcohols
<R> D: Ketones
<R> N: Ketones
<R> D: Aldehydes
<R> N: Aldehydes
<R> D: Ethers
<R> N: Ethers
<R> D: Phenols
<R> N: Phenols
<R> D: Acids
<R> N: Acids
<R> D: Esters
<R> N: Esters
<R> D: Multiple oxygen functional groups
<R> N: Multiple oxygen functional groups
<R> D: ALL functional groups containing oxygen
<R> N: ALL functional groups containing oxygen

Chemistry (*concluded*)

Organic nomenclature. Nitrogen-containing
<R> D: Amines
<R> N: Amines
<R> D: Amides
<R> N: Amides
<R> D: Nitriles
<R> N: Nitriles
<R> D: Nitro compounds
<R> N: Nitro compounds
<R> D: Multiple nitrogen (oxygen) functional groups
<R> N: Multiple nitrogen (oxygen) functional groups
<R> D: ALL functional groups containing nitrogen (and oxygen)
<R> N: ALL functional groups containing nitrogen (and oxygen)

Organic chemistry
<R> Hybridization state of carbon atoms
<R> Chain isomers
<R> Position isomers
<R> Functional isomers
<R> Geometric isomers
<R> Optical isomers
<R> All types of isomers
<R> Organic reactions

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Specifications

Description	**Worksheet Generator for Mathematics, Physics and Chemistry** is a Windows® software to create, save, load and print worksheets of Mathematics, Physics and Chemistry for educational purposes.
Maximum amount of problems in a worksheet	500
Maximum amount of problems of the same type	99
Maximum amount of pages in a worksheet	199
Amount of elements in an exercise or question	Minimum 1 Maximum 26 (or less)
First problem number	Between 1 and 1999
First page number	Between 1 and 1999
Positions of the problems answers	4 positions: - No answers - Answers after each problem - Answers together at the end - Answers in a separate page
Positions of the page number	11 positions *: - No page numbering (1) - Up, down (2) - Left, center, right, inside, outside (5) (*) 1 + 2 x 5 = 11
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