

Equation solving: $f(x) = 0$

$$\cos(4x^2 - 3x - 2) = 0$$

Typing initial argument value

The screenshot shows a Microsoft Excel window titled "eq_syst.xlsx - Microsoft Excel". The formula bar has "A2" selected and contains the formula "fx 0". The worksheet has columns labeled A through J and rows labeled 1 through 4. Cell A1 contains "x" and cell B1 contains "y". Cell A2 contains "0". A red box highlights the range A1:B1, and another red box highlights the formula bar entry "fx 0". The ribbon at the bottom shows tabs for "Лист1", "Лист2", and "Лист3".

$$\cos(4x^2 - 3x - 2) = 0$$

Creating the expression for a function calculation

The screenshot shows a Microsoft Excel interface. The formula bar at the top contains the formula $=\text{COS}(4*A2*A2-3*A2-2)$. The spreadsheet area below shows a table with columns A through J and rows 1 through 4. Column A is labeled 'x' and column B is labeled 'y'. Row 2 contains values 0 and -0,41615 respectively. The cell B2, which contains the formula, is highlighted with a red box. The cell B2, which contains the result -0,41615, is also highlighted with a red box.

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$$\cos(4x^2 - 3x - 2) = 0$$

Running command for parameters goal-seek

Данные (Data) > Подбор параметра (Goal-Seek)

The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected, indicated by a red box. In the bottom right corner of the ribbon, another red box highlights the 'Подбор параметра...' (Goal Seek) button. The Excel interface includes a formula bar with '=COS(4*A2*A2-3*A2-2)', a worksheet with columns A through J and rows 1 through 3, and a status bar at the bottom.

A	B	C	D	E	F	G	H	I	J
1	x	y							
2	0	-0,41615							
3									

Лист1 Лист2 Лист3

Готово

100%

$$\cos(4x^2 - 3x - 2) = 0$$

Set the aim value and adjusting parameter location

Подбор параметра (Goal-seek) > Установить в ячейке (Set cell), Значение (To value), Изменяя значение ячейки (By changing cell)

The screenshot shows the Microsoft Excel interface with the following details:

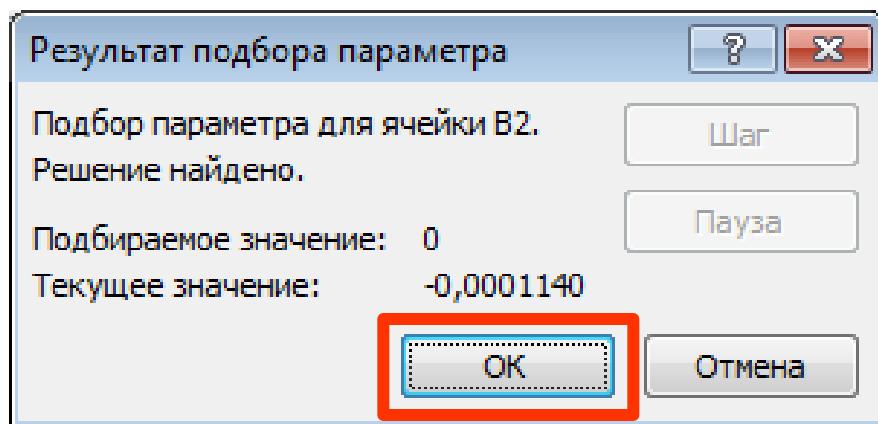
- Formula Bar:** Displays the formula `=COS(4*A2*A2-3*A2-2)`.
- Worksheet Cells:** Cell A2 contains the value `x`, cell B2 contains the value `-0,41615`, and cell A1 contains the value `0`.
- Goal Seek Dialog Box:** The "Подбор параметра" (Goal seek) dialog box is open, with the following settings:
 - Установить в ячейке:** B2 (highlighted with a red box).
 - Значение:** 0 (highlighted with a red box).
 - Изменяя значение ячейки:** \$A\$2 (highlighted with a red box).
 - Buttons:** OK (highlighted with a red box) and Отмена (Cancel).

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$$\cos(4x^2 - 3x - 2) = 0$$

Checking for the result of calculation



The spreadsheet shows the following data:

	A	B
1	x	y
2	-0,12289	-0,00011
3		

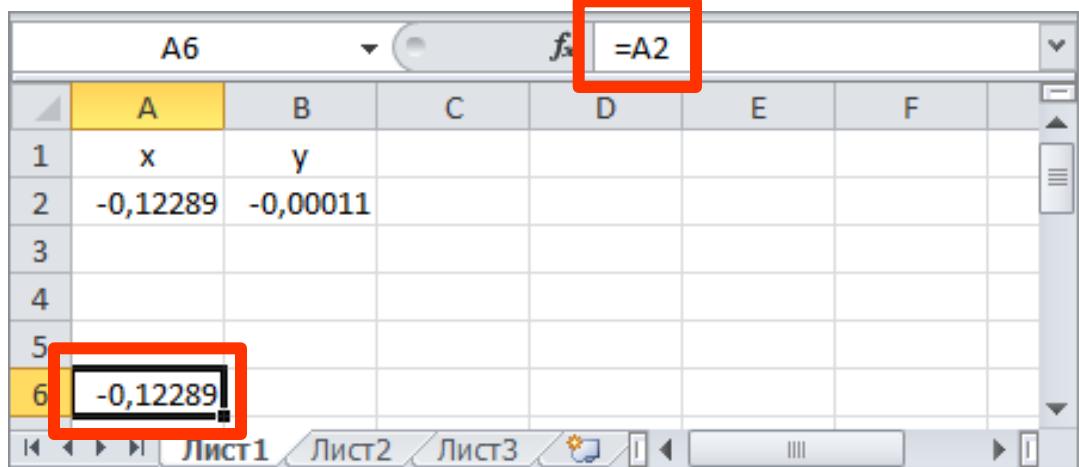
The formula in cell B2 is =COS(4*A2*A2-3*A2-2). The cells containing the values -0,12289 and -0,00011 are highlighted with a red box.

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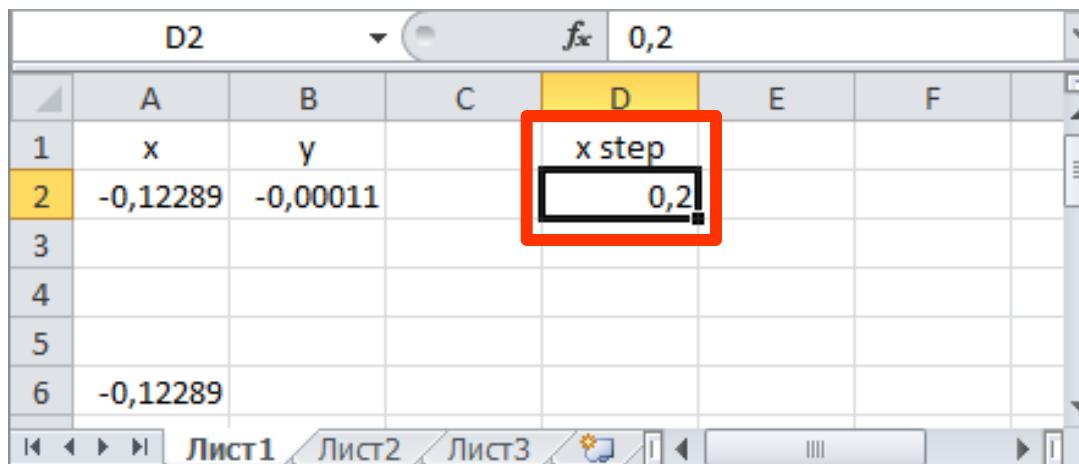
$$\cos(4x^2 - 3x - 2) = 0$$

Setting the link to a result value into the same column



A	B	C	D	E	F
1	x	y			
2	-0,12289	-0,00011			
3					
4					
5					
6	-0,12289				

Setting the step value for the argument



D	A	B	C	D	E	F
1	x	y				
2	-0,12289	-0,00011				
3				x step		
4				0,2		
5						
6	-0,12289					

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$$\cos(4x^2 - 3x - 2) = 0$$

Creating expression to calculate "previous" argument value

	A	B	C	D	E	F
1	x	y		x step		
2	-0,12289	-0,00011		0,2		
3						
4						
5	-0,32289					
6	-0,12289					

Copying expression for argument values on "negative" side

	A	B	C	D	E
1	x	y		x step	
2	-0,12289	-0,00011		0,2	
3					
4	-0,32289				
5	-0,12289				
6	-0,12289				

	A	B	C	D	E
1	x	y		x step	
2	-0,12289	-0,00011		0,2	
3					
4	-0,52289				
5	-0,32289				
6	-0,12289				

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$$\cos(4x^2 - 3x - 2) = 0$$

Creating expression to calculate "next" argument value

A7	B	C	D	E	F
1	x	y		x step	
2	-0,12289	-0,00011		0,2	
3					
4	-0,52289				
5	-0,32289				
6	-0,12289				
7	0,077107				
8					

Copying expression for argument values on "positive" side

A7	B	C	D	E
1	x	y		x step
2	-0,12289	-0,00011		0,2
3				
4	-0,52289			
5	-0,32289			
6	-0,12289			
7	0,077107			
8				

A8	B	C	D	E
1	x	y		x step
2	-0,12289	-0,00011		0,2
3				
4	-0,52289			
5	-0,32289			
6	-0,12289			
7	0,077107			
8	0,277107			

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$$\cos(4x^2 - 3x - 2) = 0$$

Copying expression for all function values

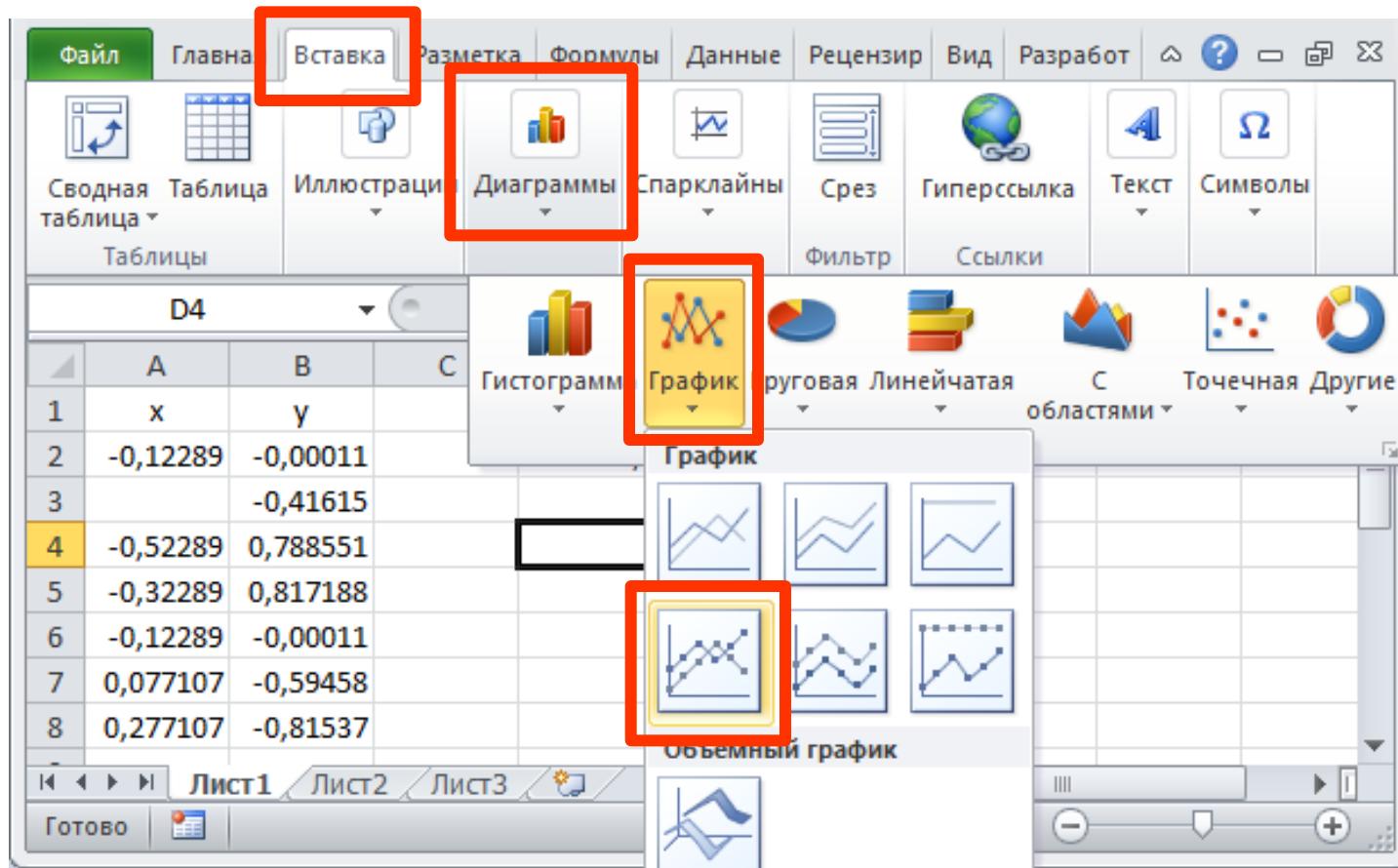
	B2	f _x	=COS(4*A2*A2-3*A2-2)
1	x	y	
2	-0,12289	-0,00011	
3			
4	-0,52289		
5	-0,32289		
6	-0,12289		
7	0,077107		
8	0,277107		

	B8	f _x	=COS(4*A8*A8-3*A8-2)
1	x	y	
2	-0,12289	-0,00011	
3		-0,41615	
4	-0,52289	0,788551	
5	-0,32289	0,817188	
6	-0,12289	-0,00011	
7	0,077107	0,59459	
8	0,277107	-0,81537	

$$\cos(4x^2 - 3x - 2) = 0$$

Running command for a graph creation

Вставка (Insert) > Графики (Charts) > Line with markers



$$\cos(4x^2 - 3x - 2) = 0$$

Running command to link selected graph with data

Chart > RMC > Выбрать данные (Select Data)

The screenshot shows a Microsoft Excel spreadsheet with a chart. On the left, there is a table of data:

	x	y
1	-0,12289	-0,00011
2		-0,41615
3	-0,52289	0,788551
4	-0,32289	0,817188
5	-0,12289	-0,00011
6	0,077107	-0,59458
7	0,277107	-0,81537
8		
9		
10		
11		
12		

A chart is displayed above the table. A context menu is open over the chart area, showing the following options:

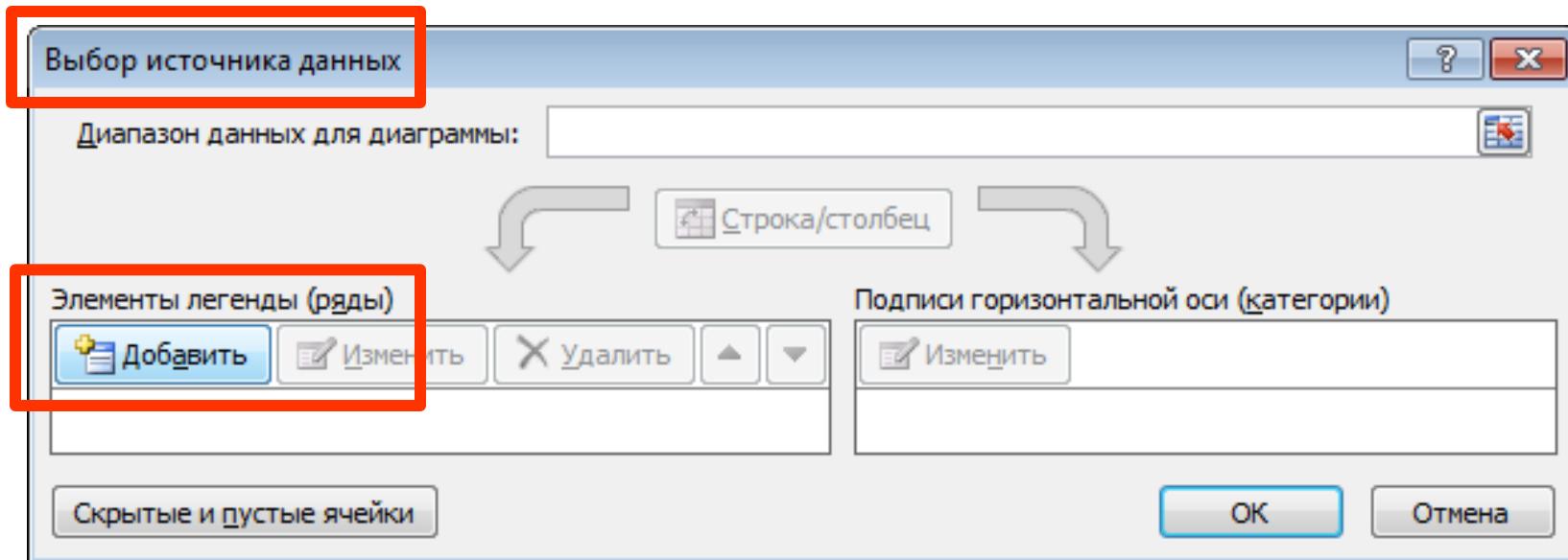
- Вырезать (Cut)
- Копировать (Copy)
- Параметры вставки: (Paste Options)
- Восстановить стиль (Restore Style)
- Шрифт... (Font...)
- Изменить тип диаграммы... (Change Chart Type...)
- Выбрать данные...** (Select Data...)
- Переместить диаграмму... (Move Chart...)

The option "Выбрать данные..." is highlighted with a red box.

$$\cos(4x^2 - 3x - 2) = 0$$

Selection of the tool to specify function values

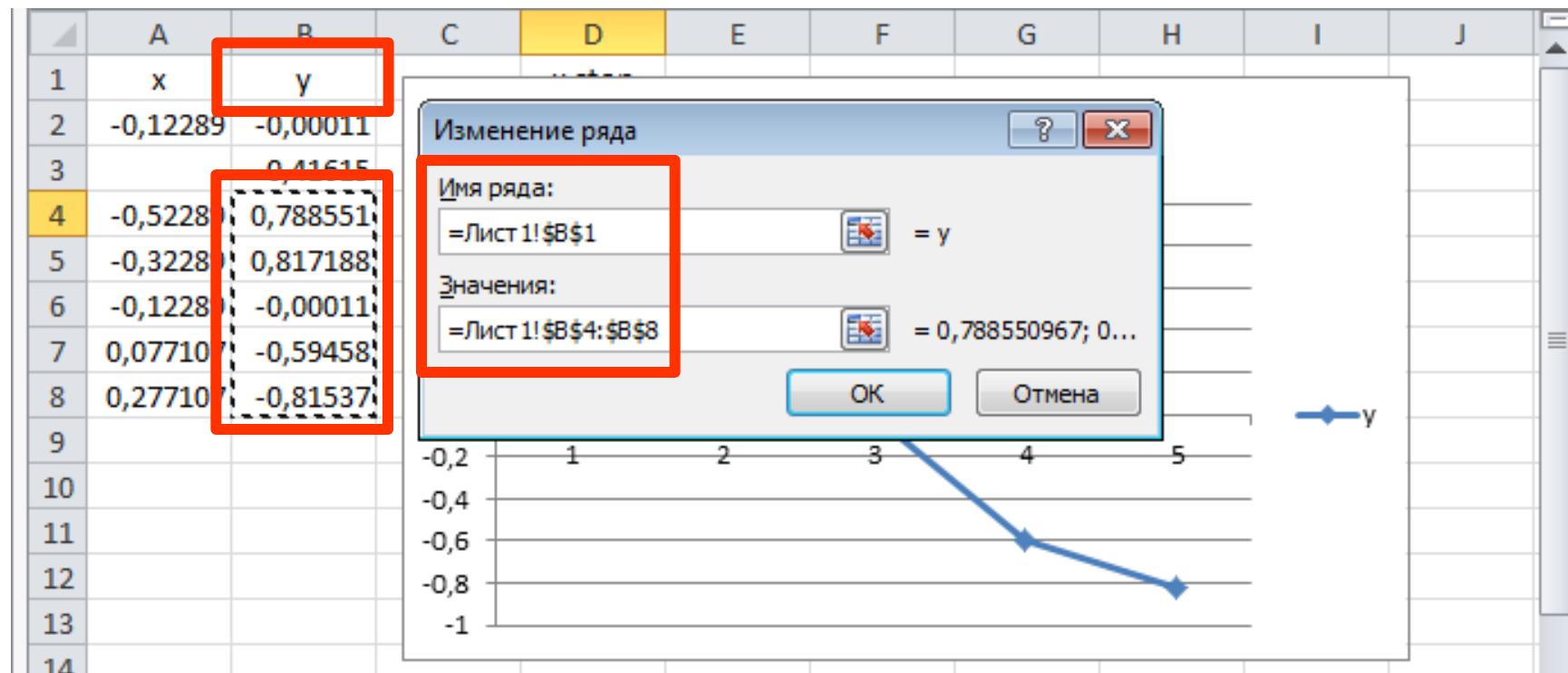
Выбор источника данных (Select data source) > Ряды (Series entries) > Добавить (Add)



$$\cos(4x^2 - 3x - 2) = 0$$

Setting the links to a title of the function and list values

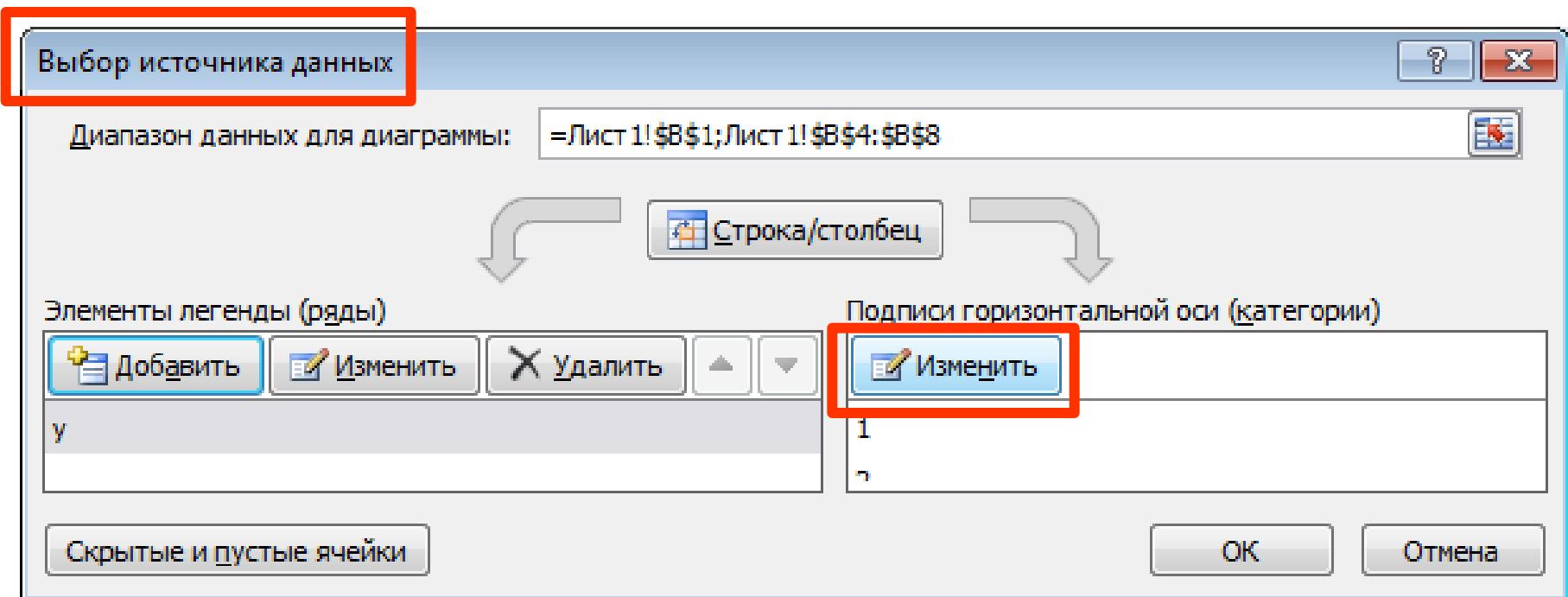
Изменение ряда (Edit series) > Имя ... (Name), Значения (Values)



$$\cos(4x^2 - 3x - 2) = 0$$

Selection of the tool to specify argument values

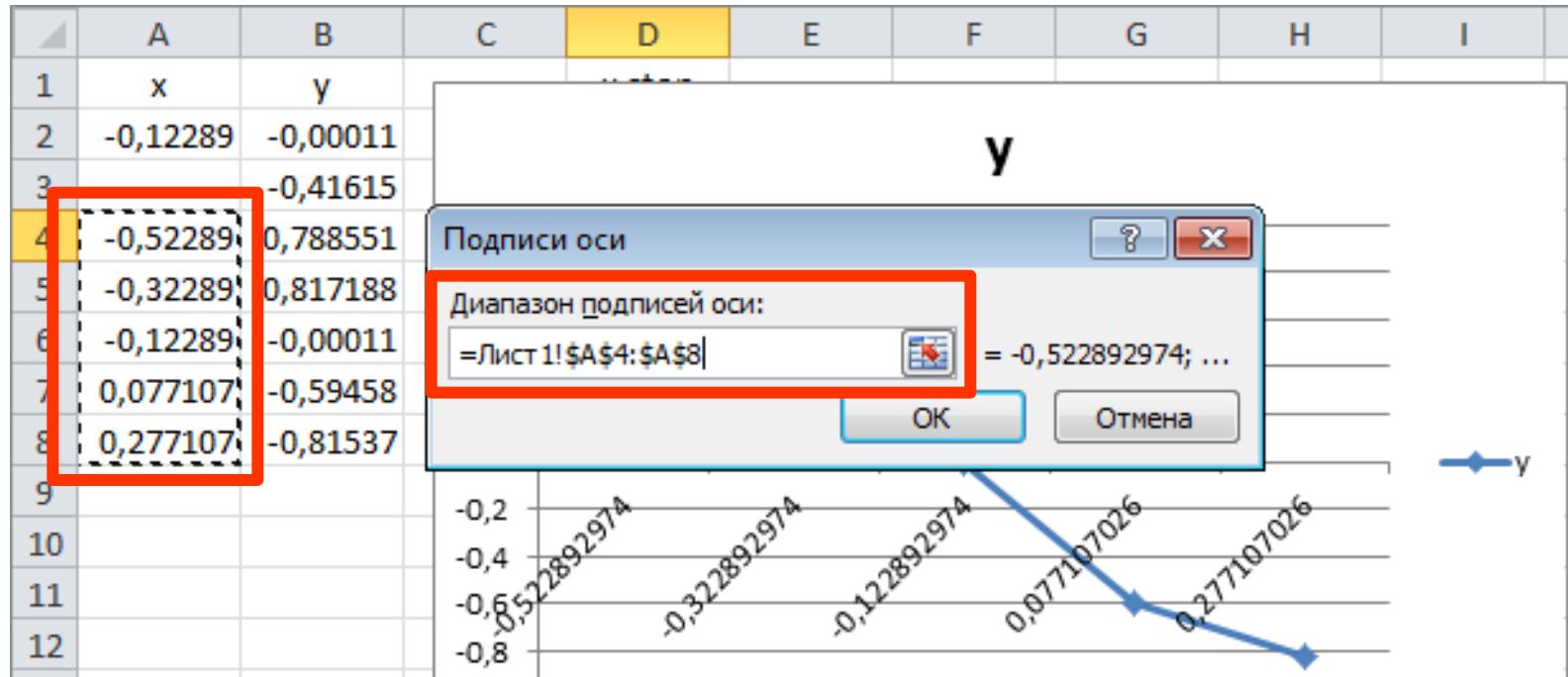
Выбор источника данных (Select data source) > Подписи горизонтальной оси (Horizontal axis labels) > Изменить (Edit)



$$\cos(4x^2 - 3x - 2) = 0$$

Setting links to a list of argument values

Подписи оси (Axis labels) > ...

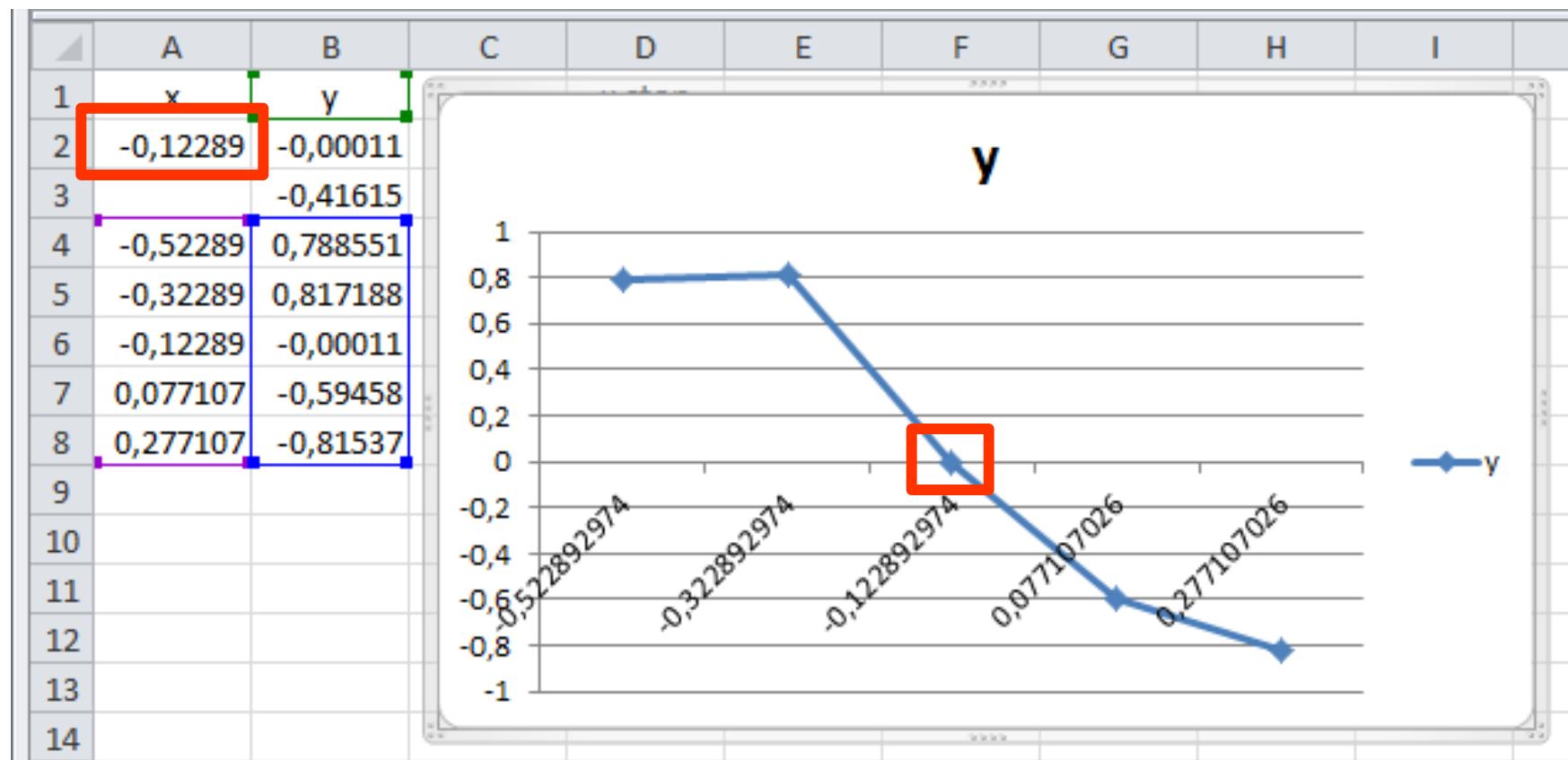


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$$\cos(4x^2 - 3x - 2) = 0$$

Checking the position of equation result (cross between graph and x axis)

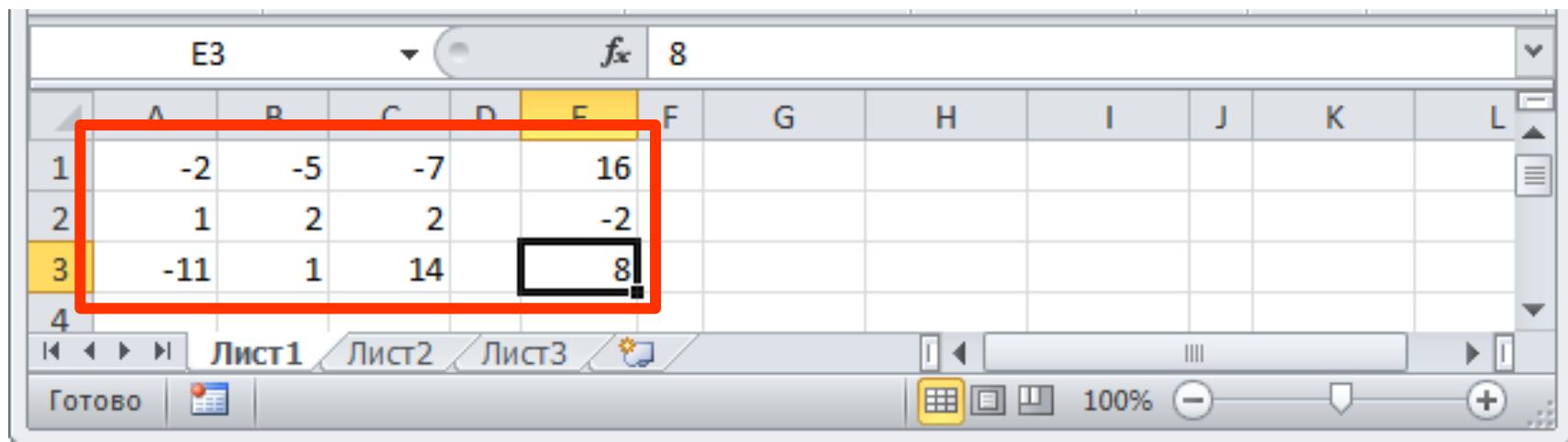


System of equations solving

$$\begin{cases} -2x - 5y - 7z = 16 \\ x + 2y + 2z = -2 \\ -11x + y + 14z = 8 \end{cases}$$

$$AX=b, X=A^{-1}b$$

Typing values of all the system coefficients



	E3				
1	-2	-5	-7	16	
2	1	2	2	-2	
3	-11	1	14	8	
4					

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$$\begin{cases} -2x - 5y - 7z = 16 \\ x + 2y + 2z = -2 \\ -11x + y + 14z = 8 \end{cases}$$

$$AX=b, X=A^{-1}b$$

Making expression to calculate reverse matrix (MINVERSE)

	A	B	C	D	E	F	G	H	I	J	K	L
1	-2	-5	-7		16		-0,78788!					
2	1	2	2		-2							
3	-11	1	14		8							

9. SOLVING MATH TASKS IN MS EXCEL

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$$\begin{cases} -2x - 5y - 7z = 16 \\ x + 2y + 2z = -2 \\ -11x + y + 14z = 8 \end{cases} \quad AX=b, X=A^{-1}b$$

Selecting appropriate region to place reverse matrix

	A	B	C	D	E	F	G	H	I	J	K	L
1	-2	-5	-7		16		-0,78788					
2	1	2	2		-2							
3	-11	1	14		8							

Activating expression field

	A	B	C	D	E	F	G	H	I	J	K	L
1	-2	-5	-7		16		=МОБР(А1:С3)					
2	1	2	2		-2							
3	-11	1	14		8							

9. SOLVING MATH TASKS IN MS EXCEL

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$$\begin{cases} -2x - 5y - 7z = 16 \\ x + 2y + 2z = -2 \\ -11x + y + 14z = 8 \end{cases} \quad AX=b, X=A^{-1}b$$

Using keyboard combination: **CTRL+SHIFT+ENTER**

	G1			f(x)	{=МОБР(A1:C3)}							
	A	B	C	D	E	F	G	H	I	J	K	L
1	-2	-5	-7		16		-0,78788	-1,90909	-0,12121			
2	1	2	2		-2		1,090909	3,181818	0,090909			
3	-11	1	14		8		-0,69697	-1,72727	-0,0303			

Making expression to multiplicate (MMULT) of reverse matrix and free coefficients array

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$$\begin{cases} -2x - 5y - 7z = 16 \\ x + 2y + 2z = -2 \\ -11x + y + 14z = 8 \end{cases}$$

$$AX=b, X=A^{-1}b$$

Selection of appropriate region to place result matrix

	A	B	C	D	E	F	G	H	I	J	K	L
1	-2	-5	-7		16		-0,78788	-1,90909	-0,12121		-9,75758	
2	1	2	2		-2		1,090909	3,181818	0,090909			
3	-11	1	14		8		-0,69697	-1,72727	-0,0303			

Activation of expression field

	A	B	C	D	E	F	G	H	I	J	K	L
1	-2	-5	-7		16		-0,78788	-1,90909	-0,12121		=МУМНОЖ(
2	1	2	2		-2		1,090909	3,181818	0,090909			
3	-11	1	14		8		-0,69697	-1,72727	-0,0303			

9. SOLVING MATH TASKS IN MS EXCEL

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$$\begin{cases} -2x - 5y - 7z = 16 \\ x + 2y + 2z = -2 \\ -11x + y + 14z = 8 \end{cases}$$

$$AX=b, X=A^{-1}b$$

Pressing keyboard combination: **CTRL+SHIFT+ENTER**

	A	B	C	D	E	F	G	H	I	J	K
1	-2	-5	-7		16		-0,78788	-1,90909	-0,12121		-9,75758
2	1	2	2		-2		1,090909	3,181818	0,090909		11,81818
3	-11	1	14		8		-0,69697	-1,72727	-0,0303		-7,93939

Checking results of calculation (from last matrix-column).

	A	B	C	D	E	F	G	H	I	J	K
1	-2	-5	-7		16		-0,78788	-1,90909	-0,12121		-9,75758
2	1	2	2		-2		1,090909	3,181818	0,090909		11,81818
3	-11	1	14		8		-0,69697	-1,72727	-0,0303		-7,93939
4											
5						16					