

Завдання 1

Робота з термінологією

✎ Task 1. Choose 5 terms from your specialty. Translate these terms. Give short explanation to each term. Learn the terms. See example below.

Linear function, Graph, Standard form, Point, Coefficient, Slope, Property, Table, Variable, Straight-line, Lecture, Construct, Cartesian coordinate system, Origin of coordinates, x-axis, y-axis, Scale, Is equal to, Equals, Plus, Minus, 2 multiplied by 2, 2 times 2, Positive number, Negative number, Positive direction, Algorithm, Belong, Infinity, Domain of definition, Range of function, Greater than, Less than, Greater than or equal to, Less than or equal to, Increase, Decrease, Acute angle, Obtuse angle, Right angle, Abscissa, Ordinate, Parallel, Perpendicular, Intersect, Point of intersection, Plane, Satisfy, Substitute, Coincide, General solution, Particular solution, Arbitrary value, Analytical, Graphical, Method of substitution, Method of addition, Empty set, Unique solution.

Лінійна (квадратична) функція, Строга (нестрога) нерівність, Розв'язок рівняння (нерівності, системи рівнянь), Дробово-лінійна нерівність, Метод інтервалів, Різниця квадратів, Сума (різниця) кубів, Квадрат (куб) суми, Квадрат (куб) різниці, Функція, Зведене квадратне рівняння, Дискримінант квадратного рівняння, Квадратична нерівність, Побудова графіка, Графічний редактор, Робота в інтернеті, Пошук інформації, Інструменти, Панель інструментів, Обробка інформації, Зразок, Урок фізики, Заходи безпеки, Лабораторна робота, Рідина, Тверде тіло, Середовище, Електричний ток, Діелектрик, Електропроводка, Навколишнє середовище.

♣ Example to the task 1.

Mathematics lesson: A structured educational session where students learn mathematical theories as set of mathematical sentences – definitions, theorems, axioms, and their applications.

Safety measures: Precautions and procedures followed to ensure a safe environment, especially during experiments, to prevent accidents and injuries.

Laboratory work: Practical experiments or investigations conducted in a laboratory to explore scientific concepts, gather data, and validate theories.

Liquid: A state of matter with a definite volume but no fixed shape, able to flow freely and take the shape of its container.

Solid: A state of matter characterized by a fixed shape and volume, with particles arranged in a structured and closely packed manner.

Medium: The material or substance through which energy, waves, or particles travel; it can be solid, liquid, or gas.

Electric current: The flow of electric charge, usually through a conductor, measured in amperes (A).

Dielectric: An insulating material that does not conduct electricity but can be polarized in an electric field, often used in capacitors.

Electrical wiring: A system of insulated conductors and devices used to transmit electrical power within buildings or equipment.

Environment: The surrounding natural world, including air, water, soil, and living organisms, affecting and being affected by human activities.

✍ **Task 2. Make sentences using selected terms.**

✍ **Task 3. Fill in the gaps in the text**

Linear function.

Introduction. The theme is called Linear function. The linear _____ is used in the different sections of mathematics and other natural sciences.

Body. The standard form of the linear function is $y = ak + b$, where $a, b, k \in R$. The graph of the linear function is the _____, k is called the _____ of the straight line. As is known, the straight line can be constructed using two points.

For example, draw the graph of the function $y = 2x - 3$. In order to obtain the _____ of two points we are going to use the table.

x	0	1
y	-3	-1

In order to fill the table we take any value of x and evaluate the corresponding value of y using the formula $y = 2x - 3$. Now we have coordinates of two points $A(0, -3)$ and $B(1, -1)$. Let us draw Cartesian coordinate system. It consists of origin of coordinates, two perpendicular axes: x -axis and y -axis with the indicated positive directions of these _____. We mark the obtained points $A(0, -3)$ and $B(1, -1)$ on the Cartesian coordinate system and construct the straight line through these points.

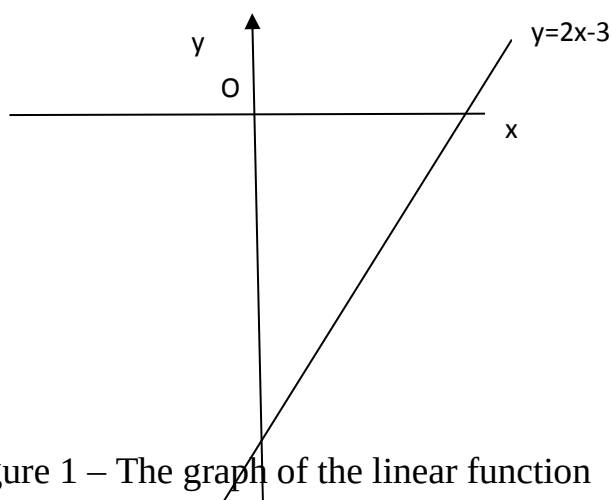


Figure 1 – The graph of the linear function

Let us consider the main _____ of the linear function.

Properties:

1. The domain of definition: $x \in (-\infty, +\infty)$.
2. The range of function $y \in (-\infty, +\infty)$.
3. If $k > 0$, then the function _____. The angle between the straight line and x -axis is _____ angle. If $k < 0$, then the function _____. The angle between the straight line and x -axis is _____.

Let us consider the examples.

1. Does the point $A(7,2)$ belong to the graph of the function $y = 2x - 3$?

Solution.

In order to answer this question it is necessary to substitute the coordinates of the point A into the _____ $y = 2x - 3$. We obtain $2 = 2 \cdot 7 - 3$. This equality is _____, hence, point A does not belong to the graph of the function $y = 2x - 3$.

2. Find such point on the straight-line $y = 2x - 3$:

- abscissa of which is equal to 7;
- ordinate of which is equal to 5.

Solution.

In order to find _____ of the point it is necessary to substitute 7 instead of x into the function $y = 2x - 3$. After the substitution we have $y = 2 \cdot 7 - 3 = 11$. In order to find _____ of the point it is necessary to substitute 5 instead of y into the function $y = 2x - 3$. After the _____ we have $5 = 2 \cdot x - 3$.

From here $x = \frac{5+3}{2} = 4$. Finally we obtain two points $K(7,11)$, $L(4,5)$.

Let us consider two _____ $y = k_1x + b_1$ and $y = k_2x + b_2$. As we have already mentioned above k is called the_____.

If $k_1 = k_2$ then the straight-lines are parallel. If $k_1 \neq k_2$ then the straight-lines intersect.

3. Find the point of intersection of the straight-lines $y = 2x - 3$ and $y = -3x + 2$.

Solution.

The point of intersection is the _____ point, hence, we are going to solve the following _____ $\begin{cases} y = 2x - 3 \\ y = -3x + 2 \end{cases}$. Let us equate the left-hand sides of the equations $2x - 3 = -3x + 2$. From here we have. Then we substitute $x = 1$ into the first _____ and obtain $y = -1$. Hence, we obtain the point of intersection $P(1,-1)$.

Conclusions. In this report we have considered the basic data, related to the theme Linear functions, the main properties and the solutions of the simplest problems.

Glossary:

linear function – лінійна функція; standard form – загальний вигляд; slop – кутовий коефіцієнт; graph – графік; straight line – пряма; point – точка; right angle – прямий кут; acute angle – гострий кут; obtuse angle – тупий кут; to increase – зростати; to decrease – спадати; Cartesian coordinate system – декартова ситема координат	origin of coordinates – початок координат; point of intersection – точка перетину; to substitute – підставляти; equation – рівняння; parallel – паралельний; abscissa – абсцисса; ordinate – ордината; equality – рівність; domain of definition – область визначення; range of function – область значення
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Homework

✎ Task 4. Make the report (7 – 10 min) on the given theme, using the terms from task 1 topic 1. Follow the general structure of the report. See example below.

- Розв'язання систем лінійних рівнянь з двома невідомими.
- Лінійні нерівності з одним невідомим.
- Системи лінійних нерівностей з одним невідомим.
- Дробово-лінійні нерівності.
- Метод інтервалів.
- Формули скороченого множення.
- Квадратична функція.
- Розв'язання квадратних рівнянь.
- Розв'язання квадратичних нерівностей.
- Класифікація тестових завдань з математики, вимоги до формулювання.
- Вимоги до оформлення математичного тексту в редакторі Word.
Вимоги до анотації наукової статті з математики.

✎ Task 5. Classify the terms from Task 1 according to the classification from the theory.

✎ Task 6. Read the text «Solution by Cramer's rule» using the following link. Classify the terms according to the classification from the theory.

https://uomus.edu.iq/img/lectures21/MUCLecture_2024_4519375.pdf.