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# The Concept of Size and Measurement

**Usmonov Makhsud**

Tashkent University of Information Technologies, Karshi branch 3rd year student
+99891 947 13 40
***maqsudusmonov22@gmail.com***

***Abstract:*** *This article provides examples and problems on the concept of size and their measurement, which is one of the most important topics in mathematics. Length, surface, mass, speed, price are the dimensions. The first acquaintance with them takes place in elementary school, where, along with the large number, it becomes a leading concept. Quantities are special properties of events.*

**Keywords:** Determining the equality or inequality of a link by direct comparison of sizes, development of science and technology, International System of Units (SI) science, technology, national economy and education.

## INTRODUCTION

### 1. Goals and objectives of the topic.

For example, the distance between objects is called the length. When we talk about the lengths of specific objects, the sizes represent the same properties of a set of objects. Different sex sizes represent different properties of objects. For example, length and surface are different sex sizes.

Length, surface, mass and other dimensions have the following properties: <

1. For two of the same size of any kind, either equal, or one smaller than the other. More precisely, for homogeneous quantities, the relations "equal", "small" and "large" are appropriate and arbitrary, and only one is correct.

For example, the length of the hypotenuse of a right triangle is greater than the length of any side of the triangle, the mass of an apple of 10 kg is less than the mass of a watermelon of 15 kg, the opposite sides of a rectangle are equal in length, and so on.

2. It is possible to add a homogeneous quantity, the result of which is determined by a single value, which is called the sum of the quantities.

3. The size is multiplied by the real number to get the same size. There is a single size for any size and any non-negative real number.

4. Homogeneous quantities are subtracted, where the difference in quantities is determined by the sum.

5. Homogeneous quantities are divisible by dividing the quantities by the product of the numbers.

## METHODS

### 2. Methods of problem solving.

By directly comparing the sizes, it is possible to determine whether the link is equal or not. To get a more accurate result of the test, for example, to find out how much the mass of one object is greater than the mass of another, it is necessary to measure the magnitudes. A measurement is a comparison of a given quantity. The comparison process depends on the type of size being considered. Another size for length, another for surface, another for mass, and so on. However, regardless of the process, the measurement takes on a certain number of values per unit of measurement.

If the quantity a is given and the unit e is chosen, then the measurement of the quantity a gives a real number x such that a = X'e. This number x is called the numerical value of the quantity a in units of quantity e.

Any quantity can be written as a product of a number and a unit of that quantity. For example, multiplying a number by a number can justify the transition from one unit of size to another. For example, length, surface area, volume, and mass are examples of quantities that can be fully determined by a single numeric value.

In mathematics, in addition to scalar quantities, vector cavities are also considered. To describe a vector quantity, it is necessary to indicate not only its numerical value, but also its direction. Power, acceleration, electric field strength, and so on are vector quantities.

We only look at quantities that have a positive numerical value. Measuring quantities, comparing them, comparing numbers, comparing operations with quantities, comparing them with corresponding operations on numbers.

1. If the response values are measured in units of size e, the relationship between the response values is colored as the relationship between the numerical values of the link, and vice versa. For example, if the mass of two bodies is a = 5 kg, b = 3 kg, then the mass of a is greater than the mass of b, because 5> 3.

2. If the answer values are in units of e, then it is sufficient to add the numerical values of the quantities a and b to find the numerical value of the sum.

People have already realized that it is necessary to open different sizes, and at the same time, to open as accurately as possible. On the basis of precise openings serve convenient and understandable units of size, as well as clearly selected units of these units. The accuracy of the selected units, in turn, determines the level of development of science, technology and industry in the country.

The oldest period is the period of time measured in parts of the human body. For example, the unit of length in this period is s palms (four toes wide without the big toe), elbow (elbow length), feet (the length of the sole of the foot) and others were used in the expression.

In the later stages of the development of units of magnitude, interconnected units were introduced. For example, in Russia, the unit of length is miles, miles, 1 mile, and 7 miles is 1 mile.

In the fourteenth and sixteenth centuries, with the development of trade, objective units of quantification began to emerge. Gram (spike mass) was used as the unit of mass. However, the relationship between the units of magnitude was optional. Not only countries, but also different sectors within a country have their own units of length, surface area and mass. In France, in particular, the units of size varied, where each feudal lord had his own measurements within his domination. At the end of the 18th century, during the Great French Revolution, a new system of unity emerged in France - the International System. The basic unit of length in this system is the meter - one of the 40 millionth of the length of the Earth's meridian passing through Paris. In addition to meters, ar is the area of a square with side length of 10 m; liter - the volume of liquid and scattering bodies equal to the volume of a cube with an edge length of 0.1 m; gram is the mass of pure water in a cube with an edge length of 0.01 m

Units such as Also, the decimal multiple and fractional units formed using the prefix: mil (10 "'), kilo (103), hecto (102), deca (10'), deci (10_1), santi (10) -2), national (10_3) were included.

The unit of mass is defined as the mass of 1 dm3 of water at 40 ° C per kilogram.

Because all units of magnitude are closely related to the unit of length, the new system of quantities is called the metric system of measurements.

For the first time in history, there is a coherent system of measurements based on a pattern taken from nature and inextricably linked to the decimal number system. But soon the system had to be changed. This is due to the fact that the length of the meridian is not calculated accurately, and with the development of science and technology, it has become clear that the value of this magnitude can be clarified. Therefore, it is necessary to abandon the unit of length derived from nature.

In Russia, the metric system of measurements began to be used in 1899, at the same time as a special law developed by the famous Russian scientist DI Mendeleev.

In 1921, the International Units of Measurement and Weight were adopted to strengthen cooperation in improving the unit system of size.

The rapid development of science and industry in the twentieth century led to the emergence in the 1950s of a system of various units that complemented and developed the metric system of measurement. There was a problem building a single size system.

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The International Committee of Weights and Measures has done a great job in solving this problem. In 1960, the XI General Conference on Weights and Measures solved this problem with the introduction of the International System of Units (SI).

The International System of Units (SI) is a single system of practical units for all areas of science, technology, economics and education. Due to the high demand for such a system, which is unique for the whole world, it soon became popular and spread all over the world.

The system has seven basic units (meters, kilograms, seconds, amperes, kelvins, moles, and candelas) and two additional units (radians and steradians).

It is known that the unit of length is the meter, and the unit of mass is the metric system of kilograms.

The meter is considered to be the path of an electromagnetic wave in a vacuum (in airless space) in seconds. This definition of metming is due to the growing demand for measurement accuracy, as well as the desire to have a unit of magnitude that exists in nature and remains unchanged under any circumstances.

Unit of mass - the definition of the kilogram has not changed, the kilogram is a cylindrical mass made in 1889 from a mixture of platinum and iridium.

The third basic unit of the international system is the unit of time - the second. It originated much earlier than the meter.

Until 1960, the second was considered to be equal to the part of the solar day, ie the second was defined as the rotation of the Earth around its axis. This was done in order to maintain the normal relationship between the different units of time. In this definition, there are 86,400 seconds per day, which is 1,440 minutes or 24 hours.

In 1960, the General Conference of Weights and Measures decided to move to a unit of time based on the Earth's orbit around the Sun. Seconds were taken as part of the year. This takes into account the fact that the average number of sunny days varies a was obtained and its accuracy was greatly increased. But even this did not satisfy the scientists. In 1967, the second was described as follows: "The second is 9192631770 times the period of radiation corresponding to the transition between the two ultra-thin surfaces of the basic state of the cesium 133 atom."

In general, the development of science and technology is constantly making adjustments to the definition of units of magnitude.

In practice, it is inconvenient to measure the length in meters, the mass in kilograms, and the time in seconds. Therefore, new units are created from the basic units that are multiple and proportional to them. Units are 10, 102, 103, 106, 109, 1015, 1012, 1018 times larger than basic units, share units are 10_l,

10-2, 10-3, 10-6, 10-9, 10-12, 10-15, 10 ”is equal to 18 parts. The new names of Birlildaming are formed from "meters", "grams", "seconds" and the addition of prefixes: For example, the unit of kilometers, 1 km = 103 m, 11 = 1000 kg; millimeter fraction unit, 1 mm = 10-3 m = 0.001 m.

In general, multiple units for length - kilometers (km), fractional units - centimeters (cm), millimeters (mm), micrometers (μm), nanometers (nm); multiple units for mass - megagram (mg), fractional units - gram (g), milligram (mg), microgram (mkg); multiple times for time - kiloseconds (ks), fractional units - milliseconds (ms), microseconds (ms), nanoseconds (ns).

Quantities determined by length, mass, and time are called derivative quantities.

Let's look at some derivative quantities and their units.

1. Units of surface are square meters (m2), square kilometers (km2), square decimeters (dm2).

2. Units of volume are cubic meters (m3), cubic decimeters (dm3), liters (/), hectoliters (gl), milliliters (ml).

3. Speed units are meters per second (m / s), kilometers per hour (km / h), centimeters per second (cm / s).

The units of sizes used in our country, their names, designation and rules of use are determined by the International System of Units (SI). In particular, the unit of ton (t) for mass; minute (min), hour, day, week, month, year, century for time; hectare (ha) for surface, Celsius (° C) units for temperature are allowed.

## RESULTS

In the fourteenth and sixteenth centuries, with the development of trade, objective units of quantification began to emerge. Gram (spike mass) was used as the unit of mass. However, the relationship between the units of magnitude was optional. Not only countries, but also different sectors within a country have their own units of length, surface area and mass. In France, in particular, the units of size varied, where each feudal lord had his own measurements within his domination. At the end of the 18th century, during the Great French Revolution, a new system of unity emerged in France - the International System. The basic unit of length in this system is the meter - one of the 40 millionth of the length of the Earth's meridian passing through Paris. In addition to meters, ar is the area of a square with side length of 10 m; liter - the volume of liquid and scattering bodies equal to the volume of a cube with an edge length of 0.1 m; gram is the mass of pure water in a cube with an edge length of 0.01 m

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## DISCUSSION

In 1921, the International Units of Measurement and Weight were adopted to strengthen cooperation in improving the unit system of size.

The rapid development of science and industry in the twentieth century led to the emergence in the 1950s of a system of various units that complemented and developed the metric system of measurement. There was a problem building a single size system. The International Committee of Weights and Measures has done a great job in solving this problem. In 1960, the XI General Conference on Weights and Measures solved this problem with the introduction of the International System of Units (SI).

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## CONCLUSION

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