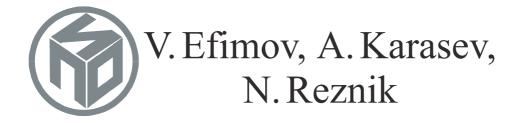
V. Efimov, A. Karasev, N. Reznik

The primary notions about the translations of the mathematical texts

The first edition The shares and the parts of the whole

The visual practical work

Saint-Petersburg 2006



The primary notions about the translations of the mathematical texts

The first edition The shares and the parts of the whole

The visual practical work

Saint-Petersburg 2006

УДК 811.111 (075.8) ББК 81.2 Англ - 923 Е 91

Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. - Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. - 48 c.

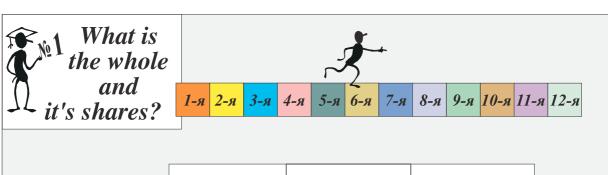
ISBN 5-88476-681-5

- © Виталий Витальевич Ефимов, 2006
- © Андрей Александрович Карасев, 2006
- © Наталия Александровна Резник, 2006
- © Концепция, дизайн и графика Н.А. Резник



The questions to the content of the slide-films

1.	What is the whole and its shares 4
2.	<i>Into how many shares the whole may be divided</i> 5
3.	How to see and to count shares of the whole 6
4.	How to paint the halves and the quarters of a circle 7
5.	Which shares of the whole are famous 8
6.	How are the parts of the whole designated 9
7.	How to write the whole according to its share 10
8.	What methods may be used
	for the writing of the whole
9.	How are the different shares
	of one whole compared
10	
11	. How is an instrument
	for measuring angles constructed
12	. How are the angles measured
	with the help of a protractor



	the whole	[houl]	целое
	check	['Cek]	клетка
Читай и запоминай!	count	['kaunt]	считать
*	equal	['Jkwql]	равный
	part	['pRt]	часть
	quantity	['kwOntiti]	количество
	share	['SFq]	доля

№ BЫБЕРИТЕ OTBET

 это задача с несколькими ответами, среди которых один или несколько

могут оказаться верными.

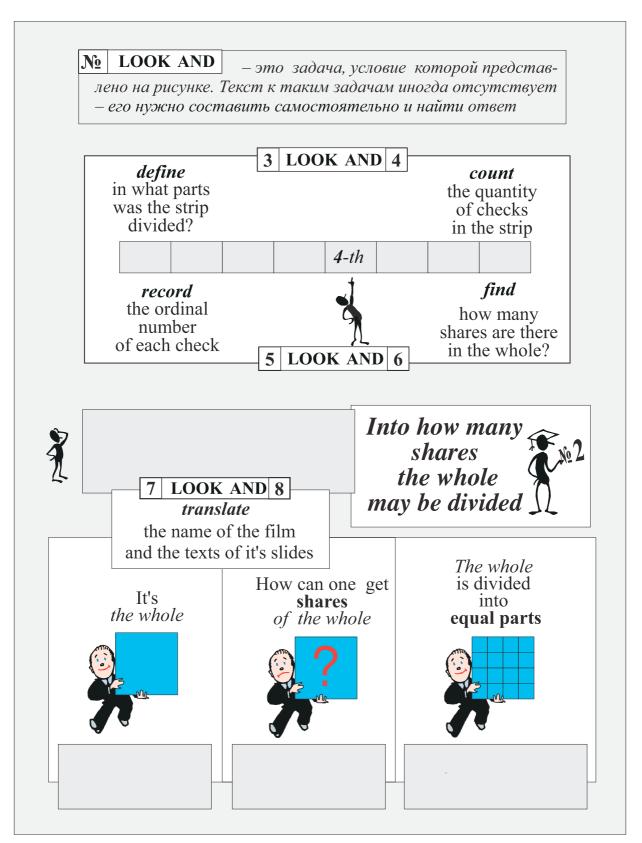
Выберите правильный ответ и отметьте его номер.

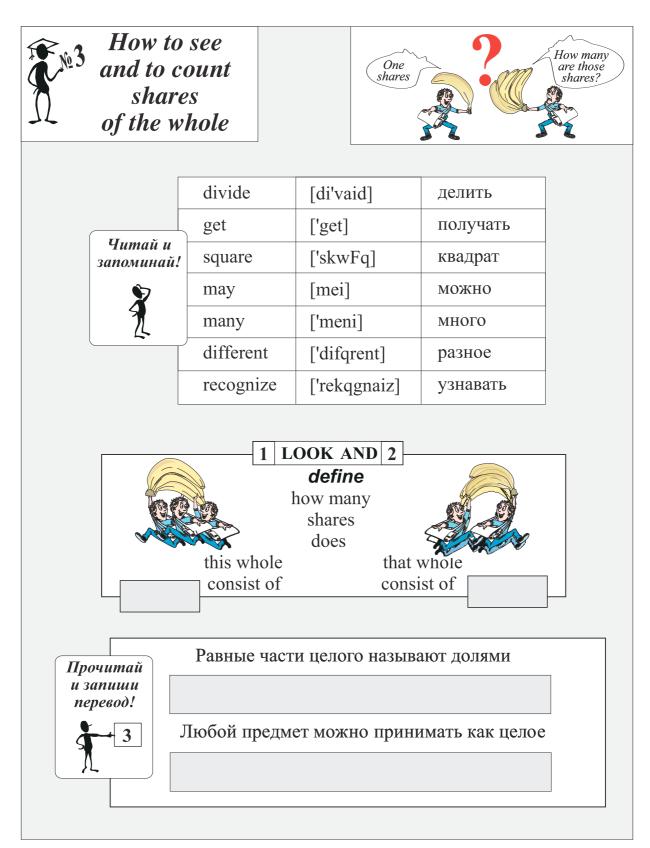
CHOOSE

The ordinal	TI	HE ANSWE	$ \mathbf{R} ^2$
numeral	A	-rst	A
the first in the abbreviated	В	-st	В
record is written	С	-nd	С
with the ending	D	-ird	D
	E	-rd	F -

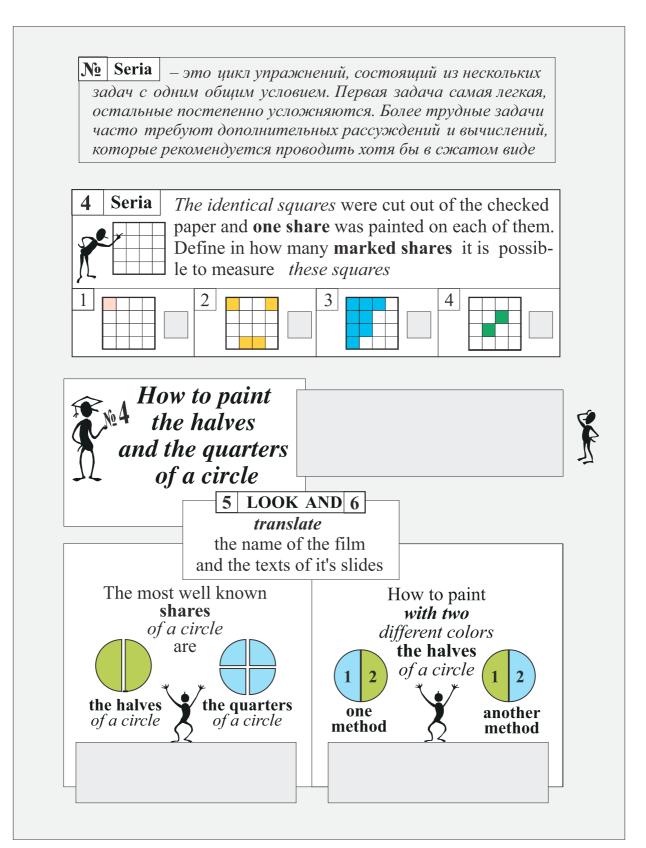
The ordinal numeral the third in the abbreviated record is written with the ending

Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.

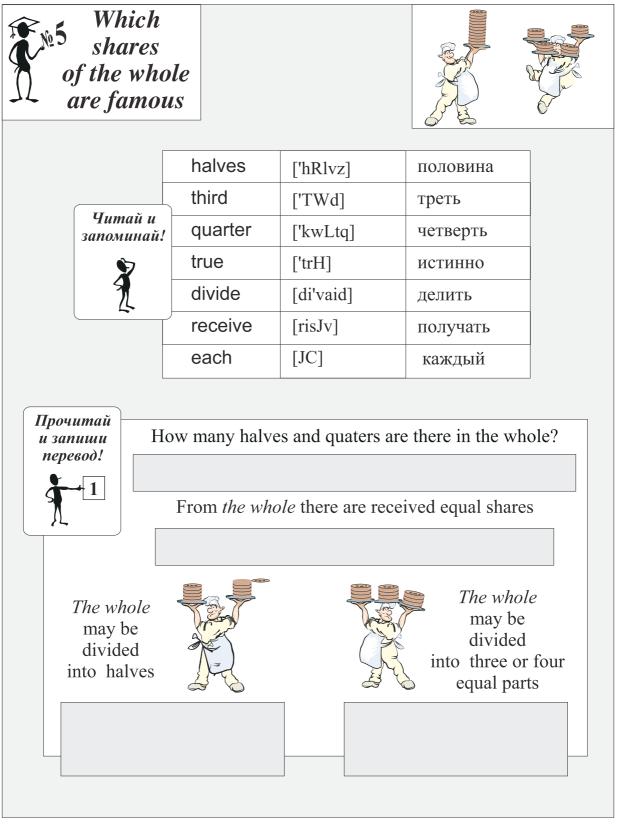




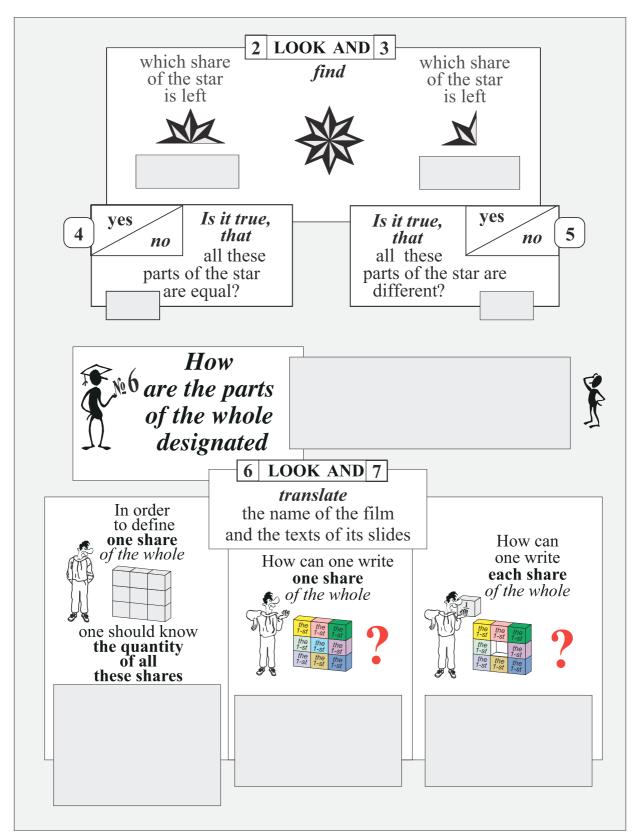
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



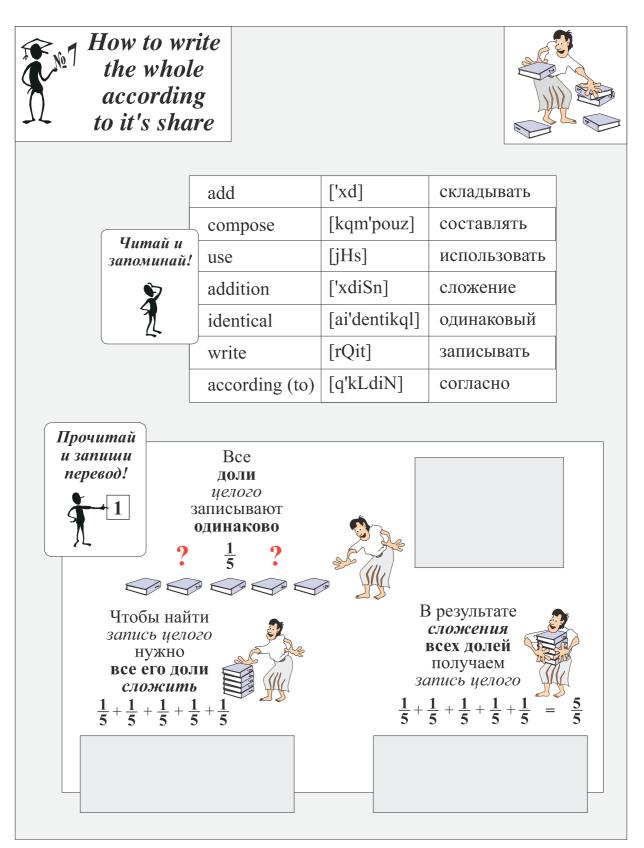
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



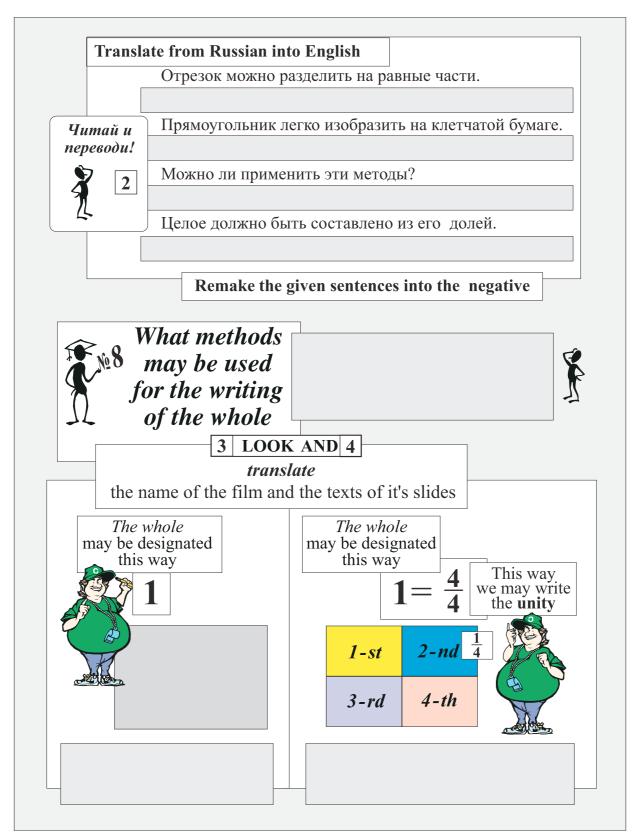
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.

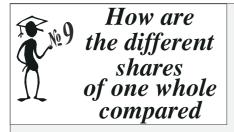


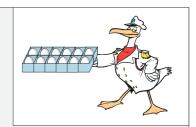
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



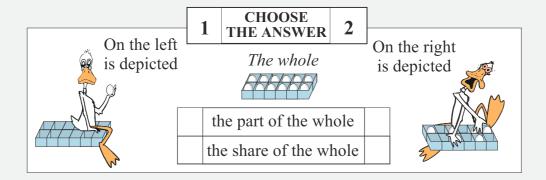
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.







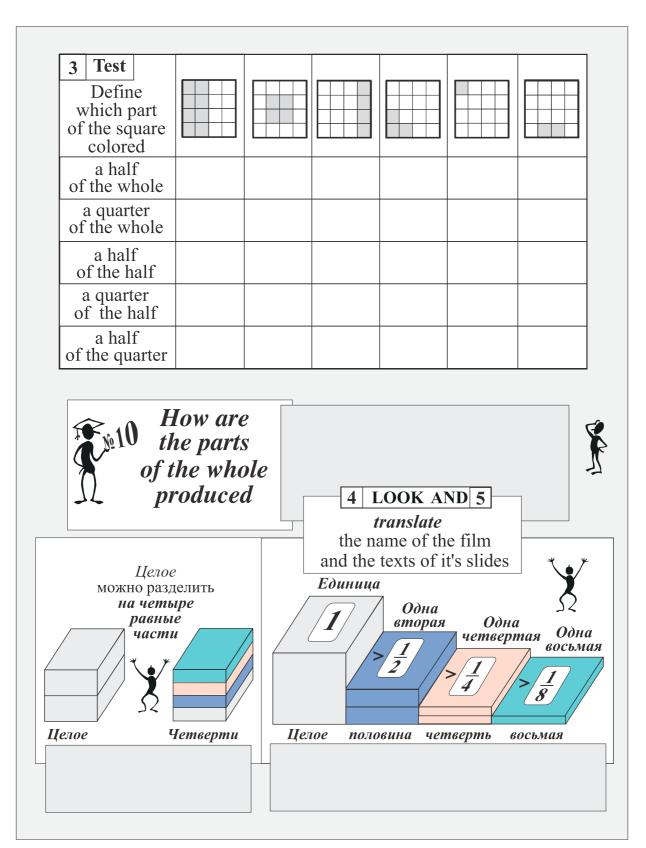
	compare	[kqm'pFq]	сравнивать
	define	[di'fain]	определять
Читай и запоминай!	divide	[di'vaid]	делить
>	produce	[prq'djHs]	получать
1	choose	[CHz]	выбирать
	eighth	['eitT]	восьмая
	the unity	['Hniti]	единица



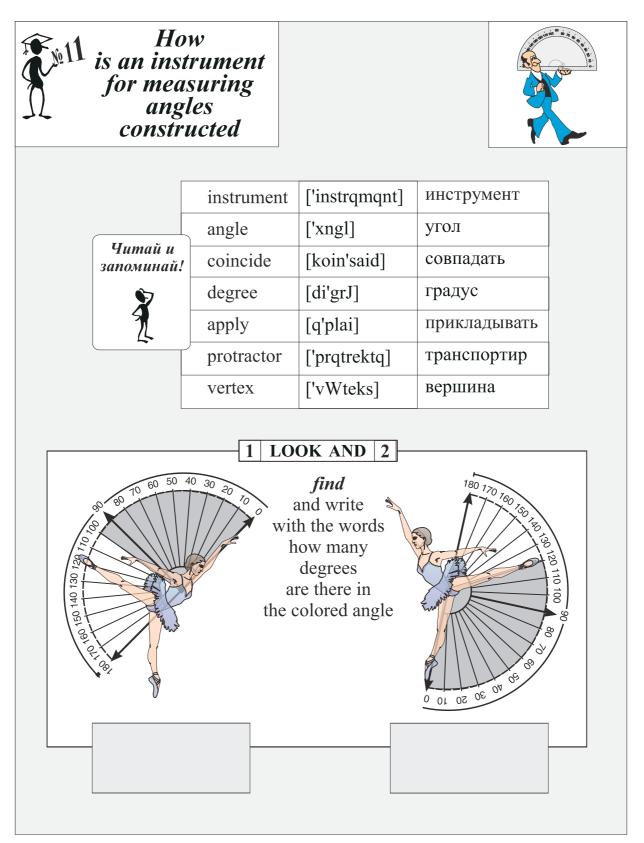
№ Test — это комплект задач, представленных в виде таблицы. В столбце слева даны условия, в строке сверху — ответы. Один ответ может подходить к нескольким заданиям, одной задаче могут соответствовать несколько ответов. Если ответа к задаче нет — найдите его самостоятельно.

Переписывать тест не нужно.Поставьте крестик в той клетке таблицы, которая соответствует самой задаче (по вертикали) и ответам к ней (по горизонтали)

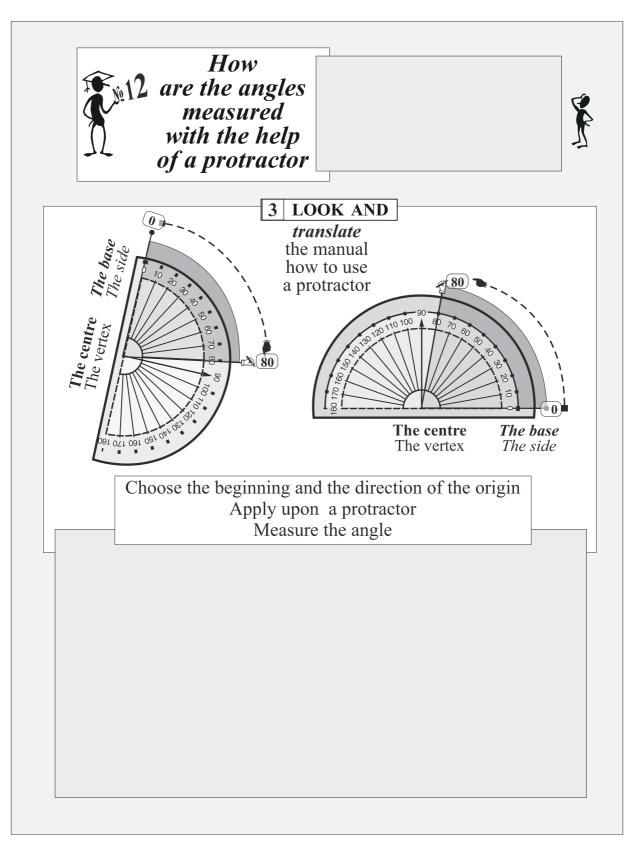
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



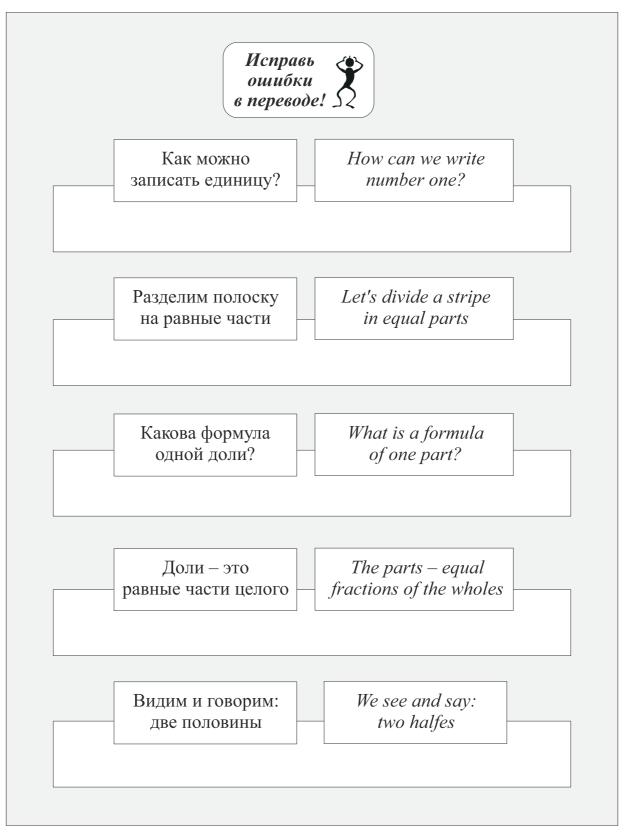
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.

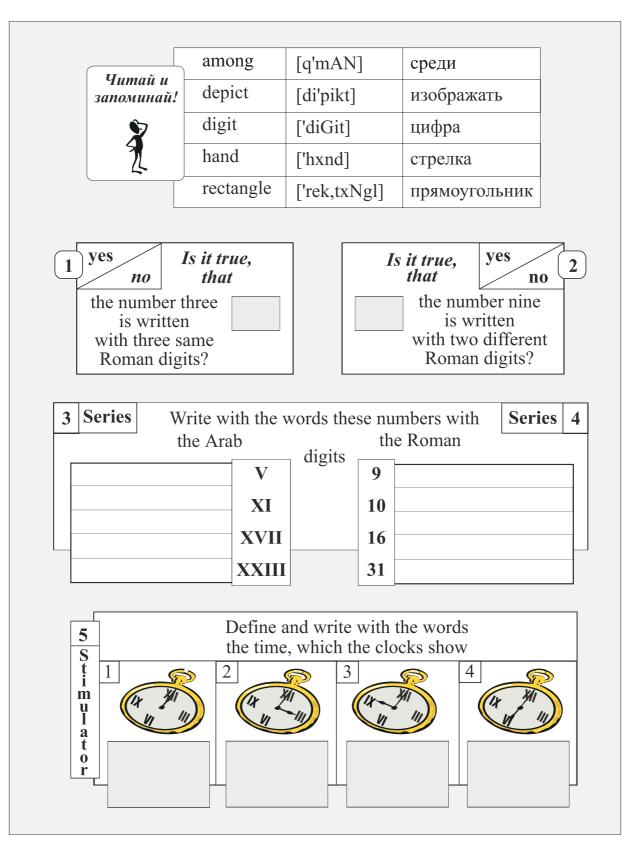


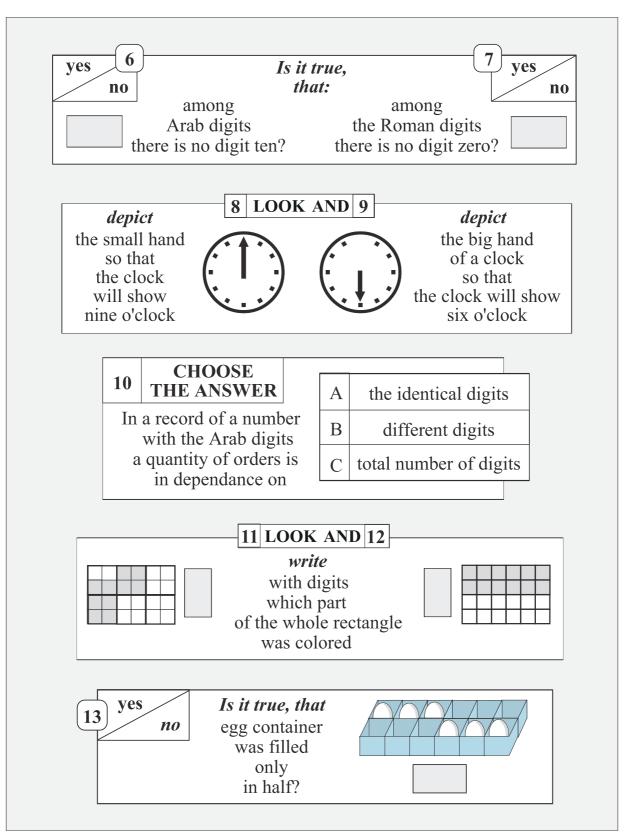


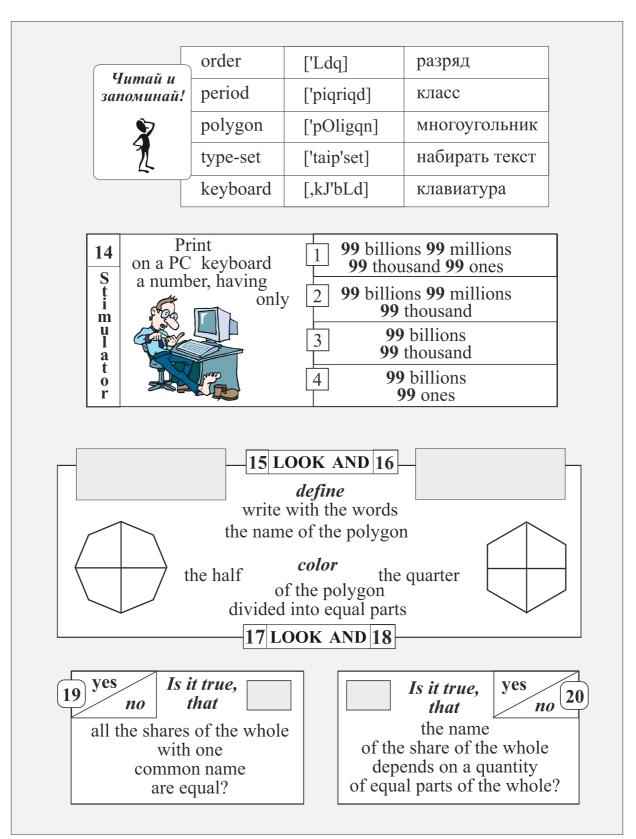
The preparatory exercises for the reading of the mathematical texts

1.The visual tasks № 1-6	18
2. The visual tasks № 7-13	19
3. The visual tasks №14-20	20
4.The visual tasks №21-25	21
5.The visual tasks №26-30	22
6.The visual tasks № 31-40	23
7. The visual tasks №41-45	24
8. The visual tasks №46-51	25
9. The visual tasks №52-55	26
10 The visual tasks №56-62	27
11.The visual tasks №63-68	28
12.The visual tasks №69-77	29
12.The visual tasks №78-81	30

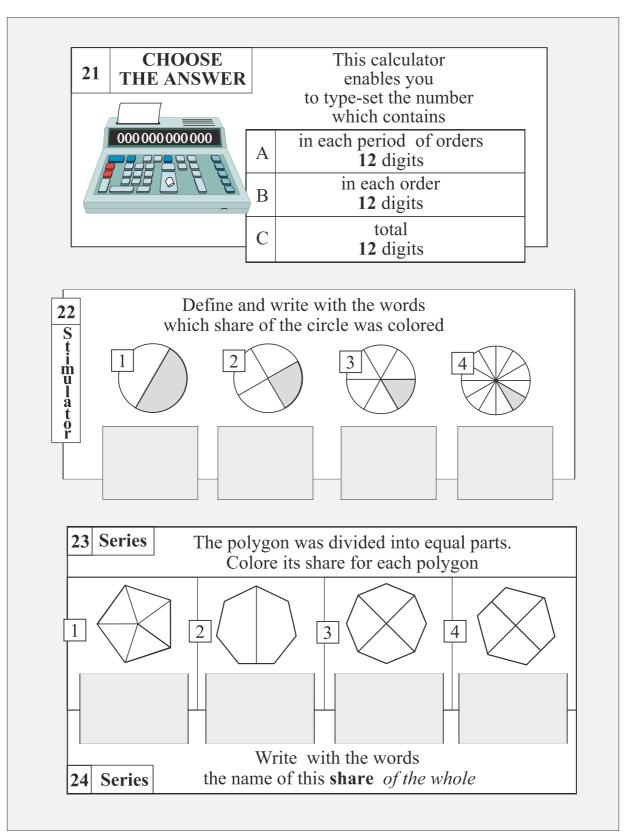
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.







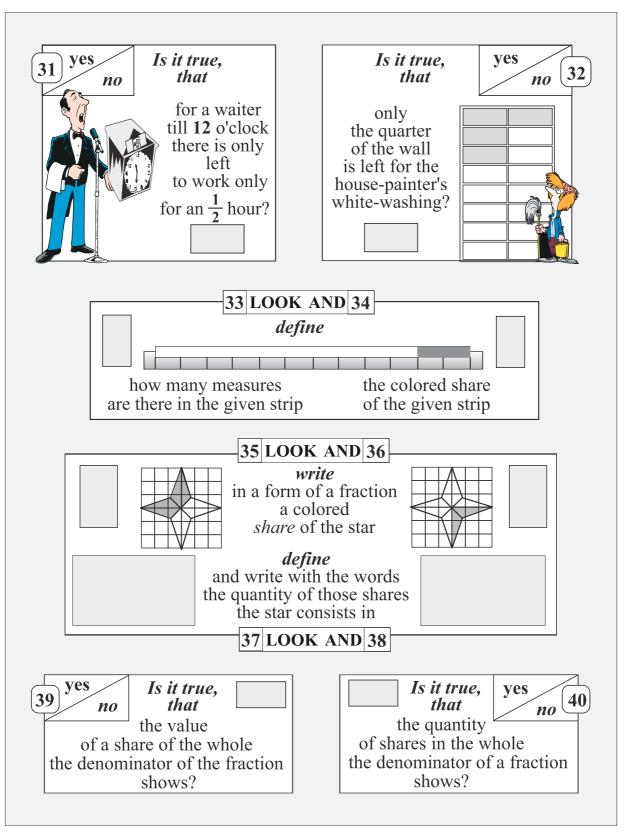
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.

	length	['16	eNT]		ДЛ	ина		
Читай и запоминай!	width	['v	vidT]		ширина высота			
•	height	['h	ait]					
9	circle	['s	'sWkl] круг					
	intercept	[ir	itesep	t]	ОТ	резо	К	
yes Is	it true,							
fo into a m may be seemed a ma	r any ercept easure e chosen? B True, that for any cept share measure may be hosen?		C ly:	to che a meason the for the last a la	it true, that point, no a straight line, les the line alves?			
	d the formula							
of a equals of	share, ne $\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{30}$	$\frac{1}{40}$	1/4	$\frac{1}{5}$	1 50	$\frac{1}{20}$
fiftytl	ı							
fourty	ch ch							
thirtyt	h							

Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Читай и	numerator	['njHmqreitq]	числитель
запоминай!	denominator	[di'nOmineitq]	знаменатель
*	stroke	['strouk]	черта
1	designate	['dezigneit]	обозначать
	notation	[nqu'teiSn]	понятие

In a denominator of a fraction the digit **0** musn't be

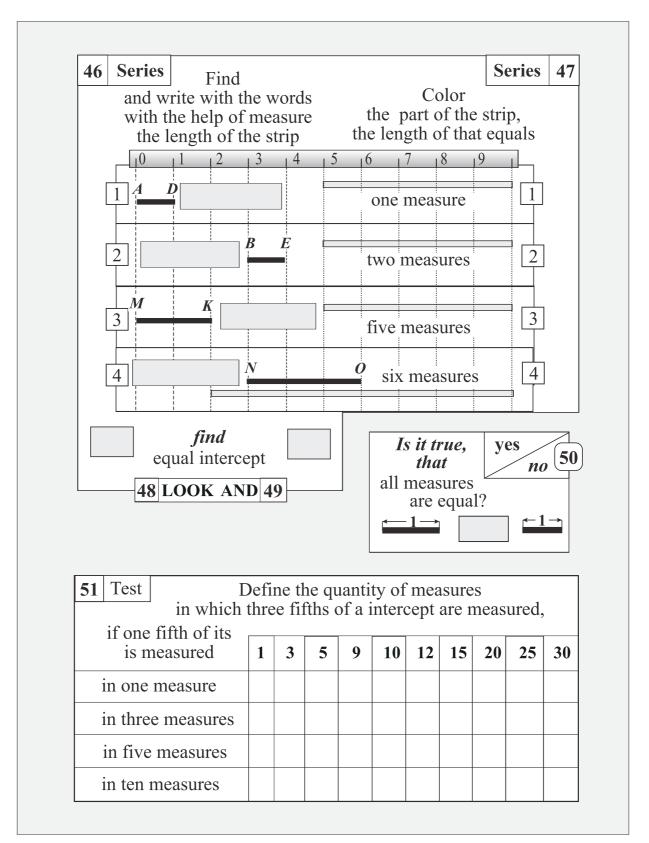
41		CHOOSE THE ANSWER	43		
A	A the first on the left				
В	the first on the right				
С	in any place				
D	the last on the left		D		
Е	E the last on the right				

In a numerator of a fraction the digit **0** may be

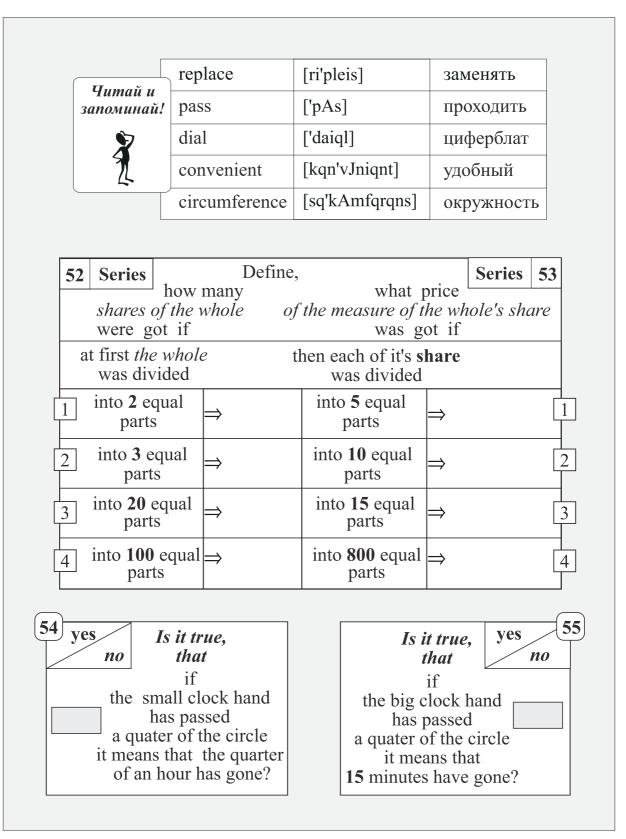
of the missed numbers so the equality will be performed $\frac{24}{6 \cdot \square} = \frac{4 \cdot 7}{14 \cdot \square} = \frac{2 \cdot 2 \cdot \square}{5 \cdot 8}$

45	Test	Find an entry of the wh	ole in	a for	m of	the fr	action	ı, if
	it's share is known, equals		<u>125</u>					525
			125	225	150	152	510	525
	one fiv	e hundred twenty fifth						
	one two hundred twenty fifth							
	one fiv	ve hudred tenth						
	one on	ne hundred twenty fifth						
	one on	e hundred fifty second						

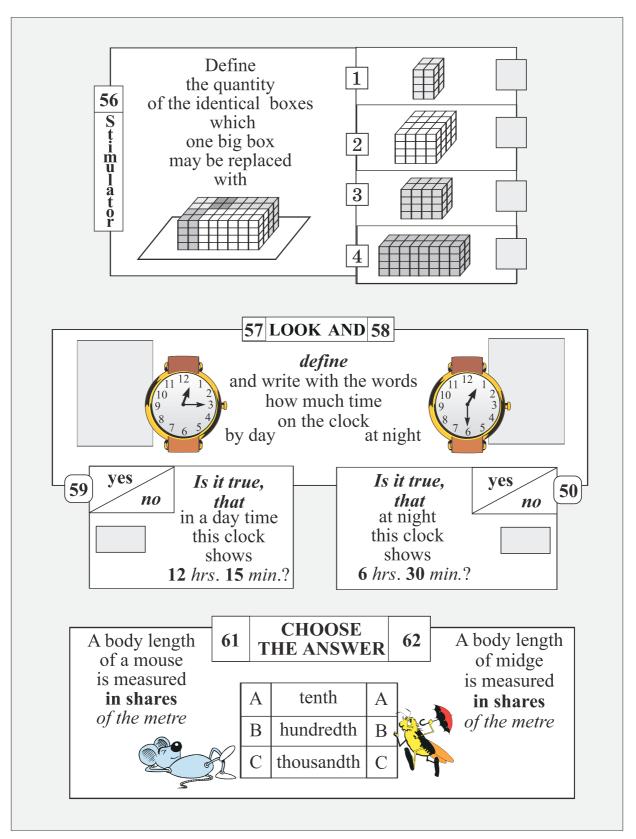
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



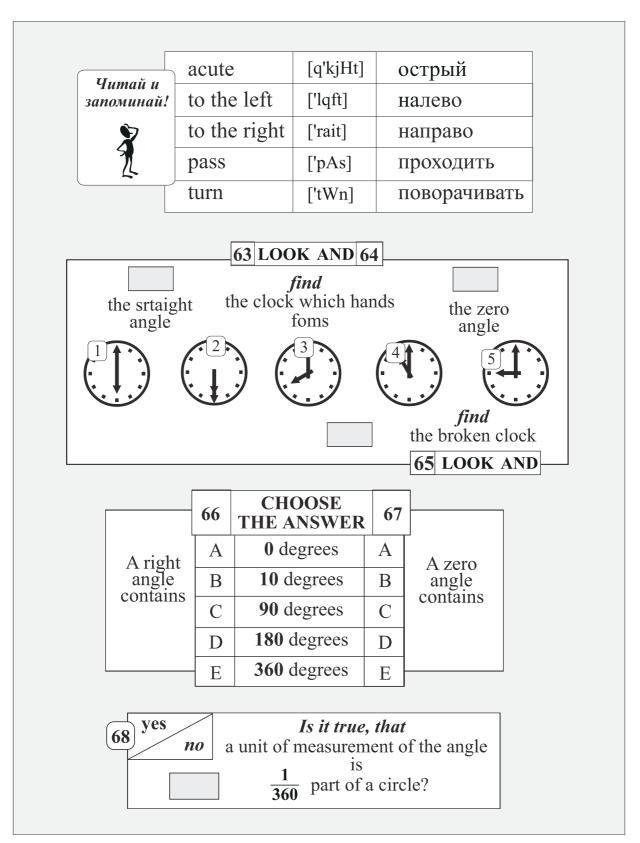
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



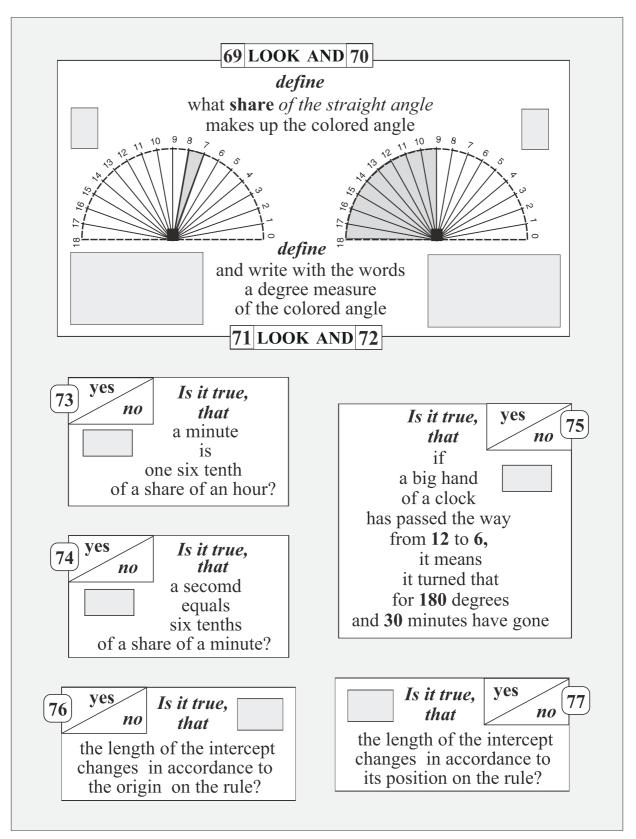
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



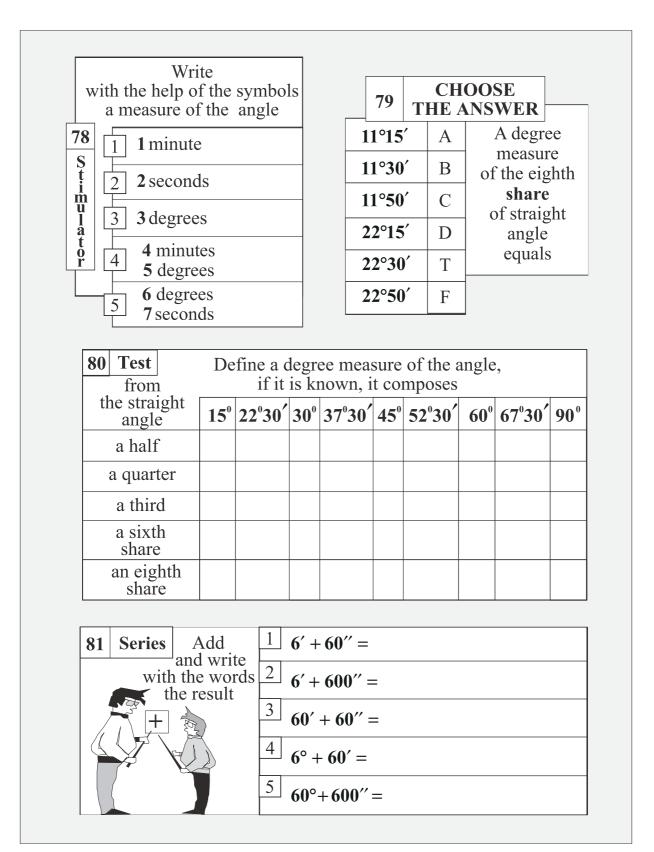
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.

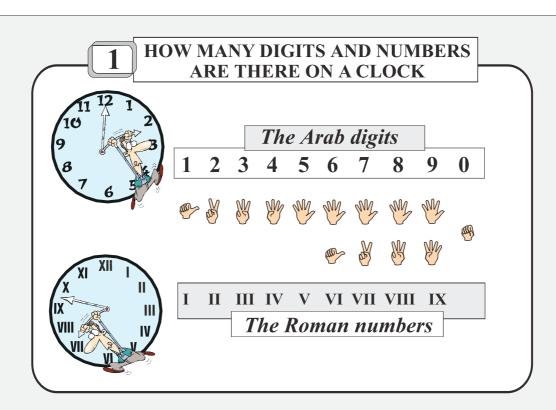


Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.





The images and the mathematical texts



There are many methods of writing a number with the digits. Among them the most famous are the digits of the ancient Romans and the Arabs, who counted with the tenths.

The Roman digits are strict and unusual:

I V X L C D M one five ten fifty a hundred five hundred thousand With the help of three first digits the first ten numbers are written:

I II III IV V VI VII VIII IX X one two three four five six seven eight nine ten

However it's not convenient to write with them large numbers. For example, the number

ten thousand five hudred nineteen is written with the Roman letters this way:

MMMMMMMMMCCCXIX.

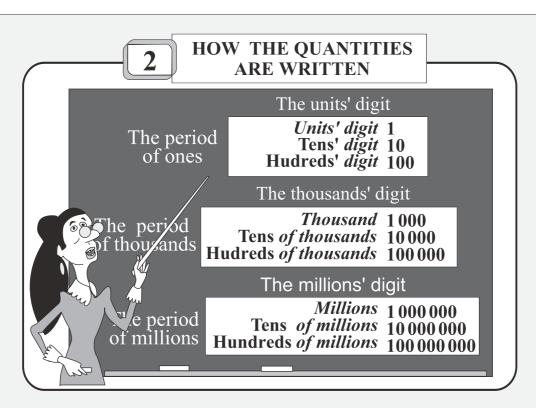
That's why people prefered another digits, which were invented by the Hindu, and a modern view was given to them by the Arabs.

They are familiar to everyone:

They are convenient for drawing from left to right and inverse.

Their number is enough, to write down a very big number:

10319

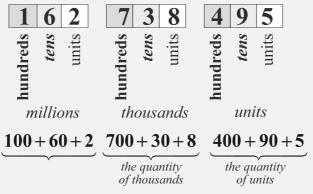


Large numbers are written with the help of *the groups of orders*, which called **the periods**.

In the writing of a large number each period has: the units' digit,

the tens' digit,

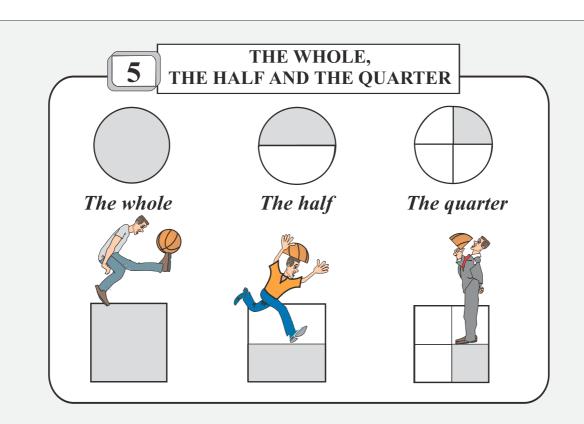
the hudreds' digit.



In a writing of a large number it's convenient to separate one period from another one with a small *gap*. In this case

in each 1-st group of three the units' digit go, in each 2-nd from the right – the digit of thousands, in the 3-rd from the right – the digit of millions

Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



It is possible «to divide in halves» (two equal parts), for fun or seriously anything you like. More important to do it reasonably to prevent getting a «half of a man».

The flat figures are considered to be equal, if while applying one figure upon another one they completely coincide.

Any thing (object) makes the whole.

If the object is divided **into two equal parts**, each of them is it's *half*.

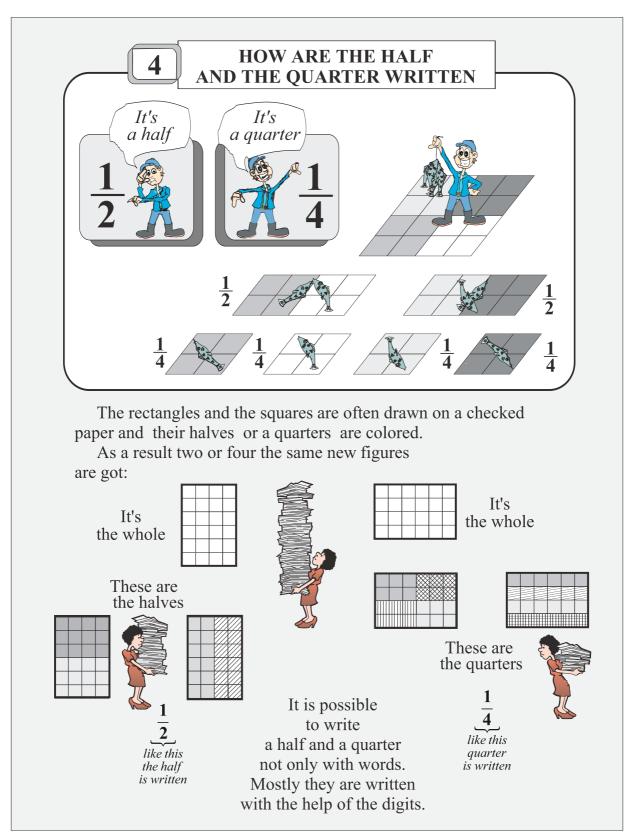
If the object is divided **into four equal parts**, any of it's parts will be called *a quarter*.

Analogously, each whole contains three thirds, the same thing contains the five fifths...

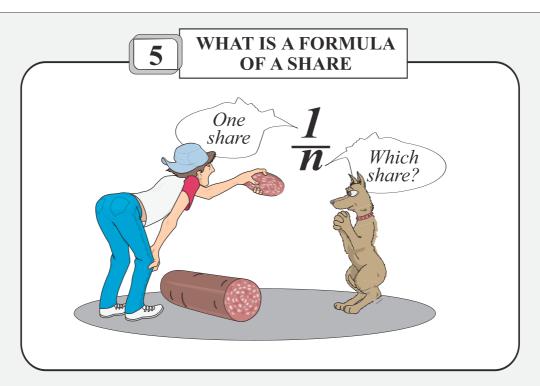
So in how many equal parts we divide *the whole*, the same quantity of these parts we get.

When dividing a square into four equal parts we get four equal small squares. Is it possible to get two equal squares when dividing the given square?

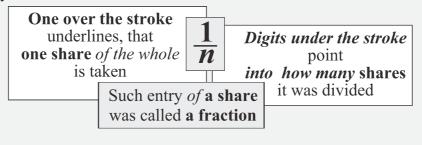
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



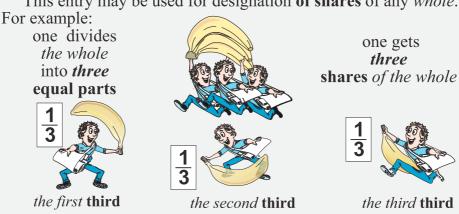
Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



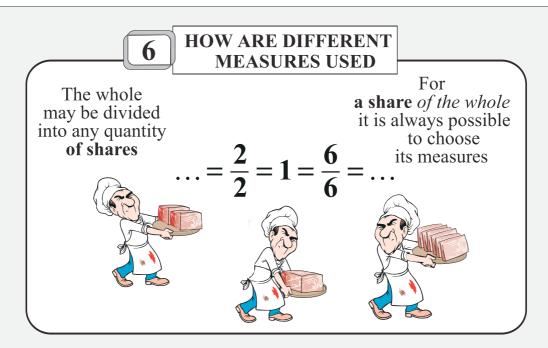
A formula for designation of a share of the whole was created in the Ancient Greece. The Greeks suggested writing of one **share** of the whole strictly in a column of two natural numbers with a stroke between them.



This entry may be used for designation of shares of any whole.



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



The single whole may be divided into different shares.

An intercept may be divided into different **shares**. If the length of all cutoff is taken for the *whole*,

so that for a number one, we may write: $1 = \frac{24}{24} = \frac{12}{12} = \frac{6}{6}$



As we previously have known, that: $1 = \frac{n}{n}$, it's easy to guess

$$1 = \frac{3}{3} = \frac{4}{4} = \frac{10}{10}$$
 or $1 = \frac{2}{2} = \frac{4}{4} = \frac{12}{12}$







The single whole may be measured with different measures.



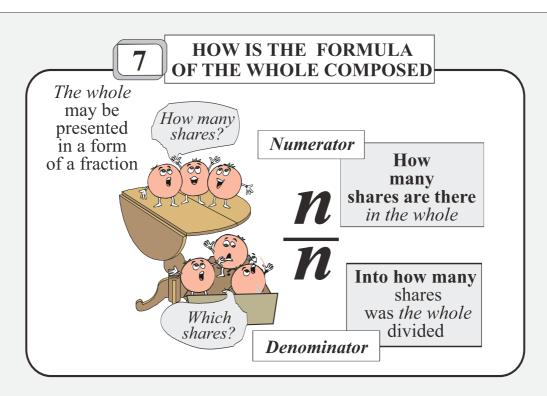
It is important, that in a share must be presented one or several **full** measures.



For example, if we divide an intercept

12 shares,	into		
4 shares,	into		
6 shares.	into		

we get, in all, **24** measures; in all, **12** measures; in all, **6** measures.



The fraction consists of two storey.

A number, written *over a stroke*, is called *a numerator* of the fraction.

In the numertor of **a share** there is always the unity.

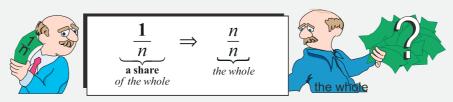
In the numerator of the whole there is always number **n**.

A numerator **of the fraction** is read as an ordinary number.

A number, standing *under the stroke*, is called *the denominator* of the fraction.

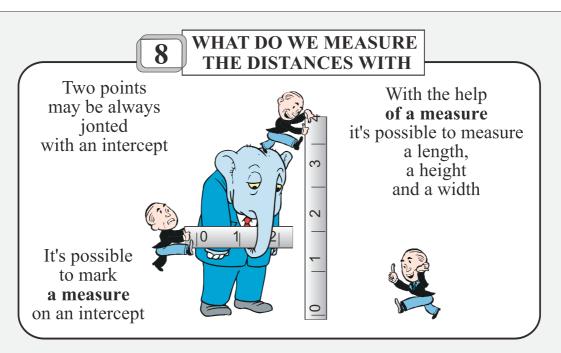
The denominator **of a fraction** is read in accordance to the rule of reading of **a share**.

In all there are *n* shares in the whole. Each of them is designated with the fraction $\frac{1}{n}$.



In order to get *the whole*, all its **shares** must be added As a result we get *n* **shares** totally and write the searched *whole* as **the fractions** $\frac{n}{n}$

Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Two points of a straight line may be jointed with an intercept. In order, to find the length of the intercept it is necessary to measure *the distance* between its end points.

The distance is a basical notation.

It's difficult to explain what the *distance* means, but it is always possible to designate it, to measure and to write.

In order to measure something, instruments for measuring are necessary.

The simplest one is an ordinary ruler. It is divided into equal parts with special primes.



Nearby each prime the digits are written in special order: 0, 1, 2, 3,... The distance between neighbouring primes is considered to be equal 1.

An intersept with the length equals 1 is called the unit intercept

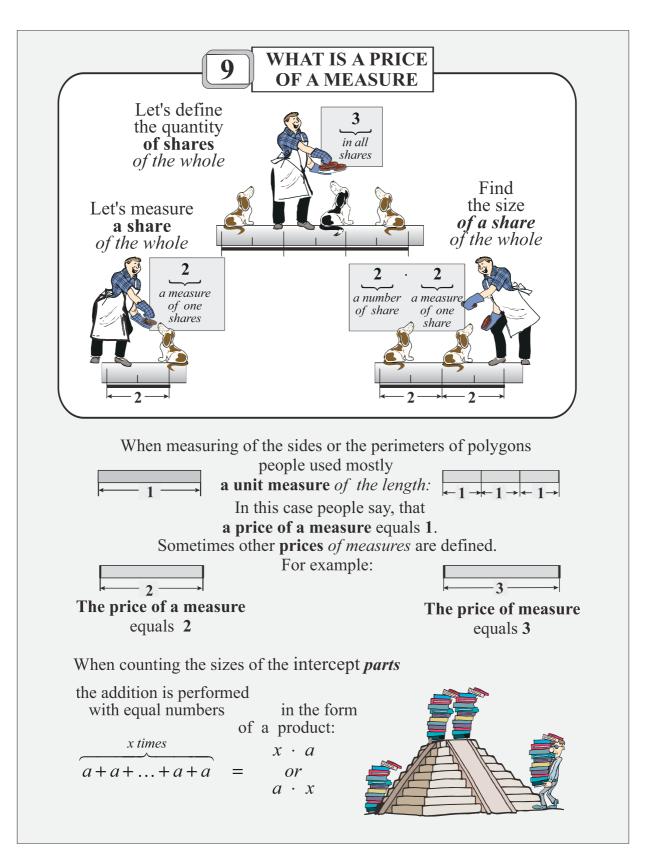
With the same unit intercept
it is possible to measure
the distances, the length, the width and the height
of the objects and alive creatures.

It's important to know, that

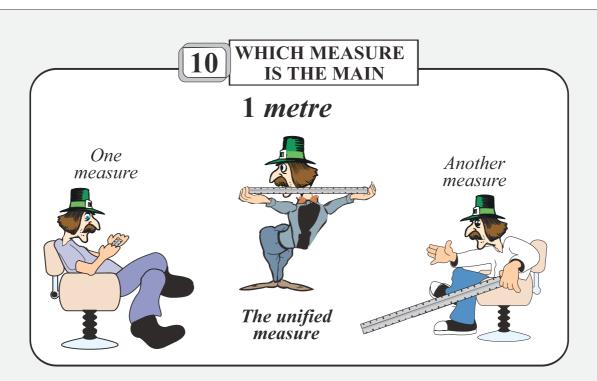
the lengths of identical intercepts are equal



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



Measures are different. One may choose a big *measure*, the other can take a less *measure*. In such case when comparing distances a confusion is inevitable. That's why people negotiated about the unified *measure*, called it a *metre* and produced the metal pattern, which is kept in France in the International Bureau of measures and weights.

So, the metre is a basical unit of measurement of the length.

The word *metre* is of a foreign origination. The Greeks write it as a *metron*, the French – *metre*, in the Russian translation it means a *measure* and is abbreviated with one russian letter M..

Very often this measure is too big. Sometimes **shares** *of metre* are used, for example, **a half** *of the metre* or **a quarter** *of the metre*, and say: one quarter of the metre, one eighth and so on.

There are **the tenth, the hundredth** and even **the thousandth share** *of the metre* in use, which correspondingly (in the same order).

$$\frac{1}{10}m, \frac{1}{100}m, \frac{1}{1000}m$$



ABOUT MINUTES AND SECONDS ON A CLOCK

If the half of a circle was passed

by the big hand, the half of an hour has gone





by *the* small hand, 6 hours have gone

by the second hand, the half of a minute has gone



A clock is an instrument for the measurement of time.

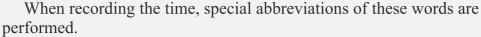
A dial of a clock may be taken for the completed circle, the circumference of which is divided with digits in 12 equal parts. Joining digits with intercept to a centre of a dial we get 12 of its *shares*, that is 12 central angles.

Each of such share the small hand passes per 1 hour. This hand is called the *hour* hand. The whole circle it passes per 12 hours.

The hour is a basic unit of measurement of time.

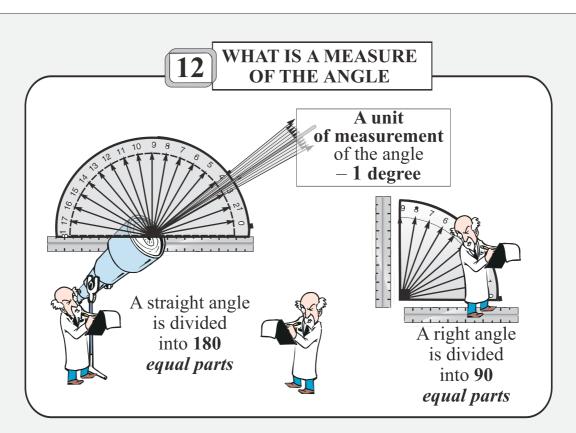
Each 12-th share of a dial the big hand passes within 5 minutes. The whole circle the minute hand passes per $5 \cdot 12 = 60$ minutes.

Sometimes there is another one small circle, in which the *second* hand revolves. The complete circle this hand passes per one minute. Therefore, there are **60** seconds in a minute.



For example, we say 6 hours 30 minutes 15 seconds. we write: 6 hrs.30 min.15 sec.

Ефимов В.В., Карасев А.А., Резник Н.А. The primary notions about the translations of the mathematical texts. – Санкт-Петербург, Изд-во ГУ РНХИ им. проф. А.Л. Поленова, 2006. – 48 с.



A special **measure - degree** is introduced for measuring angles.

The word *a degree (gradus)* is the Latin and means *a step*. Such step is performed by a big clock hand per 1 *second*.

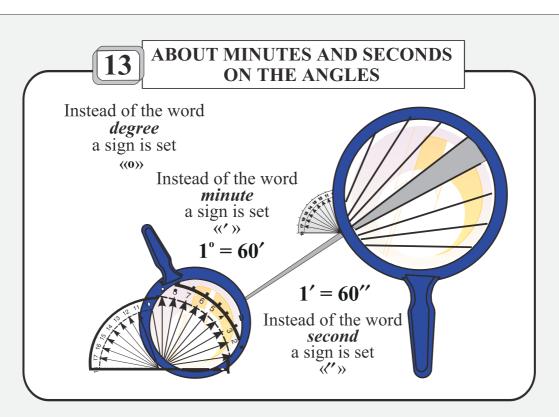
The question "what is a degree measure?" may be translated like "how many degrees?"

The degree is produced by division of the straight angle into 180 equal parts. Hence,

the degree is the one hudred eightyth **share** of the straight angle.

The division of a circle into **360** degrees, obviously, is connected with the ancient custom to consider a half of a year to be equal to **180** days





The words «a minute» (lat. *minutus*) means «decreased»

(the angle in 1 degree decreased in 60 times).



The words the «second» (lat. secunda)
means «second»
(the angle in 1 degree decreased

for the second time in 60 times).

The terms *minute* and *second* are also (like a *degree*) substituted with symbols.

The minute is marked with one prime ('), the second – with two primes ("). So, instead of equalities

1 degree = 60 minutes and 1 minute = 60 seconds we write: $1^{\circ} = 60'$ and 1' = 60''.

Hence, if it is known, that

the angle equals 30° 20' 10''

we have to decode it this way:

the angle equals 30 degrees 20 minutes 10 seconds

Ефимов В.В., Карасев А.А., Резник Н.А.

The primary notions about the translations of the mathematical texts.

Редакторы Осипова Вера Сергеевна, Темникова Ирина Сергеевна

Компьютерный набор Н.А. Резник

Подписано к печати с оригинал-макета 20.09.2006. Формат 60х80 ¹/16 . Бумага офсетная. Гарнитура Times New Roman.Усл. печ. л. 3,0. Заказ № 239. Тираж 300 экз. Издательство ГУ РНХИ им. проф. А.Л. Поленова