

*Arkalyk state pedagogical Institute named after  
Y. Altynsarin*



*Theme:*  
**Power**

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" People unfamiliar with algebra can not imagine the wonderful things that can be achieved with the help of ... called science."

G.W Leibniz

# \* Determination of a natural indicator



Powers of a with natural exponent  $n$  is the product of  $n$  factors, each of which is equal to  $a$ .

$$a^n = \underbrace{a \cdot a \cdot \dots \cdot a}_{n \text{ raz}}$$

\* Properties with a natural indicator of the degree of



$$a^m \cdot a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$(ab)^n = a^n b^n$$

$$(a^m)^n = a^{mn}$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

e  
q  
u  
a  
l  
t  
o  
z  
e  
r  
o  
,  
w  
i  
t  
h

# \* Determination of the zero indicator

$$a^0 = 1$$

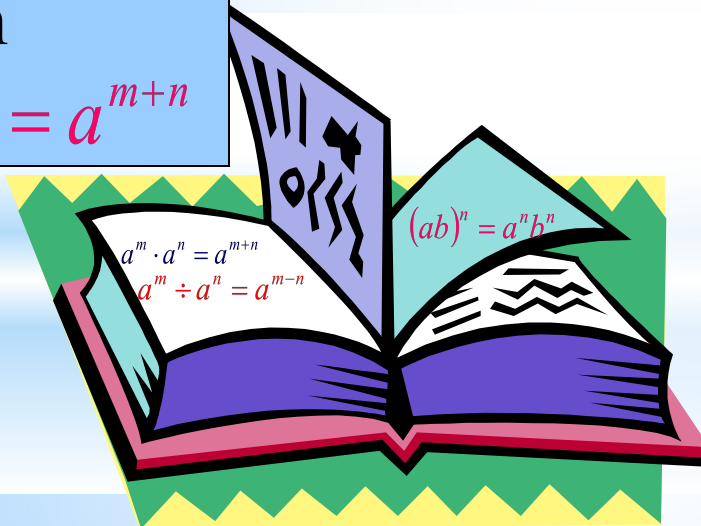
# \* Multiplying powers with the same bases

For any  
number  $a$  and  
any positive  
integers  $m$  and  
 $n$

$$a^m \cdot a^n = a^{m+n}$$

$$a^m \cdot a^n = a^{m+n}$$

Multiplying powers  
with the same bases  
of the base is left  
unchanged, and the  
figures add up



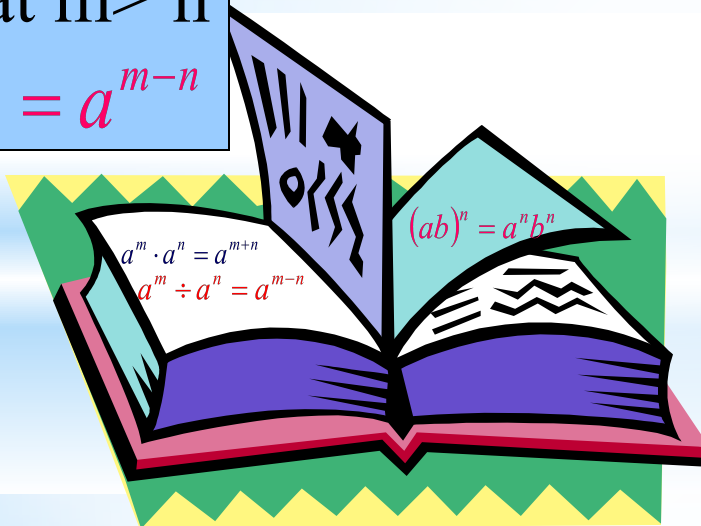
# \* The division of powers with the same bases

For any arbitrary natural number  $a \neq 0$  and  $m$  and  $n$ , such that  $m > n$

$$a^m \div a^n = a^{m-n}$$

$$a^m \div a^n = a^{m-n}$$

When dividing powers with the same base bases are left unchanged , and the dividend is subtracted from the index index divider



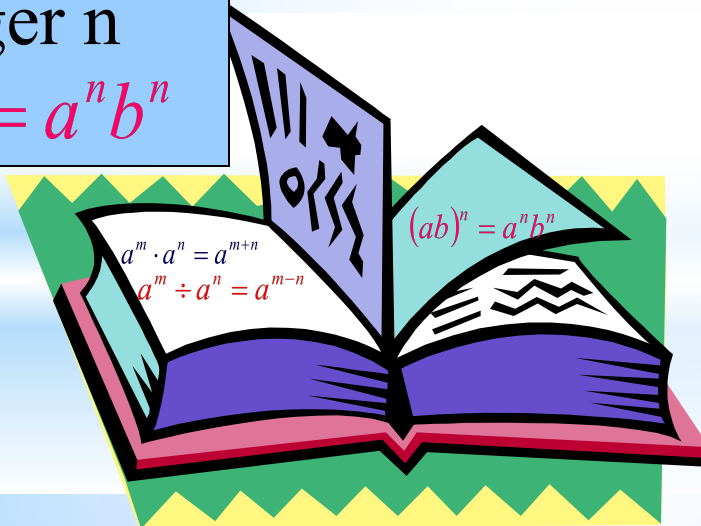
# \* Exponentiation works

For any numbers a and b and any positive integer n

$$(ab)^n = a^n b^n$$

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With the construction of the power works erected in the degree of each factor and multiply the results





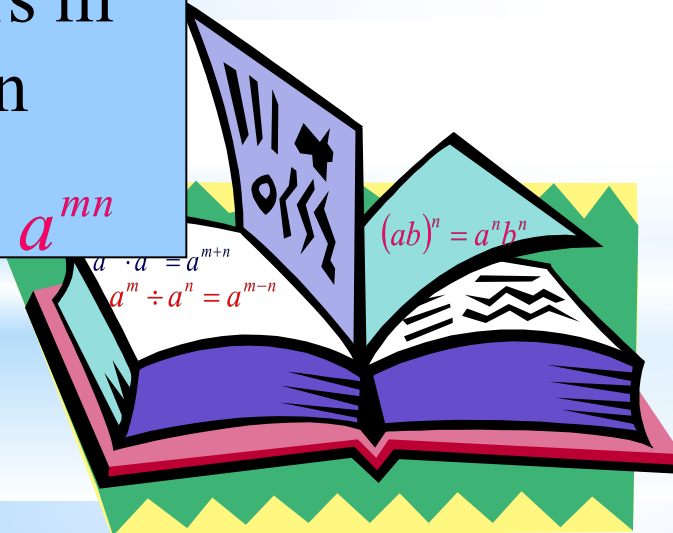
# \*Exponentiation degree

For any  
number and a  
random  
natural  
numbers m  
and n

$$(a^m)^n = a^{mn}$$

$$(a^m)^n = a^{mn}$$

With the  
construction of the  
degree of the power  
base is left  
unchanged , and the  
figures are  
multiplied



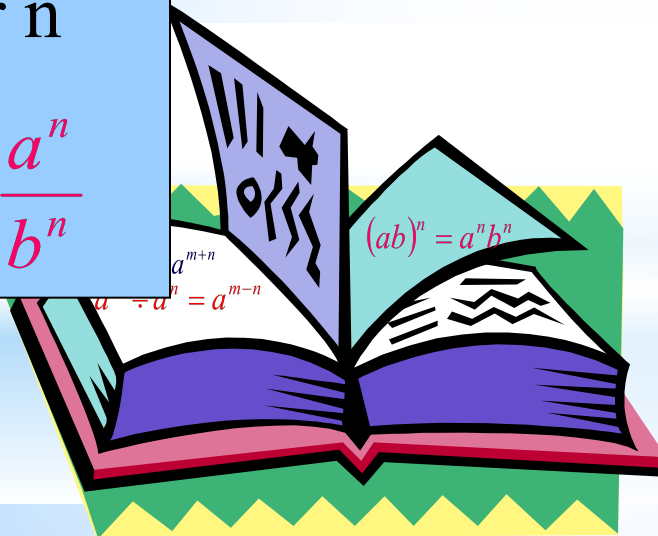
# \* Exponentiation fraction

For any numbers  $a$  and  $b > 0$  and any positive integer  $n$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

With the construction of the power fraction erected in the degree of the numerator and denominator of the fraction



# *History of the number of degree*



In his famous book "Arithmetic" Diophantus of Alexandria described the first natural degree



Rene Descartes in his  
"geometry" ( 1637 ),  
we find the current  
designation of degrees  
 $a^2, a^3, \dots$

# \*" Silences " Game

1. Follow these steps:

$$x^{11} \cdot x \cdot x^2 ; \quad x^{14} : x^5 ; \quad (a^4)^3 ; \quad (-3a)^2.$$

2. Compare the expression to zero :

$$(-5)^7; \quad (-6)^{18}; \quad (-4)^{11} \cdot (-4)^8 \quad (-5)^{18} \cdot (-5)^6; \quad -(-4)^8.$$

3. Calculate the value of the expression :

$$-1 \cdot 3^2; \quad (-1 \cdot 3)^2 \quad 1 \cdot (-3)^2; \quad -(2 \cdot 3)^2; \quad 1^2 \cdot (-3)^2$$

# THE GAME " THE PAIR OF NUMBERS "

1) $2xy \cdot 3x^2y^5$	1) $-5x^4y^5$
2) $3xy^3 \cdot x^3y^6$	2) $-x^5y^{10}z^3$
3) $-0,6ac^3 \cdot (-8)a^2c^4$	3) $6a^3c^5$
4) $-5a^2c \cdot 2ac \cdot (-0,6c^3)$	4) $6x^3y^6$
5) $xy^3z^3 \cdot x \cdot x^3y^7$	5) $-9x^4y^6z^2$
	6) $4,8a^3c^7$
	7) $2x^4y^9$

**\*ANSWERS :**

**(1, 4)**

**(2, 7)**

**(3, 6)**

**(4, 3)**

**(5, 2 )**

# Computational pause

$$1) c^3 \cdot c^5 =$$

$$2) c^8 : c^6 =$$

$$3) (c^4)^3 =$$

$$4) c^3 \cdot c^5 : c^6 =$$

$$5) c^{14} \cdot c^8 =$$

$$6) c^7 : c^5 =$$

$$7) (c^4)^3 \cdot c =$$

$$8) c^4 \cdot c^5 \cdot c^0 =$$

$$9) c^{16} : c^8 =$$

$$10) (c^5)^3 =$$



# \*Comparing expressions

Compare without performing calculations. Find the correct inequalities. From their respective letters make up the name of the architect, the project is the building of the Bolshoi Theater in Moscow was built in 1825 :

Я  $(-15)^{10} < 0$

С  $(-3,2)^{13} > 0$

Б  $-4,1^{12} < 0$

М  $-(-2)^{62} > 0$

О  $(-6,5)^4 > (-8,4)^3$

В  $(-3,4)^2 > -3,4^2$

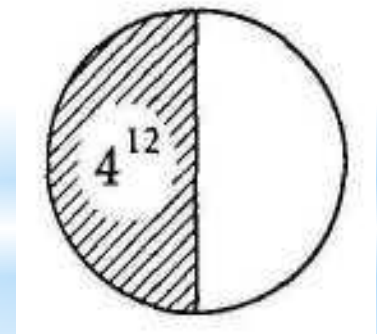
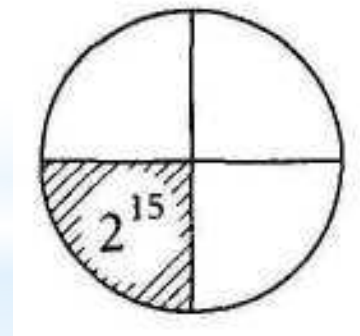
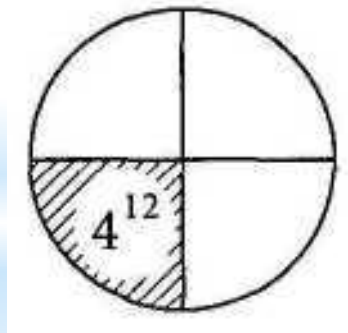
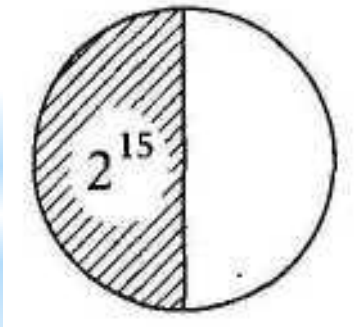
Д  $x^{101} \cdot x^{21} < 0$

Е  $\frac{(-15)^4}{-15^4} < 0$



# \*What number illustrates a circle?

Find out how many shows a circle, if the shaded portion shows a specified number . A record in the form of a degree .



# *Reflection*

<i>I know</i>	<i>I learned</i>	<i>I want to know</i>

**THANK YOU FOR  
ATTENTION**

