

Автор:

Сафечук Владислав Олегович

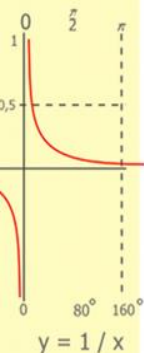
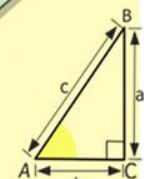
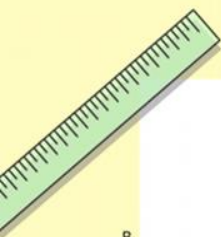
ученик 6А класса

Бюджетное общеобразовательное учреждение «Гимназия
«159»

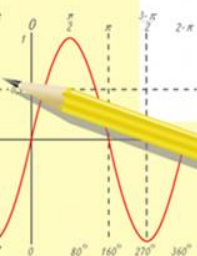
Омская область, город Омск

Руководитель:

Глушкова Светлана Александровна



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

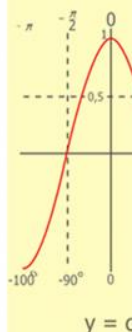
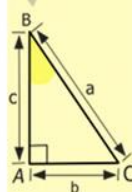
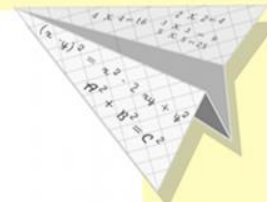
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$

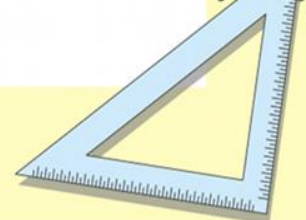


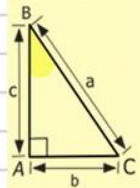
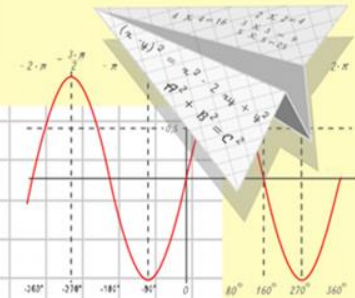
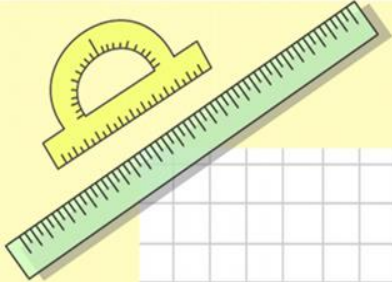
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$

$$(x+y)(x-y) = x^2 - y^2$$



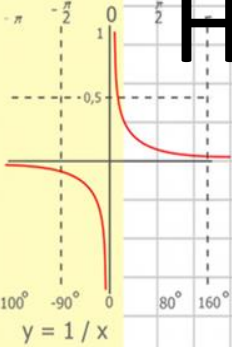
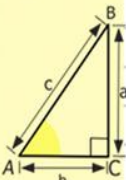
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$





$$y = \cos x$$

$$\begin{aligned} 2 \times 2 &= 4 \\ 3 \times 3 &= 9 \\ 4 \times 4 &= 16 \\ 5 \times 5 &= 25 \\ 6 \times 6 &= 36 \\ 7 \times 7 &= 49 \\ 8 \times 8 &= 64 \end{aligned}$$



$$\begin{array}{r} 1 \\ 2500 \\ \times 42 \\ \hline 210 \\ + 840 \\ \hline 10500 \end{array}$$

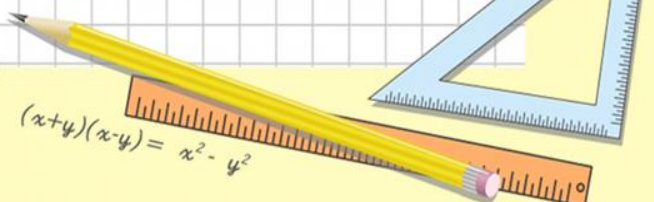


How much does your school bag weigh?

Author: Safechuk Vlad
6-grade student
Gymnasia 159



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$

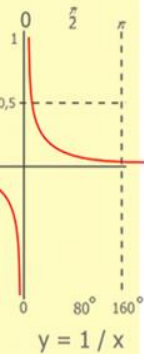
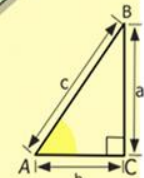
$$(x+y)(x-y) = x^2 - y^2$$

Описание

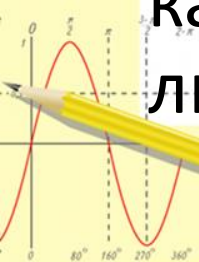
Каждый школьник вынужден приобретать портфель для ношения школьных принадлежностей. Портфель для школьника нужно подбирать внимательно, тяжелый вес может нанести значительный вред осанке ребенка.

Многие школьники страдают теми или иными заболеваниями позвоночника. Врачи считают, что причиной этого могут быть слишком тяжелые школьные рюкзаки.

Многие школьники не задумываются о качестве портфеля, а руководствуются лишь модным дизайном.



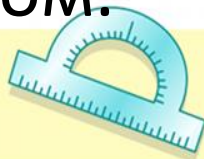
$$\begin{array}{r} 1\ 2\ 5\ 00 \\ \times 4\ 2 \\ \hline 21\ 0 \\ + 84 \\ \hline 105\ 0\ 00 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$

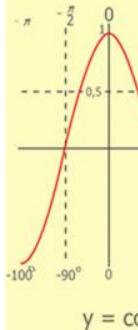
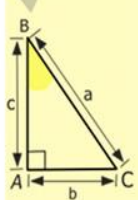


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

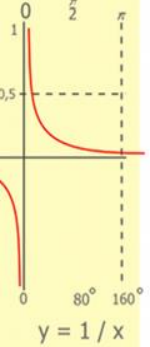
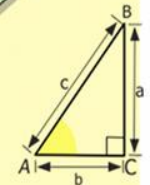
$$x = 70$$

$$(x+y)(x-y) = x^2 - y^2$$

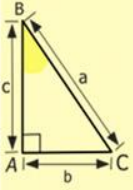
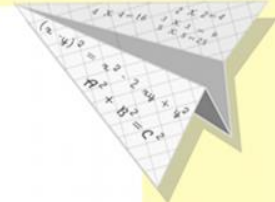
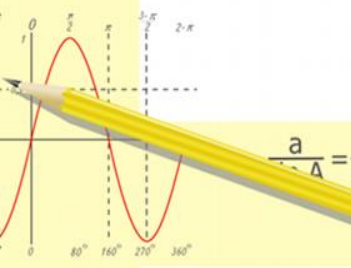


Relevance of our research

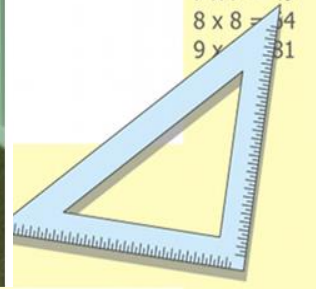
The younger generation has a significant deviations in health. It is well known that every fifth student has a chronic disease. According to our research, 60% of students have heavy school bags. If you don't care about the weight of your school bag, you will have problems with your spine.



$$\begin{array}{r} 1 \\ 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



Issue

Is there a connection between health and weight of a school bag?

Object of research

Health of the students

Subject of research

The impact of a heavy backpack on health of children

Purpose of the study

Define how a heavy school bag affects health and verify ways to lighten it

Tasks

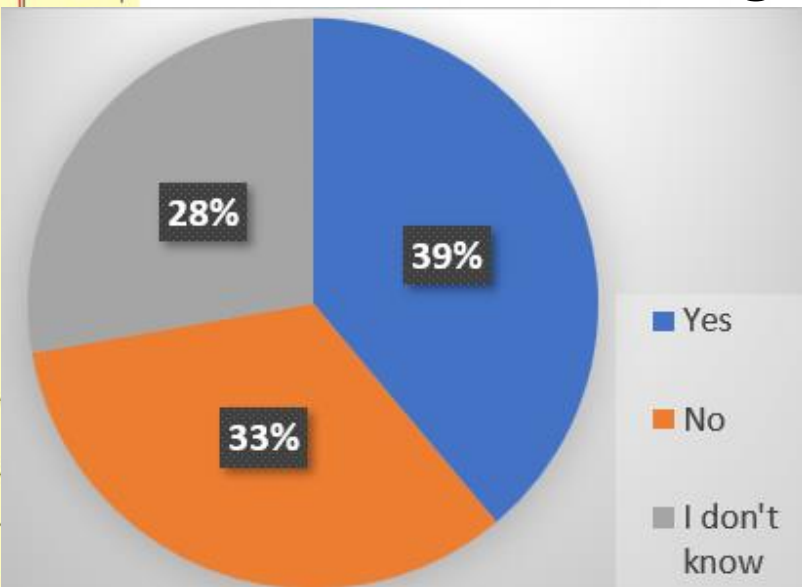
1. To study and analyze the literature on this issue.
2. To study the effect of a heavy school bag on students health
3. Develop instructions for reducing the weight of the school bag.

Theoretical section

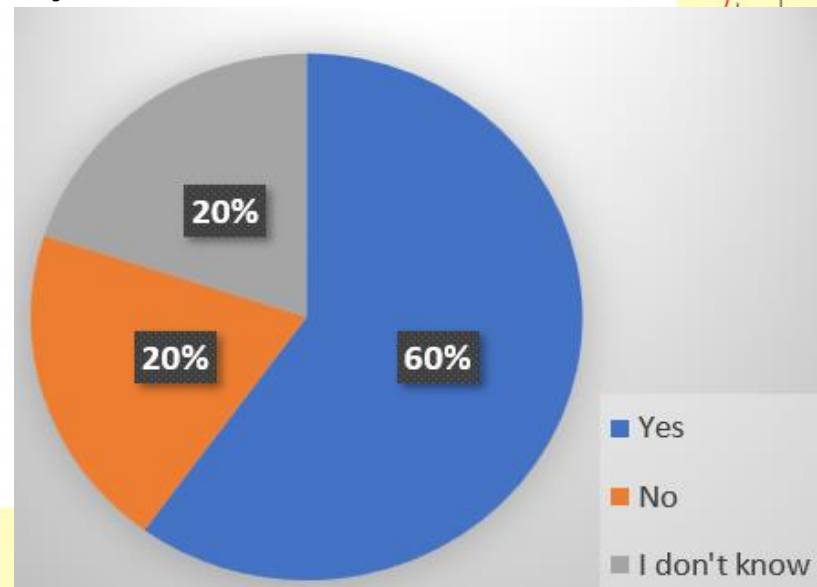
When we go to school and I carry a school bag, sometimes it seems to me that it's just very heavy. I wondered: Is it really harmful to my health?

I conducted the survey among my classmates and their parents.

According to the survey 39% of my classmates think that their school bag is very heavy.



Picture 1. Do you think your school bag is heavy?

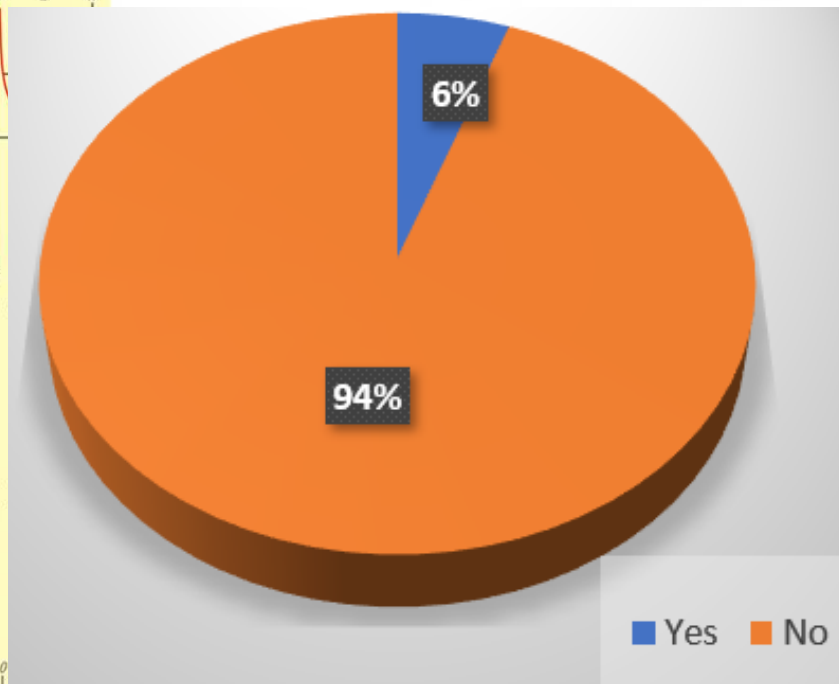
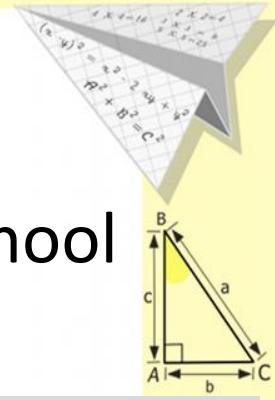
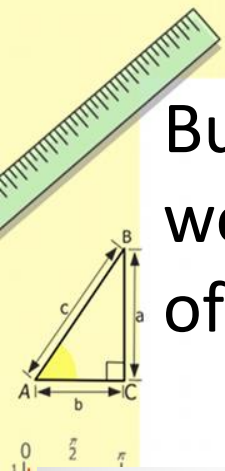


Picture 2. Is the school bag of your child heavy?

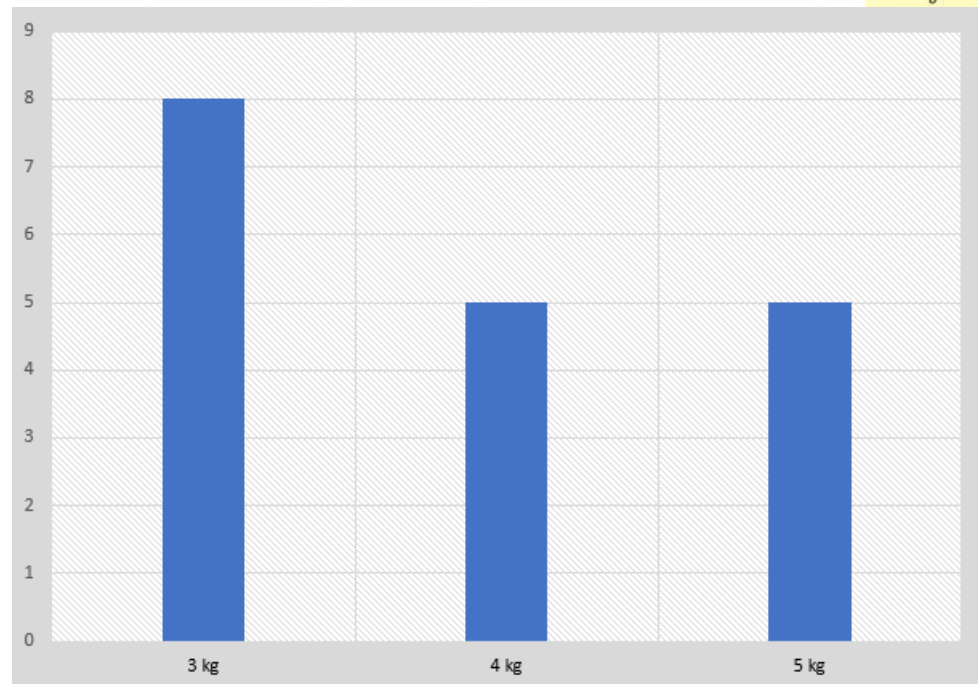
Theoretical section

But only 6% of students worry about the weight of their school bag.

And only 40% of students know the weight norms of a school bag.



Picture 3. Do you think about the weight of your school bag when you buy it?



Picture 4. How much should your school bag weigh?



Theoretical section

I've read the health standards and found out that every age group has its own weight norms.

1-2 grade – 1,5 kg

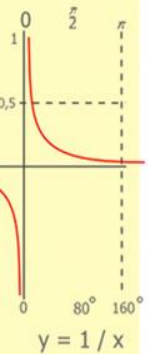
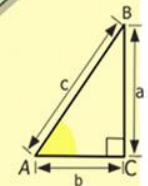
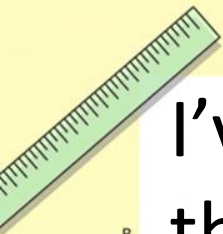
3-4 grade -2,5 kg

5-6 grade – 3 kg

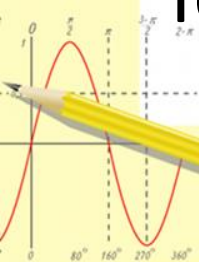
7-8 grade- 3,5 kg

9-11 grade- 4 kg

The recommended weight of a school bag with all accessories should not exceed 10% of body weight, and is calculated with the formula: divide your weight by 10.



$$\begin{array}{r} 1 \\ \times 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

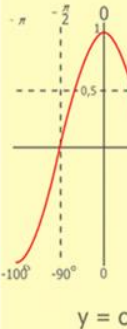
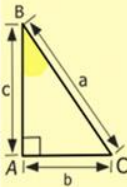
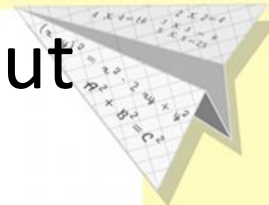
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$



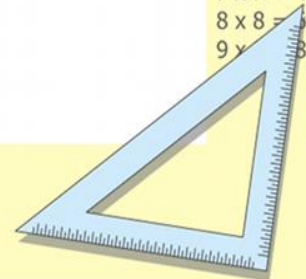
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$

$$(x+y)(x-y) = x^2 - y^2$$



$$y = \cos$$

$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



Practical section

I decided to do a little research in my class and find out how much the student's school bags weigh and how it affects their health. The school bags of my classmates were weighted: empty and with things, weight of pupils is defined, and the optimum weight of a school bag is calculated.

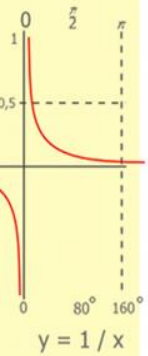
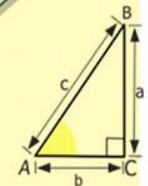
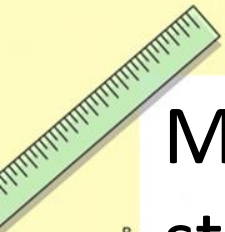
Table 1. The results of calculations on percentage of students according to the healthy standard

Weight	Quantity of school bags
Less than 10% of student weight	10
More than 10% of student weight	12

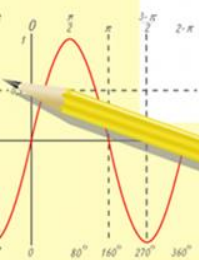
Practical section

Mathematical calculations showed that 12 students have heavier school bags than it's supposed in health standards. And it is very unhealthy.

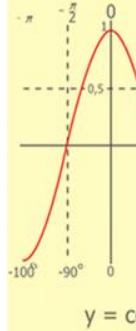
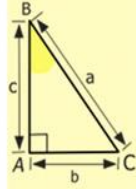
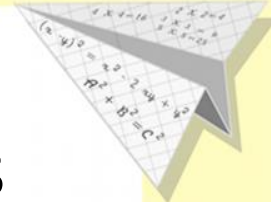
We've analyzed the medical files of my classmates and defined that 6 students have got difficulties with their spine.



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

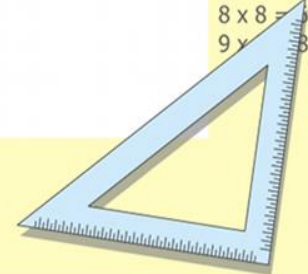


$$\frac{a}{A} = \frac{b}{\sin B}$$



$$y = \cos$$

$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$

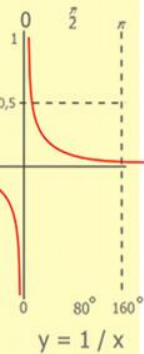
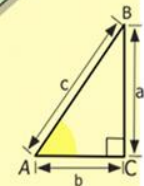
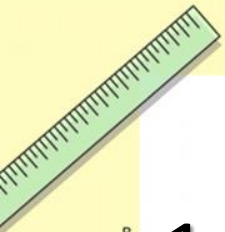


$$x^2 - y^2$$

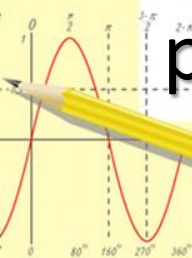
Recommendations

How to reduce weight of your school bag

1. Go light by avoiding heavy items inside the backpack.
2. Have two sets of books, one for school and one for home.
3. Consider buying an e-reader and download the books.
4. Choose quality and light school bags.
5. Place all heavy items at the base of the pack, close to the spine.



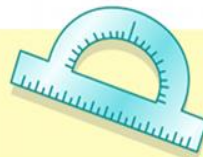
$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

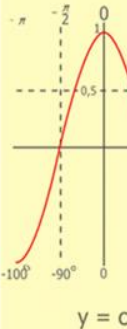
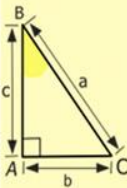
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$



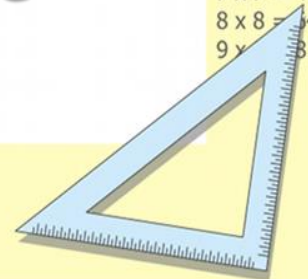
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$

$$(x+y)(x-y) = x^2 - y^2$$



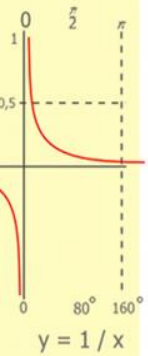
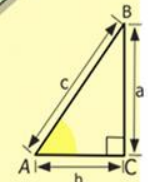
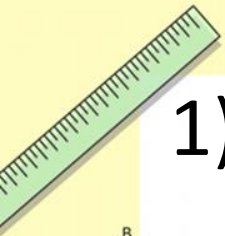
$$y = \cos$$

$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$

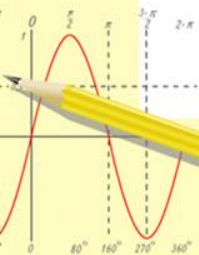


Conclusions

- 1) We've learned the literature given on the issue of our research.
- 2) We've proved that there is a correlation between a heavy school bag and difficulties with students' health.
- 3) We've made recommendations on how to minimize the risk of backpains.



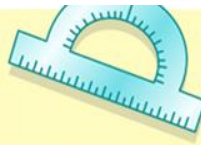
$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 840 \\ \hline 105000 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

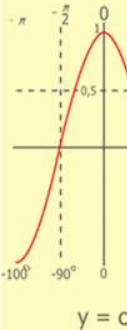
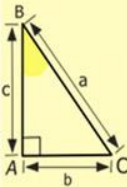
$$\sin 90^\circ = 1$$



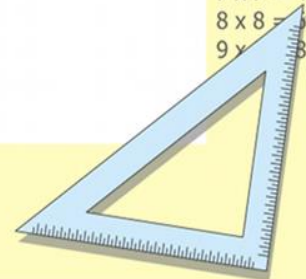
$$\sin 90^\circ$$

$$\begin{cases} x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ x = 70 \end{cases}$$

$$(x+y)(x-y) = x^2 - y^2$$

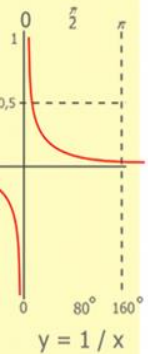
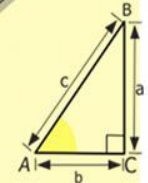


$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$

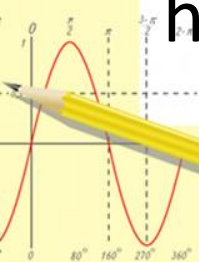


Results

- The result of my research work was a presentation to my classmates. My conclusions would convince them not to carry extra things with them.
- Also, I've posted the poster that showed the results of my study in the class, so children's parents whose weight of backpacks was above the norm, will be more careful next time buying a backpack.
- Parents can read the instructions 'How to reduce weight of your school bag', if they want to help their children to be healthy.



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

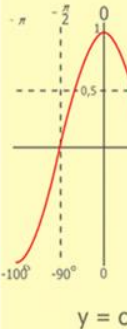
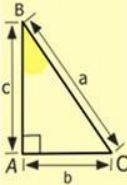
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

$$(x+y)(x-y) = x^2 - y^2$$



$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$

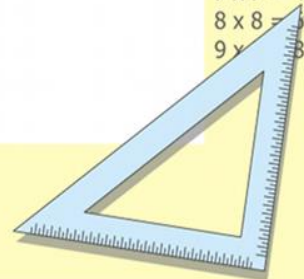
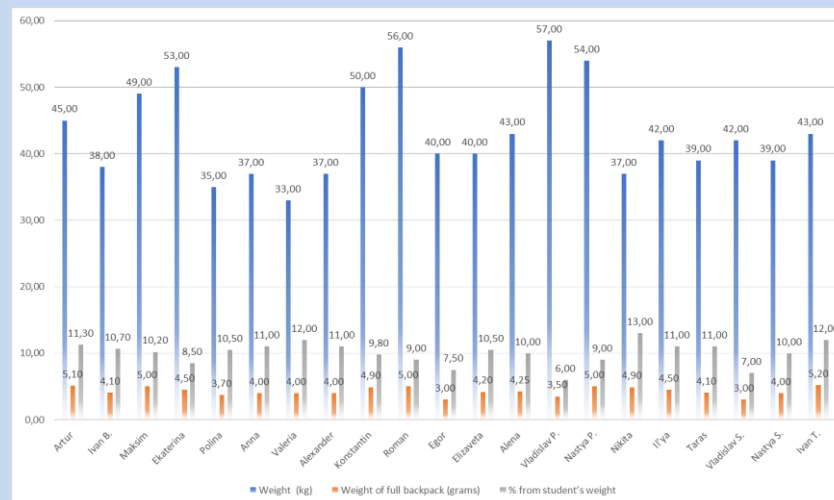


Table 2. Summery table of results in class 6A

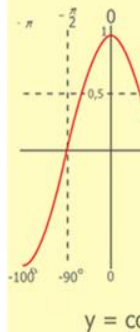
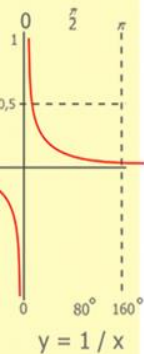
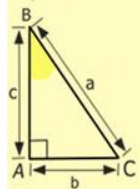
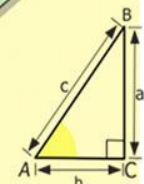
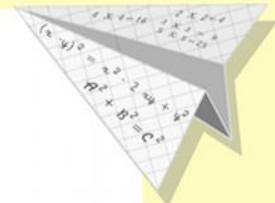
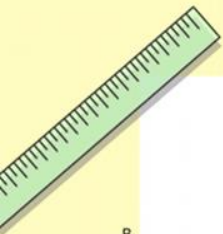
Name	Weight (kg)	Weight of empty backpack (grams)	Weight of full backpack (grams)	Weight limits of school bag (kg)	% from student's weight
Artur	45	510	5 100	4.5	11.3
Ivan B.	38	740	4100	3.8	10.7
Maksim	49	750	5 000	4.9	10.2
Ekaterina	53	800	4500	5.3	8.5
Polina	35	550	3700	3.5	10.5
Anna	37	798	4000	3.7	11
Valeria	33	845	4000	3.3	12
Alexander	37	520	4 000	3.7	11
Konstantin	50	670	4900	5.0	9.8
Roman	56	900	5000	5.6	9
Egor	40	490	3 000	4.0	7.5
Elizaveta	40	455	4200	4.0	10.5
Alena	43	600	4250	4.3	10
Vladislav P.	57	965	3 500	5.7	6
Nastya P.	54	1000	5000	5.4	9
Nikita	37	900	4900	3.7	13
Il'ya	42	620	4500	4.2	11
Taras	39	970	4100	3.9	11
Vladislav S.	42	230	3 000	4.2	7
Nastya S.	39	600	4 000	3.9	10
Ivan T.	43	950	5200	4.3	12
Sofia	45	550	4300	4.5	10



Picture 5. Summery results in class 6A

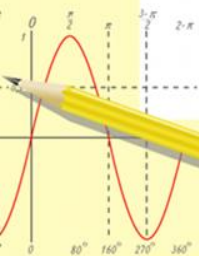
Thank you

for your attention!



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$



$$\begin{array}{l} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{array}$$

$$(x+y)(x-y) = x^2 - y^2$$

