# QURAMALI KVADRAT  KOREN` QATNASQAN BIRDEYLIKLERDEN PAYDALANIP MISALLAR SHESHIW USILLARI

*Djumabaev N.*

*A`jiniyaz atindag`i  N M PI u`lken oqıtıwshısı. p. i.k*

*J. Duzenova*

*asissistent –oqıtıwshısı*

*Mamutova Gulnaz*

*talaba*

Таянч сўзлар: квадрат, корень. фойдаланиш, масала, метод, мисол, машк, тенглама

Ключевые слова: квадрат, корень, использовать, задача, метод, пример, заня-тие, уравнение.

Key words: square, root, use, target, method, example, activity, equation.

Quramalı kvadrat koren` qatnasqan an`latpalardı tu`rlendiriwde to`mendegi birdeylikler paydalanıladı:

$$\sqrt{A+\sqrt{B}} = \sqrt{\frac{A+\sqrt{A^2-B}}{2}} + \sqrt{\frac{A-\sqrt{A^2-B}}{2}} \qquad (1)$$

$$\sqrt{A-\sqrt{B}} = \sqrt{\frac{A+\sqrt{A^2-B}}{2}} - \sqrt{\frac{A-\sqrt{A^2-B}}{2}} \qquad (2)$$

Meyli (2) birdeylikti da`lilleyik. Aldın-ala bul birdeyliktin` on` ha`m sol jaqlarının` anıqlanıw oblastlarının` birdey bolatug`ının ko`rseteyik:

sol jag`ı: $B \geq 0$ olay bolsa, $A - \sqrt{B} \geq 0 \Rightarrow A \geq \sqrt{B}$.

on` jag`ı: $A - \sqrt{A^2-B} \geq 0 \Rightarrow A \geq \sqrt{A^2-B}$ bunnan $A \geq 0$ ha`m $A^2 \geq A^2 - B$ bunnan $B \geq 0$ ekenligi kelip shıg`adı, demek $A^2 - B \geq 0 \Rightarrow A \geq \sqrt{B}$.

Olay bolsa (2) birdeyliktin` eki jag`ıda on`:

$$\frac{A+\sqrt{A^2-B}}{2} - \frac{A-\sqrt{A^2-B}}{2} \geq 0 \Leftrightarrow \frac{A+\sqrt{A^2-B}-A+\sqrt{A^2-B}}{2} \geq 0 \Leftrightarrow \sqrt{A^2-B} \geq 0$$

(2) nin` eki jag`ın kvadratqa ko`teremiz:

$$\left(\sqrt{\frac{A+\sqrt{A^2-B}}{2}} - \sqrt{\frac{A-\sqrt{A^2-B}}{2}}\right)^2 = \frac{A+\sqrt{A^2-B}}{2} - \frac{A+\sqrt{A^2-B}}{2} - 2\sqrt{\frac{A^2-\left(\sqrt{A^2-B}\right)^2}{4}} =$$

$$= A - 2\sqrt{\frac{B}{4}} = A - \sqrt{B} = \left(A - \sqrt{B}\right)$$

Demek. (2) birdeylik da`lillendi.

(1) birdeylikte usınday bolıp da`lillenedi.

Endi (1) ha`m (2) birdeyliklerden paydalanı mısallar shesheyik:

1-mısal. $\sqrt{a - 2\sqrt{a-1}}$ an`latpasın a`piwayılastırın`.

Sheshiw. Berilgen an`latpanın` anıqlanıw oblastı $a \geq 1$ boladı.

Berilgen an`latpanı (2) birdeylikten paydalanıp to`mendegishe tu`rlendiremiz:

$$\sqrt{a-2\sqrt{a-1}}=\sqrt{a-\sqrt{4a-4}}=\sqrt{\frac{a+\sqrt{a^2-4a+4}}{2}}-\sqrt{\frac{a-\sqrt{a^2-4a+4}}{2}}=$$

$$=\sqrt{\frac{a+\sqrt{(a-2)^2}}{2}}-\sqrt{\frac{a-\sqrt{(a-2)^2}}{2}}=\sqrt{\frac{a+|a-2|}{2}}-\sqrt{\frac{a-|a-2|}{2}}$$

bul an'latpanın' ma'nisin tabıwda eki jag'day boladı:

1) eger $a\geq 2$ bolsa

$$\sqrt{\frac{a+|a-2|}{2}}-\sqrt{\frac{a-|a-2|}{2}}=\sqrt{\frac{a+a-2}{2}}-\sqrt{\frac{a-a+2}{2}}=\sqrt{\frac{2a-2}{2}}-\sqrt{\frac{2}{2}}=\sqrt{a-1}-1$$

2) eger $1\leq a<2$ bolsa

$$\sqrt{\frac{a+|a-2|}{2}}-\sqrt{\frac{a-|a-2|}{2}}=\sqrt{\frac{a-a+2}{2}}-\sqrt{\frac{a+a-2}{2}}=\sqrt{\frac{2}{2}}-\sqrt{\frac{2a-2}{2}}=1-\sqrt{a-1}$$

2-mısal. $\sqrt{4\sqrt{2}+2\sqrt{6}}=\sqrt[4]{18}+\sqrt[4]{2}$ ten'ligin da'lillen'.

Da'lillew. (1) birdeylikten paydalanıp da'lilleymiz, bunda $A=4\sqrt{2}, B=24$

$$\sqrt{4\sqrt{2}+2\sqrt{6}}=\sqrt{\frac{4\sqrt{2}+\sqrt{32-24}}{2}}+\sqrt{\frac{4\sqrt{2}-\sqrt{32-24}}{2}}=\sqrt{3\sqrt{2}}+\sqrt{\sqrt{2}}=\sqrt[4]{18}+\sqrt[4]{2}.$$

3-mısal. $\dfrac{\sqrt{2a+\sqrt{a^2-6^2}}-\sqrt{a-6}}{\sqrt{2a-\sqrt{a^2-6^2}}+\sqrt{a-6}}$ an'latpasın a'piwayılastırın'.

Sheshiw.

$$\frac{\sqrt{2a+\sqrt{a^2-6^2}}-\sqrt{a-6}}{\sqrt{2a-\sqrt{a^2-6^2}}+\sqrt{a-6}}=\frac{\sqrt{\frac{2a+\sqrt{4a^2-4a^2+46^2}}{2}}+\sqrt{\frac{2a-\sqrt{4a^2-4a^2+46^2}}{2}}-\sqrt{a-6}}{\sqrt{\frac{2a+\sqrt{4a^2-4a^2+46^2}}{2}}-\sqrt{\frac{2a-\sqrt{4a^2-4a^2+46^2}}{2}}+\sqrt{a-6}}$$

$$=\frac{\sqrt{\frac{2a+26}{2}}+\sqrt{\frac{2a-26}{2}}-\sqrt{a-6}}{\sqrt{\frac{2a+26}{2}}-\sqrt{\frac{2a-26}{2}}+\sqrt{a-6}}=\frac{\sqrt{a+6}+\sqrt{a-6}-\sqrt{a-6}}{\sqrt{a+6}-\sqrt{a-6}+\sqrt{a-6}}=1$$

4-mısal. $\sqrt{13+30\sqrt{2+\sqrt{4\sqrt{2}+9}}}$ an'latpasın a'piwayılastırın'.

Sheshiw.

1) $\sqrt{9+4\sqrt{2}}=\sqrt{9+\sqrt{32}}=\sqrt{\frac{9+\sqrt{81-32}}{2}}+\sqrt{\frac{9-\sqrt{81-32}}{2}}=\sqrt{\frac{16}{2}}+\sqrt{1}=2\sqrt{2}+1$

2) $\sqrt{2+\sqrt{9+4\sqrt{2}}}=\sqrt{2+2\sqrt{2}+1}=\sqrt{3+\sqrt{8}}=\sqrt{\frac{3+\sqrt{9-8}}{2}}+\sqrt{\frac{3-\sqrt{9-8}}{2}}=\sqrt{2}+1$

3)

$$\sqrt{13+30(\sqrt{2}+1)}=\sqrt{43+30\sqrt{2}}=\sqrt{43+\sqrt{1800}}=\sqrt{\frac{43+\sqrt{1849-1800}}{2}}+\sqrt{\frac{43-\sqrt{1849-1800}}{2}}=$$

$$=\sqrt{\frac{43+7}{2}}+\sqrt{\frac{43-7}{2}}=5+3\sqrt{2}$$

5-mısal. $\dfrac{1}{1+\sqrt{7-\sqrt{24}}}-\dfrac{1}{\sqrt{7+\sqrt{24}}-1}$ an'latpasın a'piwayılastırın'.

Sheshiw. Berilgen an'latpanın' birinshi ha'm ekinshi bo'lsheginin' bo'limlerindegi quramalı koren'lerdi o'z aldına tu'rlendirip alamız.

1) $\sqrt{7+\sqrt{24}}=\sqrt{\frac{7+\sqrt{49-24}}{2}}+\sqrt{\frac{7-\sqrt{49-24}}{2}}=\sqrt{\frac{12}{2}}+\sqrt{1}=\sqrt{6}+1$

2) $\sqrt{7-\sqrt{24}}=\sqrt{\frac{7+\sqrt{49-24}}{2}}-\sqrt{\frac{7-\sqrt{49-24}}{2}}=\sqrt{\frac{12}{2}}-\sqrt{1}=\sqrt{6}-1$

Bul tabılg'anlardı berilgen bo'lshekke qoyamız:

$$\frac{1}{1+\sqrt{7-\sqrt{24}}}-\frac{1}{\sqrt{7+\sqrt{24}}-1}=\frac{1}{1+\sqrt{6}-1}-\frac{1}{\sqrt{6}+1-1}=\frac{1}{\sqrt{6}}-\frac{1}{\sqrt{6}}=0$$

6-mısal. $\dfrac{\sqrt{(4+\sqrt{15})^3}+\sqrt{(4-\sqrt{15})^3}}{\sqrt{(6+\sqrt{35})^3}+\sqrt{(6-\sqrt{35})^3}}$ an'latpasın a'piwayılastırın'.

Sheshiw. Berilgen an'latpanın' alımı ha'm bo'limindegi quramalı koren'lerdi o'z aldına tu'rlendirip alamız:

1) $\sqrt{4+\sqrt{15}}=\sqrt{\frac{4+\sqrt{16-15}}{2}}+\sqrt{\frac{4-\sqrt{16-15}}{2}}=\sqrt{\frac{5}{2}}+\sqrt{\frac{3}{2}}=\frac{\sqrt{5}+\sqrt{3}}{\sqrt{2}}$

2) $\sqrt{4-\sqrt{15}}=\sqrt{\frac{4+\sqrt{16-15}}{2}}-\sqrt{\frac{4-\sqrt{16-15}}{2}}=\sqrt{\frac{5}{2}}-\sqrt{\frac{3}{2}}=\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}$

3) $\sqrt{6+\sqrt{35}}=\sqrt{\frac{6+\sqrt{36-35}}{2}}+\sqrt{\frac{6-\sqrt{36-35}}{2}}=\sqrt{\frac{7}{2}}+\sqrt{\frac{5}{2}}=\frac{\sqrt{7}+\sqrt{5}}{\sqrt{2}}$

4) $\sqrt{6-\sqrt{35}}=\sqrt{\frac{6+\sqrt{36-35}}{2}}-\sqrt{\frac{6-\sqrt{36-35}}{2}}=\sqrt{\frac{7}{2}}-\sqrt{\frac{5}{2}}=\frac{\sqrt{7}-\sqrt{5}}{\sqrt{2}}$

Bul tabılg'an ma'nislerdi berilgen an'latpag'a qoyamız:

$$\frac{\sqrt{(4+\sqrt{15})^3}+\sqrt{(4-\sqrt{15})^3}}{\sqrt{(6+\sqrt{35})^3}+\sqrt{(6-\sqrt{35})^3}}=\frac{(4+\sqrt{15})\sqrt{4+\sqrt{15}}+(4-\sqrt{15})\sqrt{4-\sqrt{15}}}{(6+\sqrt{35})\sqrt{6+\sqrt{35}}+(6-\sqrt{35})\sqrt{6-\sqrt{35}}}=$$

$$=\frac{4\sqrt{4+\sqrt{15}}+\sqrt{15}\sqrt{4+\sqrt{15}}+4\sqrt{4-\sqrt{15}}-\sqrt{15}\sqrt{4-\sqrt{15}}}{6\sqrt{6+\sqrt{35}}+\sqrt{35}\sqrt{6+\sqrt{35}}+6\sqrt{6-\sqrt{35}}-\sqrt{35}\sqrt{6-\sqrt{35}}}=$$

$$=\frac{4\left(\sqrt{4+\sqrt{15}}+\sqrt{4-\sqrt{15}}\right)+\sqrt{15}\left(\sqrt{4+\sqrt{15}}+\sqrt{4-\sqrt{15}}\right)}{6\left(\sqrt{6+\sqrt{35}}+\sqrt{6-\sqrt{35}}\right)+\sqrt{35}\left(\sqrt{6+\sqrt{35}}+\sqrt{6-\sqrt{35}}\right)}=$$

$$=\frac{4\left(\frac{\sqrt{5}+\sqrt{3}}{\sqrt{2}}+\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}\right)+\sqrt{15}\left(\frac{\sqrt{5}+\sqrt{3}}{\sqrt{2}}+\frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}}\right)}{6\left(\frac{\sqrt{7}+\sqrt{5}}{\sqrt{2}}+\frac{\sqrt{7}-\sqrt{5}}{\sqrt{2}}\right)+\sqrt{35}\left(\frac{\sqrt{7}+\sqrt{5}}{\sqrt{2}}+\frac{\sqrt{7}-\sqrt{5}}{\sqrt{2}}\right)}=\frac{4\sqrt{10}+3\sqrt{10}}{6\sqrt{14}+5\sqrt{14}}=\frac{7\sqrt{10}}{11\sqrt{14}}=$$

$$=\frac{7}{11}\cdot\frac{\sqrt{2}\cdot\sqrt{5}}{\sqrt{2}\cdot\sqrt{7}}=\frac{\sqrt{7}\cdot\sqrt{5}}{11}=\frac{\sqrt{35}}{11}$$

A'debiyatlar:

1. V.V.Vavilov, I.I. Mel`nikov, S.N. Olexnik, P.I. Pasinchenko. Uravneniya i neravenstva. Moskva «Nauka» 1987.

2. M.A. Mirzaaxmedov, N.N.Mel`nikov, R.A.Karimov. Tenglama va tengsizliklarni echish. Toshkent «O`qituvchi» 1989.

3. I.I. Gaydukov. Absolyutnaya velichina. «Prosvechenie» 1968.

РЕЗЮМЕ

Maqolada matematika faniga qızıqadigan oqıvshilarning' qızıqishlarin yanada orttiradigan mısol va masalalar keltirilgan. Bu mısol va masalalar ularning bilim va ko'nikmalarin shakllantirishda katta ahamiyatga ega. Matematika faniga qızıqadigan oquvshilarning qızıqishin yanada orttirish. Logik mısol-masalalarni echib urgatish katta ahamiyatga ega.

РЕЗЮМЕ

В этой статье приведении примеры и задачи для студентов повышающие интерес к математике. Эти примеры и задачи имеют большое значение в разветии их новиков и знаний. Приведении логические примеры и задачи для студентов повышающие интерес к математике.

SUMMARY

In this article given examples and problems for students rising their interest to mathematics. These examples and problems have great meaning in developing their skills and knowledge. To involve active students who are interested in mathematics. To train students by solving various logical examples and tasks.