

**O'ZBEKISTON RESPUBLIKASI
QISHLOQ VA SUV XO'JALIGI
VAZIRLIGI
SAMARQAND QISHLOQ XO'JALIK
INSTITUTI**

**ELEMENTAR
MATEMATIKADAN
MASALALAR
YECHISH BO'YICHA
USLUBIY QO'LLANMA**

Samarqand - 2004

USLUBIY QO'LLANMA SAMARQAND
QISHLOQ XO'JALIK INSTITUTI OLIMLAR KENGASHI
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NASHIRGA TAVSIYA ETILGAN

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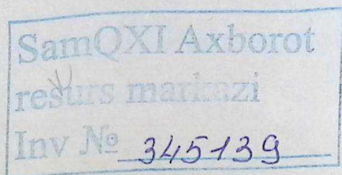
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O'ttiz yildan ortiq oliy o'quv yurtlarida matematik tahlil, oliy algebra, analitik geometriya, geometriya, oliy matematika, ehtimollar nazariyasi va matematik statistika fanlaridan olib borgan darslarimiz jarayonida talabalarning ko'pchiligi bilimlarida shu fanlar bo'yicha davlat o'quv dasturida belgilab qo'yilgan bilim, ko'nikma va malakalarni o'zlashtirish uchun zarur bo'ladigan o'rta maktab matematikasi elementlarining yetishmasligiga amin bo'ldik. Bu bilimlarsiz oliy matematika yo'nalishidagi fanlarni o'qitish o'ta samarasiz ish bo'lib qolmoqda. Talabalar bilimi, ko'nikmasi va malakasidagi maktab matematikasi bo'yicha bo'shliqni ma'lum darajada to'ldirish zarurati va oliy matematika o'qitishning samaradorligini oshirish maqsadida ushbu uslubiy qo'llanma tayyorlandi.

Uslubiy qo'llanma tayyorlashda agroinjener fakultetining 3 - bosqich tolibi J.R.Shokirov kerakli masala va misollarni to'plash, ularni tartibga solish ishlarida ishtirok etdi.

Uslubiy qo'llanma oliy o'quv yurtlari va kollejar talabalari, o'quvchilar va keng jamoatchilik uchun mo'ljallangan.



§1. ISHORALAR BILAN ISHLASH

Ikkita bir xil ishorali sonlar qo'shiladi va natija o'sha ishora bilan olinadi:

$$(+)+(+)=(+)$$

$$(-)+(-)=(-)$$

Misollar.

$$5+7=12$$

$$-5-7=-12.$$

Ikkita son har xil ishorali bo'lsa, ularning kattasidan kichigi ayriladi va natijaga katta sonning ishorasi qo'yiladi:

$$(+)-(-)=\text{kattasining ishorasi};$$

$$(-)-(+)=\text{kattasining ishorasi}.$$

Misollar:

$$5-7=-2$$

$$-5+7=2.$$

Ikkita bir xil ishorali sonlar ko'paytirilsa yoki bo'linsa, natija plus ishora bilan olinadi:

$$(+)\cdot(+)=(+); \quad (-)\cdot(-)=(+);$$

$$\frac{(+)}{(+)}=(+); \quad \frac{(-)}{(-)}=(+).$$

Misollar.

$$10 \cdot 2 = 20;$$

$$-10 \cdot (-2) = 20,$$

$$\frac{10}{2} = 5;$$

$$\frac{-10}{-2} = 5.$$

Ikkita son har xil ishorali бўlsa, ular көpaytirilsa yoki бўлинса, natija minus ishora bilan olinadi:

$$(+) \cdot (-) = (-); \quad (-) \cdot (+) = (-);$$

$$\frac{(+)}{(-)} = (-); \quad \frac{(-)}{(+)} = (-).$$

Misollar:

$$10 \cdot (-2) = -20;$$

$$-10 \cdot 2 = -20;$$

$$\frac{10}{-2} = -5;$$

$$\frac{-10}{2} = -5.$$

§2. BIR HAD VA KÕPHAD

Kõpaytiruv va bõluv bor joy bir had hisoblanadi:

$$a = 1 \cdot a; 24 \cdot 25; a \cdot b \cdot c; 2x \cdot y \cdot z; x : 3 \text{ va hokazo.}$$

Bir hadlar qõshuv va ayiruv ishoralari bilan boğlab yozilsa kõphad hosil bõladi:

$$x + y; 2x + 3; a \cdot b - m \cdot n - \text{ikki hadlar};$$

$$x + y - z; 2a - b + c; ax^2 + bx + c - \text{uch hadlar va hokazo.}$$

Kõpaytiruv, qõshuv, ayiruv bor joyda bir xil kõpaytuvchi qavsdan tashqariga chiqariladi va õrnida bir qoladi.

Misol:

$$\begin{aligned} & 24 \cdot 25 - 25 \cdot 24 + 24 \cdot 23 - 23 \cdot 22 - 12 \cdot 8 = \\ & = 25(26 \cdot 1 - 1 \cdot 24) + 23(24 \cdot 1 - 1 \cdot 22) - 96 = 25 \cdot 2 + 23 \cdot 2 - 96 = \\ & = 50 + 46 - 96 = 96 - 96 = 0. \end{aligned}$$

Misol:

$$\begin{aligned} & 21 \cdot 13 + 24 \cdot 13 + 45 \cdot 12 + 25 \cdot 44 - 89 \cdot 24 = \\ & = 13(21 \cdot 1 + 24 \cdot 1) + 45 \cdot 12 + 25 \cdot 44 - 89 \cdot 24 = \\ & = 13 \cdot 45 + 45 \cdot 12 + 25 \cdot 44 - 89 \cdot 24 = \\ & = 45(13 \cdot 1 + 1 \cdot 12) + 25 \cdot 44 - 89 \cdot 24 = \\ & = 45 \cdot 25 + 25 \cdot 44 - 89 \cdot 24 = \\ & = 25(45 \cdot 1 + 1 \cdot 44) - 89 \cdot 24 = \\ & = 25 \cdot 89 - 89 \cdot 24 = 89(25 \cdot 1 - 1 \cdot 24) = \\ & = 89 \cdot 1 = 89 \end{aligned}$$

Qavsning oldida turgan ifoda qavsning ichidagi har bir hadga alohida-alohida kõpaytiriladi:

$$2(3a-4b+5)=6a-8b+10;$$

$$3c(2a+4b-5)=6ac+12bc-15c;$$

$$(2x-3) \cdot (a-4)=2ax-8x-3a+12.$$

Bir xil asosli sonlar kōpaytirilganda asoslardan bittasi olinib daraja kōrsatkichlari qōshiladi:

$$a^m \cdot a^n = a^{m+n}; b^2 \cdot b = b^3; x \cdot x^3 = x^4;$$

$$x(ax^2-x+3)=ax^3-x^2+3x.$$

Qavs ichiga minus ishora kiritilsa yoki qavsdan minus ishora chiqarilsa, qavs ichidagi barcha hadlarning ishoralari qarama-qarshisiga almashadi:

$$-(a+b-c)=-a-b+c;$$

$$a \cdot (b-c)=-a(-b+c);$$

$$a+b+c=-(-a-b-c);$$

$$-a-b+c=-(a+b-c);$$

$$b-a=-(a-b)$$

va hokazo.

Xuddi shuningdek kasr oldida turgan minus ishora suratdagi yoki maxrajdagi barcha hadlarning ishoralarini qarama-qarshisiga almashtiradi:

$$-\frac{a-l}{b-c}=\frac{l-a}{b-c}; \quad \text{yoki} \quad -\frac{a-l}{b-c}=\frac{a-l}{c-b}.$$

§3. KASRLAR

$\frac{a}{b}$ - kasr;

a – kasrning surati;

b – kasrning maxraji.

Agar kasrning surati maxrajidan kichik ($a < b$) бўлса, bunday kasrni tōğri (oddiy) kasr deyiladi.

Agar kasrning surati maxrajidan katta ($a > b$) бўлса, bunday kasrni notōğri kasr deyiladi.

Misollar:

$\frac{3}{4}$ - tōğri (oddiy) kasr;

$\frac{5}{2}$ - notōğri kasr.

§4. ÑNLI KASR

Vergul qatnashgan 0,02; 5,7; 10,705 va hokazo sonlar ñnli kasrlarga misol bñladi.

Ñqilishi:

0,2 – nol butun ñndan ikki;

5,07 – besh butun yuzdan yetti;

3,00125 – uch butun yuzmingdan bir yuz yigirma besh;

0,001 -- nol butun mingdan bir.

Ñnli kasrning oxiriga hoxlagancha nollar yozish mumkin, bunda uning qiymati ñzgarmaydi:

$$2,35=2,3500; \quad 0,2=0,20; \quad 1,1=1,10000$$

va hokazo.

Ñnli kasr oxirida turgan nollarni tashlab yozish mumkin:

$$0.1200=0,12 \quad 1,20=1,2 \quad 1,57000=1,57$$

Ñnli kasrlarni qñshish:

$$\begin{array}{r} 0,157 \\ + \quad \underline{1,25237} \\ \hline 1,40937 \end{array} \qquad \begin{array}{r} 3,017152 \\ + \quad \underline{14,103} \\ \hline 17,120152 \end{array}$$

Ñnli kasrlarni ayirish:

$$\begin{array}{r} 0,43200 \\ - \quad \underline{0,33752} \\ \hline 0,09448 \end{array} \qquad \begin{array}{r} 217,0012 \\ - \quad \underline{26,89} \\ \hline 190,1112 \end{array}$$

Xulosa: ikkita ōnli kasrni qōshish va ayirishda butunning tagidan butun, kasrning tagidan kasr qismi yoziladi va olingan natijada vergul belgisi tagidan vergul qōyiladi.

Ōnli kasrlarni kōpaytirish:

$$1) 0,217$$

$$\begin{array}{r} * \\ \underline{0,5} \end{array}$$

$$0,1085$$

$$2) 2,712$$

$$\begin{array}{r} * \\ \underline{0,204} \end{array}$$

$$10848$$

$$+ \underline{5424}$$

$$0,553248$$

$$3) 1,527$$

$$\begin{array}{r} * \\ \underline{8,17} \end{array}$$

$$10689$$

$$+ 1527$$

$$\underline{12216}$$

$$12,47559$$

$$4) 5,2004$$

$$\begin{array}{r} * \\ \underline{1,2008} \end{array}$$

$$416032$$

$$+104008$$

$$\underline{52004}$$

$$6,24464032$$

Xulosa: ōnli kasrlarni kōpaytirish butun sonlarni kōpaytirish tartibida bajariladi. Kōpaytirilayotgan ōnli kasrlarda vergul belgisidan keyin nechta raqam turgan bōlsa, olingan natijaning oxiridan boshlab chap tomonga shuncha raqam sanaladi va uning oldiga vergul belgisi qōyiladi.

Õnli kasrlarni bõlish: õnli kasrlarni dastlab butun sonlarga aylantirib, sõngra ularni bõlish qulay. Buning uchun bõlinuvchi va bõluvchidagi vergullar bir xil sondagi raqamlar qadar õng tomonga suriladi:

$$1) \quad \frac{7,9763}{0,31} = \frac{79763}{3100} = 25,73.$$

$$\begin{array}{r} 79763 \quad | \quad 3100 \\ - 6200 \quad | \quad 25,73 \\ \hline 17763 \\ - 15500 \\ \hline 22630 \\ - 21700 \\ \hline 9300 \\ - 9300 \\ \hline 0 \end{array}$$

$$2) \quad \frac{0,17}{0,5} = \frac{17}{50};$$

$$3) \quad \frac{0,0015}{19} = \frac{15}{190000}.$$

Õnli kasrni 10, 100, 1000 va hokazo sonlarda kõpaytirish uchun vergulni birdan keyin nechta nol turgan bõlsa, õng tomonga shuncha surish kerak:

$$0,125 \cdot 10 = 1,25;$$

$$1,273 \cdot 100 = 127,3;$$

$$0,00012 \cdot 1000 = 0,12;$$

$$4,95 \cdot 10^2 = 495;$$

$$2,5 \cdot 10^3 = 2500;$$

$$0,002157 \cdot 10^4 = 21,57;$$

$$0,00006 \cdot 10^5 = 6.$$

Õnli kasrni 10, 100, 1000 va hokazo sonlarga bõlish uchun vergulni birdan keyin nechta nol turgan bõlsa, chap tomonga shuncha surish kerak:

$$12,3 : 10 = 1,23;$$

$$3,2 : 100 = 0,032;$$

$$0,001 : 1000 = 0,000001;$$

$$41,7 \cdot 10^{-1} = 4,17;$$

$$217,05 \cdot 10^{-2} = 2,1705;$$

$$5784,23 \cdot 10^{-3} = 5,78423;$$

$$0,2 \cdot 10^{-5} = 0,000002.$$

§5. DAVRIY ÒNLI KASR

0,222...; 0,777...; 2,171717...; 15,010101... sonlar davriy ònli kasrlarga misol bòladi. Unda takrorlanayotgan raqamlarni uning davri deyiladi.

0,222... davriy ònli kasrning davri 2 ga teng. Bu davriy ònli kasr qisqacha 0,(2) kòrinishda yoziladi.

Davriy ònli kasrlarni kasr kòrinishida yozish mumkin:

1) Agar davriy ònli kasrda butun qism nol bòlsa, vergul va qavs etiborga olinmasdan davrda turgan son kasrning suratiga, maxrajiga esa davrda nechta raqam bòlsa shuncha tòqqiz yoziladi:

$$0,(2) = \frac{2}{9}; \quad 0,(14) = \frac{14}{99};$$

2) 3,(5); 2,(13); 5,(207) kòrinishdagi davriy ònli kasrlar, kasrning suratiga vergul va qavssiz yoziladi handa undan qavsgacha bòlgan son ayiriladi, maxrajia esa davrda nechta raqam bòlsa shuncha tòqqiz qòyiladi:

$$3,(5) = \frac{35-3}{9} = \frac{32}{9} = 3\frac{5}{9};$$

$$2,(13) = \frac{213-2}{99} = \frac{211}{99} = 2\frac{13}{99};$$

$$5.(207) = \frac{5207 - 5}{999} = \frac{5202}{999} = 5 \frac{207}{999} = 5 \frac{23}{111}.$$

3) $3,2(5)$; $5,12(25)$ kōrinishdagi davriy ōnli kasrlar, kasrning suratiga vergul va qavssiz yoziladi hamda undan qavsgacha bōlgan son ayriladi, maxrajga esa davrda nechta raqam bōlsa shuncha tōqqiz, uning orqasidan vergul bilan qavs ōrtasida nechta raqam bōlsa shuncha nol qōyiladi:

$$3,2(5) = \frac{325 - 32}{90} = \frac{293}{90} = 3 \frac{23}{90},$$

$$5,12(25) = \frac{51225 - 512}{9900} = \frac{50713}{9900} = 5 \frac{1213}{9900}$$

Misol. $0.(2) + 0.(3)$ ni hisoblang.

Yechilishi.

$$0.(2) + 0.(3) = \frac{2}{9} + \frac{3}{9} = \frac{2+3}{9} = \frac{5}{9} = 0.(5).$$

§6. ARALASH SON

$2\frac{1}{3}$; $15\frac{4}{7}$ lar aralash sonlarga misol бўлади.

Ўқилиши:

$3\frac{2}{5}$ – uch butun beshdan ikki;

$8\frac{4}{7}$ – sakkiz butun yettiddan tōrt.

Aralash son notōgri kasrga aylantiriladi:

$$3\frac{2}{5} = \frac{5 \cdot 3 + 2}{5} = \frac{15 + 2}{5} = \frac{17}{5}.$$

Хулоса: aralash sonni notōgri kasrga aylantirish uchun maxraj bilan butun kōpaytirilib surat qōshiladi va natija suratga yoziladi, maxraj esa ōzgarishsiz joyida qoladi.

§7. KASRLAR USTIDA AMALLAR

$$2 - 4\frac{2}{3} + \frac{3}{4} - \frac{11}{6} =$$

Butun sonning Aralash To'g'ri Noto'g'ri
maxraji birga son kasr kasr

teng

$$= \frac{\overset{13}{2}}{1} - \frac{\overset{14}{14}}{3} + \frac{\overset{3}{3}}{4} - \frac{\overset{2}{11}}{6} =$$

Kasr, ayiruv, qo'shuv amallari bor joyda umumiy maxraj topiladi.

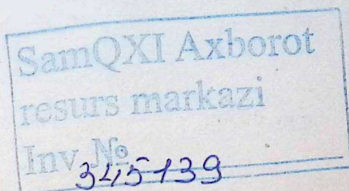
Barcha maxrajlarga bo'linadigan eng kichik songa umumiy maxraj deyiladi.

1,3,4,6 maxrajlarga bo'linadigan 12 soni umumiy maxraj bo'ladi.

Umumiy maxraj har bir kasrning maxrajiga bo'linib natija suratdagi son ustiga yoziladi va ular ko'paytirilib suratga yoziladi.

$$= \frac{2 \cdot 12 - 14 \cdot 4 + 3 \cdot 3 - 11 \cdot 2}{12} = \frac{24 - 56 + 9 - 22}{12} =$$

Bir xil ishorali sonlar qo'shiladi va natija o'sha ishora bilan olinadi.



$$= \frac{24 + 9 - 56 - 22}{12} = \frac{33 - 78}{12} =$$

Har xir ishorali sonlar kattasidan kishigi ayriladi va natijaga kattasining ishorasi qōyiladi.

$$= \frac{-45}{12} =$$

Kasrning suratidagi (yoki maxrajidagi) minus ishora kasrning oldiga yoziladi.

$$= -\frac{45}{12} =$$

Kasr bor joyda qisqarishni ōylash kerak.

45 bilan 12 sonlari 3 ga qisqaradi, 45 ni 3 ga bōlsak 15 tadan, 12 ni 3 ga bōlsak 4 tadan.

$$= -\frac{15}{4} =$$

15 ning ichida 4 uchtdan, maxraj ōzgarmaydi, qoldiq 3 suratga yoziladi.

$$= -3\frac{3}{4}.$$

Misol.

$$\begin{aligned}
 & 5,8 - \frac{3}{7} \cdot 2,2 \cdot \left(-2 \frac{1}{3}\right) = \\
 & = \frac{\overset{29}{\cancel{58}}}{\underset{5}{\cancel{10}}} + \frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{7}}} \cdot \frac{\overset{11}{\cancel{22}}}{\underset{5}{\cancel{10}}} \cdot \frac{\overset{1}{\cancel{7}}}{\underset{1}{\cancel{3}}} = \\
 & = \frac{29}{5} + \frac{11}{5} = \frac{29+11}{5} = \frac{40}{5} = 8
 \end{aligned}$$

Misol.

$$\begin{aligned}
 & \frac{3}{7} \cdot \left(1 \frac{2}{5} \cdot a + 2,1\right) + \frac{3}{5} \cdot \left(\frac{2}{3}a - \frac{5}{6}\right) = \\
 & = \frac{3}{7} \cdot \left(\frac{7 \cdot a}{5} + \frac{21}{10}\right) + \frac{3}{5} \cdot \left(\frac{2a}{3} - \frac{5}{6}\right) = \\
 & = \frac{3}{7} \cdot \frac{14a+21}{10} + \frac{\overset{1}{3}}{5} \cdot \frac{4a-5}{6} = \\
 & = \frac{\overset{1}{3} \cdot \cancel{7} \cdot (2a+3)}{\underset{1}{\cancel{7}} \cdot 10} + \frac{4a-5}{10} = \frac{\overset{1}{6}a+9}{10} + \frac{\overset{1}{4}a-5}{10} = \\
 & = \frac{6a+9+4a-5}{10} = \frac{10 \cdot a+4}{10} = \frac{\overset{1}{10}a}{\underset{1}{10}} + \frac{\overset{2}{4}}{\underset{5}{10}} = a + \frac{2}{5}
 \end{aligned}$$

Misol.

$$2 \cdot 4^{-2} + \left(\frac{2}{3}\right)^{-3} - \left(\frac{1}{5}\right)^0 =$$

$$= \left| \begin{array}{l} a^{-m} = \frac{1}{a^m}; \\ \left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m; \\ \left(\frac{a}{b}\right)^0 = 1; \\ \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}. \end{array} \right| =$$

$$= 2 \cdot \frac{1}{4^2} + \left(\frac{3}{2}\right)^3 - 1 =$$

$$= \frac{\overset{1}{2}}{\underset{8}{16}} + \frac{3^3}{2^3} - 1 = \frac{1}{8} + \frac{27}{8} - 1 =$$

$$= \frac{1+27-8}{8} = \frac{\overset{5}{20}}{\underset{2}{8}} = \frac{5}{2} = 2\frac{1}{2} = 2,5$$

Misol.

$$\frac{6,8 \cdot 0,04 \cdot 1,65}{3,3 \cdot 5,1 \cdot 0,16} = \frac{\overset{1}{68} \cdot \overset{1}{4} \cdot \overset{5}{165}}{\underset{1}{33} \cdot \underset{102}{510} \cdot \underset{4}{16}} = \frac{1}{6}$$

§8. QISQA KÖPAYTIRISH FORMULALARI

$$a^2 - b^2 = (a - b) \cdot (a + b);$$

$$(a + b)^2 = a^2 + 2ab + b^2;$$

$$(a - b)^2 = a^2 - 2ab + b^2;$$

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3;$$

$$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3;$$

$$a^3 + b^3 = (a + b) \cdot (a^2 - ab + b^2);$$

$$a^3 - b^3 = (a - b) \cdot (a^2 + ab + b^2).$$

Kvadratlar ayirmasi formulasiga doir misollar.

Misol. $4,5^2 - 1,5^2$ ni hisoblang.

Yechilishi.

$$4,5^2 - 1,5^2 = (4,5 - 1,5) \cdot (4,5 + 1,5) = 3 \cdot 6 = 18.$$

Misol. $(x - 3y)^2 - (x + y)^2$ ni soddalashtiring.

Yechilishi.

$$(x - 3y)^2 - (x + y)^2 = \left| \begin{array}{l} a^2 - b^2 = (a - b)(a + b); \\ a = x - 3y; \quad b = x + y. \end{array} \right| =$$

$$\begin{aligned}
 &= [x - 3y - (x + y)] \cdot (x - 3y + x + y) = \\
 &= (x - 3y - x - y) \cdot (2x - 2y) =
 \end{aligned}$$

$$= -4y \cdot 2(x - y) = -8y \cdot (x - y) = 8y(y - x)$$

Misol. $\frac{x^2 + 3xy}{9y^2 - x^2}$ kasrni qisqartiring.

Yechilishi.

$$\begin{aligned}
 \frac{x^2 + 3xy}{9y^2 - x^2} &= \frac{x(x + 3y)}{3^2 y^2 - x^2} = \\
 &= \left| a^m \cdot b^m = (a \cdot b)^m \right| = \frac{x(x + 3y)}{(3y)^2 - x^2} =
 \end{aligned}$$

$$\begin{aligned}
 &= \left| \begin{aligned} a^2 - b^2 &= (a - b) \cdot (a + b); \\ a &= 3y; \quad b = x. \end{aligned} \right| = \\
 &= \frac{x(x + 3y)}{(3y - x)(3y + x)} = \frac{x}{(3y - x)}
 \end{aligned}$$

$(a + b)^2 = a^2 + 2ab + b^2$ formulaga doir misollar.

Misol. $(2x + 3y)^2$

Yechilishi.

$$(2x + 3y)^2 = \left| \begin{aligned} a &= 2x \\ b &= 3y \end{aligned} \right| = (2x)^2 + 2 \cdot 2x \cdot 3y + (3y)^2 =$$

$$= |(a \cdot b)^m| = |a^m \cdot b^m| = 4x^2 + 12xy + 9y^2.$$

Misol. $\left(-\frac{1}{2}x - 3y^2\right)^2$.

Yechilishi.

$$\begin{aligned} \left(-\frac{1}{2}x - 3y^2\right)^2 &= \left[-\left(\frac{x}{2} + 3y^2\right)\right]^2 = \\ &= |(a \cdot b)^m| = |a^m \cdot b^m| = (-)^2 \left(\frac{x}{2} + 3y^2\right)^2 = \\ &= \left| \begin{array}{l} (-)^2 = + \\ a = \frac{x}{2}; \\ b = 3y^2. \end{array} \right| = \left(\frac{x}{2}\right)^2 + 2 \cdot \frac{x}{2} \cdot 3y^2 + (3y^2)^2 = \\ &= \left| \begin{array}{l} \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}; \\ \left(a^m\right)^n = a^{mn}. \end{array} \right| = \frac{x^2}{4} + 3xy^2 + 9y^4. \end{aligned}$$

Misol. $25 + 10x + x^2$.

Yechilishi.

$$25 + 10x + x^2 = 5^2 + 2 \cdot 5 \cdot x + x^2 = (5 + x)^2.$$

Misol. $40^2 + 80 \cdot 35 + 35^2$.

Yechilishi.

$$\begin{aligned} 40^2 + 80 \cdot 35 + 35^2 &= 40^2 + 2 \cdot 40 \cdot 35 + 35^2 = \\ &= (40 + 35)^2 = 75^2 = 5625 \end{aligned}$$

§9. KVADRAT TENGLAMALAR

$ax^2 + bx + c$ ni kvadrat uchhad deyiladi.

Tarkibida özgaruvchi qatnashgan tenglikka tenglama deyiladi.

Tenglikning ikkala tomoni bir xil bōlgan tenglamaga ayniyat deyiladi. Ayniyatning ildizlari soni cheksiz kōp bōladi.

$ax^2 + bx + c = 0$ ($a \neq 0$) ni tōla kvadrat tenglama deyiladi. Uning ildizlari

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

formula yordamida topiladi.

$x^2 + px + q = 0$ ni keltirilgan kvadrat tenglama deyiladi. Uning ildizlari

$$x_{1,2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

formula yordamida topiladi.

Kvadrat uchhadlar quyidagicha chiziqli ko'paytuvchilarga ajratiladi

$$ax^2 + bx + c = a(x - x_1)(x - x_2);$$

$$x^2 + px + q = (x - x_1)(x - x_2).$$

$D = b^2 - 4ac$ diskriminant kvadrat tenglamaning ildizlari

sonini aniqlaydi:

$D > 0$ бўlsa, ildiz ikkita;

$D = 0$ бўlsa, ildiz bitta;

$D < 0$ бўlsa, ildiz yõq.

§10. BIKVADRAT TENGLAMA.

$ax^4 + bx^2 + c = 0$ ($a \neq 0$) ni bikvadrat tenglama deyiladi.

Bu tenglamada $x^2 = y$ almashtirish olish orqali kvadrat tenglamaga keltirib yechiladi.

Misol. $2x^2 + 5x + 2 = 0$ tōla kvadrat tenglama berilgan:

- 1) ildizlari sonini toping;
- 2) ildizlarini toping;
- 3) chiziqli kōpaytuvchilarga ajrating.

Yechilishi.

$$a = 2; \quad b = 5; \quad c = 2.$$

$$1) \quad D = b^2 - 4ac = 5^2 - 4 \cdot 2 \cdot 2 = 25 - 16 = 9 > 0$$

Demak, yechim ikkita.

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 2 \cdot 2}}{2 \cdot 2} =$$

$$2) \quad \frac{-5 \pm \sqrt{9}}{4} = \frac{-5 \pm 3}{4} \Rightarrow$$

$$\Rightarrow \begin{cases} x_1 = \frac{-5-3}{4} = \frac{-8}{4} = -2; \\ x_2 = \frac{-5+3}{4} = \frac{-2}{4} = -\frac{1}{2} \end{cases} \Rightarrow \begin{cases} x_1 = -2; \\ x_2 = -\frac{1}{2}. \end{cases}$$

$$3) 2x^2 + 5x + 2 = 2\left(x + 2\right)\left(x + \frac{1}{2}\right).$$

Misol. $x^2 + 3x - 10 = 0$ keltirilgan kvadrat tenglama berilgan:

- 1) ildizlari sonini toping;
- 2) ildizlarini toping;
- 3) chiziqli kōpaytuvchilarga ajrating.

Yechilishi.

$$1) a = 1; \quad b = 3; \quad c = -10;$$

$$D = b^2 - 4ac = 3^2 - 4 \cdot 1 \cdot (-10) = 9 + 40 = 49 > 0$$

Demak, yechim ikkita.

$$2) p = 3; \quad q = -10;$$

$$\begin{aligned} x_{1,2} &= -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q} = \\ &= -\frac{3}{2} \pm \sqrt{\left(\frac{3}{2}\right)^2 - (-10)} = -\frac{3}{2} \pm \sqrt{\frac{9}{4} + 10} = \end{aligned}$$

$$= -\frac{3}{2} \pm \sqrt{\frac{9+40}{4}} = -\frac{3}{2} \pm \sqrt{\frac{49}{4}} = -\frac{3}{2} \pm \frac{7}{2} \Rightarrow$$

$$\Rightarrow \begin{cases} x_1 = -\frac{3}{2} + \frac{7}{2} = \frac{-3+7}{2} = \frac{4}{2} = 2 \\ x_2 = -\frac{3}{2} - \frac{7}{2} = \frac{-3-7}{2} = \frac{-10}{2} = -5 \end{cases} \Rightarrow \begin{cases} x_1 = 2 \\ x_2 = -5 \end{cases}$$

$$3) x^2 + 3x - 10 = (x + 5) \cdot (x - 2).$$

Misol. $x^2 - 10x + 25 = 0$ keltirilgan kvadrat tenglama berilgan:

- 1) ildizlari sonini toping;
- 2) ildizlarini toping;
- 3) chiziqli kōpaytuvchilarga ajrating.

Yechilishi.

$$1) a = 1; b = -10; c = 25;$$

$$D = b^2 - 4ac = (-10)^2 - 4 \cdot 1 \cdot 25 = 100 - 100 = 0$$

Demak, tenglamaning ildizi bitta.

$$2) p = -10; q = 25;$$

$$\begin{aligned} x_{1,2} &= -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q} = \frac{-(-10)}{2} \pm \sqrt{\left(\frac{-10}{2}\right)^2 - 25} = \\ &= 5 \pm \sqrt{25 - 25} = 5 \pm 0 = 5 \Rightarrow x_1 = x_2 = 5 \end{aligned}$$

$$3) x^2 - 10x + 25 = (x - 5) \cdot (x - 5) = (x - 5)^2$$

Misol. $9x^4 + 5x^2 - 4 = 0$ bikvadrat tenglamani yeching

Yechilishi.

$$x^2 = y;$$

$$9y^2 + 5y - 4 = 0$$

$$a = 9;$$

$$b = 5;$$

$$c = -4;$$

$$y_{1,2} = \frac{-5 \pm \sqrt{25 - 4 \cdot 9 \cdot (-4)}}{2 \cdot 9} = \frac{-5 \pm \sqrt{25 + 144}}{18} =$$

$$= \frac{-5 \pm \sqrt{169}}{18} = \frac{-5 \pm 13}{18} \Rightarrow$$

$$\Rightarrow \begin{cases} y_1 = \frac{-5 - 13}{18} = \frac{-18}{18} = -1; \\ y_2 = \frac{-5 + 13}{18} = \frac{8}{18} = \frac{4}{9}; \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} y_1 = -1; \\ y_2 = \frac{4}{9}; \end{cases} \Rightarrow \begin{cases} x^2 \neq -1; \\ x^2 = \frac{4}{9}; \end{cases} \Rightarrow$$

$$\Rightarrow x_{1,2} = \pm \frac{2}{3} \Rightarrow \begin{cases} x_1 = -\frac{2}{3}; \\ x_2 = \frac{2}{3}. \end{cases}$$

Bikvadrat tenglamaning yechimi ikkita ekan.

Misol. $x^4 - 10x^2 + 9 = 0$ bikvadrat tenglamani yeching.

Yechilishi.

$$x^4 - 10x^2 + 9 = 0;$$

$$x^2 = y;$$

$$y^2 - 10y + 9 = 0 \Rightarrow \begin{cases} p = -10 \\ q = 9 \end{cases}$$

$$y_{1,2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q} = -\frac{-10}{2} \pm \sqrt{\left(\frac{-10}{2}\right)^2 - 9} =$$

$$= 5 \pm \sqrt{25 - 9} = 5 \pm \sqrt{16} = 5 \pm 4 \Rightarrow$$

$$\Rightarrow \begin{cases} y_1 = 5 - 4 = 1 \\ y_2 = 5 + 4 = 9 \end{cases} \Rightarrow \begin{cases} y_1 = 1 \\ y_2 = 9 \end{cases} \Rightarrow \begin{cases} x^2 = 1 \\ x^2 = 9 \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} x_{1,2} = \pm 1 \\ x_{3,4} = \pm 3 \end{cases} \Rightarrow \begin{cases} x_1 = -1; \\ x_2 = 1; \\ x_3 = -3; \\ x_4 = 3. \end{cases}$$

Bikvadrat tenglamaning yechimi trtta ekan.

Bikvadrat tenglamaning ildizlari yig'indisi nolga teng bo'ladi:

$$x_1 + x_2 + x_3 + x_4 = -1 + 1 - 3 + 3 = 0.$$

§11. MUHIM ALGEBRAIK ALMASHTIRISHLAR

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

$$a^{-m} = \frac{1}{a^m}$$

$$\frac{a^m}{a^n} = a^{m-n};$$

$$\left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m;$$

$$(a \cdot b)^m = a^m \cdot b^m;$$

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

$$(a^m)^n = a^{m \cdot n};$$

$$\left(\frac{a}{b}\right)^0 = 1;$$

$$\sqrt[m]{a^n} = a^{\frac{n}{m}};$$

$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[m \cdot n]{a};$$

$$(\sqrt{a})^2 = \sqrt{a^2};$$

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d};$$

$$\sqrt{a^2} = |a|;$$

$$\frac{a}{b} : \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c};$$

$$|a| = \pm a;$$

$$a - b = -(b - a);$$

$$(\sqrt[3]{a})^3 = a;$$

$$a^m = a^n \Leftrightarrow m = n;$$

$\frac{a}{b}$ va $\frac{b}{a}$ teskari sonlar;

$$\frac{a}{b} \cdot \frac{b}{a} = 1;$$

a va $-a$ qarama – qarshi sonlar;

$$a + (-a) = 0$$

MUSTAQIL BAJARISH UCHUN TOPSHIRIQLAR

Amallarni yozma ravishda bajaring.

- | | |
|---------------------------------|------------------------------|
| 1. $200512 + 40007$; | 15. $-0,312 \cdot (-0,52)$; |
| 2. $-400003 - 491$; | 16. $-7,93 \cdot 0,8$; |
| 3. $1,0215 + 3,00065$; | 17. $3,275 \cdot (-1,203)$; |
| 4. $-2,00312 - 5,123$; | 18. $9275 : 25$; |
| 5. $40032 - 842$; | 19. $-325 : 12$; |
| 6. $-52000315 + 30105$; | 20. $-975 : (-5)$; |
| 7. $3,00215 - 0,512$; | 21. $475 : (-45)$ |
| 8. $-0,003002 + 0,0004$; | 22. $21 : (-2)$; |
| 9. $800543 \cdot 8005$; | 23. $-32 : 3$; |
| 10. $-90765 \cdot (-796)$; | 24. $-0,312 : 1,2$; |
| 11. $-700205 \cdot (-290305)$; | 25. $-1,82 : (-3,1)$; |
| 12. $485 \cdot (-50029)$; | 26. $4,525 : 0,5$. |
| 13. $-7009 \cdot 90807$; | |
| 14. $95,019 \cdot 0,25$; | |

27. Beshta oddiy kasr yozing va ularni o'nli kasrga keltiring.

28. Beshta noto'g'ri kasr yozing va ularni aralash son ko'rinishiga keltiring.

29. Beshta aralash son yozing, ularni noto'g'ri kasr ko'rinishiga keltiring.

30. $21 \cdot 18 - 19 \cdot 18 + 18 \cdot 17 - 17 \cdot 16 + 16 \cdot 15 - 15 \cdot 14$ ni hisoblang

31. $18 \cdot 36 - 6 \cdot 36 + 24 \cdot 27 - 25 \cdot 24 - 21 \cdot 5$ ni hisoblang.

32. $21 \cdot 17 - 18 \cdot 17 + 17 \cdot 15 - 15 \cdot 14 + 18 \cdot 13 - 15 \cdot 13$ ni hisoblang.

33. $36 \cdot 24 - 33 \cdot 24 + 17 \cdot 11 - 14 \cdot 11 + 18 \cdot 16 - 15 \cdot 16$ ni hisoblang.

34. $27 \cdot 23 - 24 \cdot 23 + 21 \cdot 19 - 18 \cdot 19 + 17 \cdot 11 - 14 \cdot 11$ ni hisoblang.

Soddalashtiring.

35. $8a + (3b + 5a);$

36. $(6a - 2b) - (5a + 3b);$

37. $5x - (2x - 3y);$

38. $(4x + 2) + (-x - 1);$

39. $3x^2 - (4x^2 + 2y);$

40. $0,6a^2 - (0,5a^2 - 0,4a);$

41. $3x^2 - (b^2 - 3a^2);$

42. $2,2b^2 - (2b^2 - 1,25);$

43. $-6 - 2(2 - y) - 2y + 2;$

44. $-8 - 2(1 - b) - 2b + 1;$

45. $0,2(5y - 0,02) - 0,3(2y - 1) + 0,9;$

46. $2x(x - 1) - (2x - 1)(x + 1);$

47. $2a(1 + 2a) + (1 + 2a)(1 - 2a);$

48. $(x - 1)(1 - 2x) - (3 - 2x);$

49. $3,5ab^2 - (0,3a^2 - 1,2a^2b + 2,3b^2)$;
 50. $-(1,7a^2 - 3,5b^2a + 0,8a^2b - 1,1b^2)$;
 51. $4,3x - (5,2x^2 + 3,4x^3 - 0,8x^4) -$
 $-(0,8x^4 + 1,6x^3 - 4,2x^2 + 4,3x)$.

Amallarni yozma ravishda bajarang.

52. $8277 : (3204 : 36)$;
 53. $5238 : (5626 : 58)$;
 54. $195840 : (32 \cdot 18)$;
 55. $538 \cdot (301608 : 426)$;
 56. $(281878 + 69543 - 286413) : 68$;
 57. $(543283 - 298354 - 178653) : 84$;
 58. $439060 + 432288 : 72$;
 59. $2010201 - 415498 : 83$;
 60. $202000 - (59595 + 78 \cdot 407)$;
 61. $603802 + (269522 - 194016 : 48)$;
 62. $(83 \cdot 250 - 14918) : 54$;
 63. $(972000 : 36 + 43 \cdot 1800) : 89$;
 64. $60014 - 14 \cdot 2675 : 25 \cdot 40$;
 65. $(60014 - 14) \cdot 2675 : 25 \cdot 40$;

$$66. 47040 : 14 : 7 : 32;$$

$$67. 319488 : 96 : 64 \cdot 230;$$

$$68. 5007 \cdot [11815 : 85 - (4808 - 4715)];$$

$$69. [(22962 : 534 + 9936 : 48) : 25 + 37] \cdot 43;$$

$$70. 38 \cdot 203 + 75 \cdot (514 - 476) + (15 + 23) \cdot 22$$

O'nli kasrlar bilan berilgan amallarni
yozma ravishda bajaring.

$$71. 395,486 + 4,58;$$

$$72. 1,9679 + 2065,0121;$$

$$73. 7,6 - 908,67;$$

$$74. 0,01237 - 0,0009876;$$

$$75. 6,05 \cdot 2,87;$$

$$76. 206,48 \cdot 90,507;$$

$$77. (15,94 + 17,54) : (10,96 + 16,04) \cdot 3,72 - 1,901;$$

$$78. [(4 : 0,128 + 1462825) : 1,011 \cdot 0,00008 + 6,84] : 12,5.$$

$$79. (69 - 5,52 : 0,69085) \cdot [(5 - 0,125) : (3,7 + 0,05).$$

$$80. 7,215 \cdot 10^2;$$

81. $0,0027 \cdot 10^3$;
 82. $2,148 \cdot 10^4$;
 83. $5,49 \cdot 10^5$;
 84. $84.487,5 \cdot 10^{-1}$;
 85. $2728,42 \cdot 10^{-2}$;
 86. $0,25 \cdot 10^{-3}$;
 87. $1,27 \cdot 10^{-4}$.

Davriy o'nli kasrlarni kasr ko'rinishida yozing.

- | | |
|-----------------------|------------------|
| 88. $0,(7)$; | 93. $650,(27)$; |
| <u>89.</u> $0,(27)$; | 94. $25,2(87)$; |
| 90. $0,(276)$; | 95. $5,03(28)$; |
| 91. $3,(36)$; | 96. $7,456(9)$; |
| 92. $27,(09)$; | |

Amallarni bajaring.

- | | |
|------------------------------------|---------------------------------|
| 97. $0,(7) + 0,(27)$; | 100. $27,(09) - 25,2(87)$; |
| 98. $3,(36) - 0,(276)$; | 101. $650,(27) \cdot 27,(09)$; |
| <u>99.</u> $25,2(87) + 5,03(28)$; | 102. $25,2(87) : 0,(5)$. |

Misollarni yeching.

$$103. -\frac{3}{15} + \frac{1}{5} - \frac{1}{3};$$

$$104. -\frac{1}{2} - \frac{1}{3};$$

$$105. \frac{1}{3} \cdot \left(-\frac{2}{7}\right) : \left(-\frac{5}{12}\right);$$

$$106. \frac{1}{2} - \frac{2}{3};$$

$$107. 3\frac{3}{4} - \frac{4}{5} + 3 - \frac{17}{10};$$

$$108. 1\frac{3}{5} - 3\frac{1}{5};$$

$$109. -\frac{2}{3} + 4 - 4\frac{3}{4} + \frac{7}{6} + 3\frac{1}{2};$$

$$110. \left(4\frac{1}{10} - 3\frac{4}{15}\right) \cdot \frac{5}{6} + 4\frac{1}{10} : 1\frac{1}{5};$$

$$111. \left(\frac{5}{9} - 1\frac{1}{6} \cdot \frac{1}{2}\right) : \frac{5}{9} + \frac{1}{3};$$

$$112. \left(7\frac{1}{3} - 6\frac{7}{8}\right) : \frac{3}{4} + 8\frac{8}{9} \cdot 2\frac{1}{80};$$

$$113. 6\frac{3}{8} - \left(2,5 - 2\frac{1}{3}\right) : 1\frac{1}{3};$$

$$114. \left(5\frac{3}{4} - 4\frac{8}{9} \right) \cdot 2 + 67\frac{1}{2} : 2\frac{1}{7};$$

$$115. \left(5\frac{1}{3} - 3,2 \right) : 2\frac{2}{3} + 1\frac{2}{5};$$

$$116. 1\frac{1}{4} + \frac{5}{12} : \left(\frac{1}{3} \cdot 2\frac{1}{2} - \frac{7}{8} \right);$$

$$117. \left(\frac{1}{6} - 1\frac{1}{15} + \frac{1}{10} \right) : 0,6 + 0,4;$$

$$118. 0,2 + 1,8 \cdot \left(\frac{4}{9} - 1\frac{1}{2} + \frac{1}{6} \right);$$

$$119. \left(3\frac{17}{36} - 5\frac{7}{12} \right) : \frac{2}{9} - \frac{3}{26} - 4\frac{1}{3};$$

$$120. \left(2,5 - 2\frac{1}{3} \right) \cdot 5,2 : 2\frac{3}{5}.$$

$$121. 0,8 + 0,2 : \left(\frac{7}{15} - 1\frac{1}{6} + \frac{9}{20} \right);$$

$$122. 1,75 - \left(-1\frac{2}{7} \right) \cdot 6,5 \cdot \frac{7}{9};$$

$$123. \left(12\frac{1}{9} - 10\frac{2}{5} \right) : 38\frac{1}{2} + 2\frac{8}{9} \cdot 18;$$

$$124. 4\frac{1}{2} \cdot 6^{-2} + \left(\frac{2}{3} \right)^{-3} - \left(\frac{2}{5} \right)^0;$$

$$125. 12 \cdot 3^{-3} + \left(\frac{3}{5} \right)^{-2} - \left(\frac{4}{9} \right)^0;$$

$$126. \left(\frac{1}{7}\right)^0 + 6 \cdot 2^{-3} + \left(\frac{2}{5}\right)^{-2};$$

$$127. 2\frac{2}{3} \cdot \left(1\frac{1}{2} \cdot a - 2\frac{1}{4}\right) + 1\frac{1}{5} \cdot \left(2\frac{1}{2}a - \frac{5}{6}\right);$$

$$128. 2\frac{1}{3} \cdot \left(\frac{6}{7}m + 3\right) - 1\frac{2}{3} \cdot \left(\frac{3}{5}m - 3\right);$$

$$\underline{129.} 2\frac{1}{2} \cdot \left(\frac{4}{5} \cdot x + 2\right) - 2\frac{1}{3} \cdot \left(\frac{3}{7} \cdot x - 6\right);$$

$$130. -\frac{1}{3} \cdot \left(-\frac{2}{7}\right) : \frac{5}{42};$$

$$131. \frac{42}{95} \cdot 1\frac{3}{14} : \frac{3}{5} : 2 \cdot 4\frac{3}{4};$$

$$132. 5\frac{5}{7} : 2\frac{2}{5} \cdot 5\frac{1}{4} : 1\frac{1}{6} \cdot \frac{3}{2};$$

$$133. 1\frac{8}{17} \cdot 3\frac{2}{5} : \frac{11}{12} \cdot 2\frac{1}{5} : \frac{4}{9};$$

$$134. \frac{3}{4} \cdot 1\frac{1}{7} : \frac{2}{15} \cdot 12\frac{1}{4} : 7\frac{1}{2};$$

$$135. \frac{0,7 \cdot 1,8 \cdot 2,6}{7,2 \cdot 7,8 \cdot 1,4};$$

$$136. \frac{0,15 \cdot 1,6 \cdot 4,6}{9,2 \cdot 0,03 \cdot 6,4};$$

$a^2 - b^2 = (a - b) \cdot (a + b)$ formulaga doir misollar.

$$137. (c - d) \cdot (c + d);$$

$$138. (m - n) \cdot (m + n);$$

$$139. (x - 7) \cdot (x + 7);$$

$$140. (x - 5) \cdot (-x - 5);$$

$$141. (b - 1) \cdot (-1 - b);$$

$$142. (2 - m) \cdot (-2 - m);$$

$$143. (2b - a) \cdot (2b + a);$$

$$144. (4c - d) \cdot (d + 4c);$$

$$145. (2a - 3b) \cdot (2a + 3b);$$

$$146. (36m - 9n)(-9n - 36m);$$

$$147. \left(4d - \frac{1}{2}\right) \cdot \left(4d + \frac{1}{2}\right);$$

$$148. \left(\frac{1}{2}x - \frac{1}{3}y\right) \left(\frac{1}{2}x + \frac{1}{3}y\right);$$

$$149. (2x^4 - 5y^3) \cdot (2x^4 + 5y^3);$$

$$150. (3x^2y - 4xy^2)(3x^2y + 4xy^2);$$

$$151. (3-x)(3+x) \cdot (9+x^2);$$

$$152. (x^2+1)(x+1) \cdot (x-1);$$

$$153. (9a^2+4b^2) \cdot (3a+2b) \cdot (3a-2b);$$

$$154. 7,5^2 - 2,5^2;$$

$$155. 9,7^2 - 1,3^2;$$

$$156. 2003^2 - 2002^2;$$

$$157. 1 - (8a-3)^2;$$

$$158. a^2 - 36;$$

$$159. b^2 - 49c^2;$$

$$160. (x^2+9)^2 - 36x^2;$$

$$161. (a^2+16)^2 - 64a^2;$$

$$162. (2a-b)^2 - (2a+b)^2;$$

$$163. 9 - (2c-1)^2;$$

$$164. (a^2+4)^2 - 16a^2;$$

$$165. (a-5)^2 - 25a^2;$$

$$166. (\sqrt{a}-\sqrt{b}) \cdot (\sqrt{a}+\sqrt{b});$$

$$167. (\sqrt[3]{x} - \sqrt[3]{y}) \cdot (\sqrt[3]{x} + \sqrt[3]{y});$$

$$168. (\sqrt[6]{m} - \sqrt[6]{n}) \cdot (\sqrt[6]{m} + \sqrt[6]{n}).$$

Kasrlarni qisqartiring.

$$169. \frac{a^2 - 2ab}{4b^2 - a^2};$$

$$171. \frac{x^2 + 2xy}{x^2 - 4y^2};$$

$$170. \frac{m^2 - 8mn}{64n^2 - m^2};$$

$$172. \frac{c^2 + 5cd}{25d - c^2}.$$

173. Agar $x = 4,5$ va $y = 3,5$ bo'lsa, $x^3 - x^2y - xy^2 + y^3$ ni hisoblang.

174. Agar $x = 71,8$ va $y = 70,8$ bo'lsa,

$x^3 - y^3 - 2y^2 + x^2 - 2xy - 3y - 1$ ni hisoblang.

$$(a + b)^2 = a^2 + 2ab + b^2 \quad \text{formulaga}$$

doir misollar.

Õqilishi: ikki son yig'indisining kvadrati birinchi son kvadrati plus birinchi son bilan ikkinchi son kōpaytmasining ikkilangani plus ikkinchi son kvadratiga teng.

Quyidagi ifodalarning nimaga tengligini yozing:

$$175. (c + d)^2;$$

$$187. (0,2x + 0,3y)^2;$$

$$176. (x + y)^2;$$

$$188. \left(\frac{x}{3} + \frac{y}{4}\right)^2;$$

$$177. (m + n)^2;$$

$$189. (0,4b + 0,5a)^2;$$

$$178. (2 + 4x)^2;$$

$$190. \left(\frac{1}{4}a^3 + \frac{4}{5}b^2\right)^2;$$

$$179. (2a + b)^2;$$

$$180. (3m + 2n)^2;$$

$$191. (-4ab - 5a^2)^2;$$

$$181. (a^2 + 1)^2;$$

$$192. (8p^3 + 5p^2)^2;$$

$$182. \left(c^2 + \frac{1}{2}\right)^2;$$

$$193. (-3b^2 - 2ab)^2;$$

$$183. (m^2 + 3)^2;$$

$$194. (4xy + 0,5y^2)^2.$$

$$184. (2x^2 + 3y^2)^2;$$

$$195. c^2 + 2c + 1;$$

$$185. (x^2 + y^2)^2;$$

$$196. 1 + 2a + a^2;$$

$$186. (3m^2 + n)^2;$$

$$197. 36b^2 + 12b + 1;$$

198. $4c^4 + 12c^2b^2 + 9b^4$;

205. $(\sqrt{a} + \sqrt{b})^2$;

199. $9m^2 + 30mn + 25n^2$;

206. $(\sqrt[3]{x} + \sqrt[3]{y})^2$;

200. $x^2 + 16x + 64$;

207. $(\sqrt[4]{c} + \sqrt[4]{d})^2$;

201. $x^4 + 2x^2y + y^2$;

208. $(\sqrt[6]{m} + \sqrt[6]{n})^2$.

202. $4x^2 + 4x + 1$;

203. $37^2 + 126 \cdot 37 + 63^2$;

204. $125^2 + 250 \cdot 81 + 81^2$

$(a - b)^2 = a^2 - 2ab + b^2$ formulaga doir misollar.

Ôqilishi: ikki son ayirmasining kvadrati birinchi son kvadrati minus birinchi son bilan ikkinchi son kōpaytmasining ikkilangani plyus ikkinchi son kvadratiga teng.

Quyidagi ifodalarning nimaga tengligini yozing.

209. $(x - y)^2$;

214. $(y - 6)^2$;

210. $(c - d)^2$;

215. $\left(a - \frac{1}{3}\right)^2$;

211. $(m - 2)^2$;

216. $\left(\frac{2}{5} - b\right)^2$;

212. $(7 - a)^2$;

213. $(x - 5)^2$;

$$217. \left(\frac{a}{2} - \frac{b}{3} \right)^2;$$

$$218. (0,5a - 0,2b)^2;$$

$$219. \left(\frac{3}{4}m^3 - \frac{4}{5} \right)^2;$$

$$220. (10x^2 - 3y^3)^2;$$

$$221. (8x^2 - 7y^2)^2;$$

$$222. (-4a + 5c)^2;$$

$$223. (-m + 4n)^2;$$

$$224. (6a^2b - 5ab^2)^2;$$

$$225. (-4xy^3 + 9x^3y)^2.$$

$$226. 9a^2 - 6a + 1;$$

$$227. 81 - 18x + x^2;$$

$$228. 100 - 60a + 9a^2;$$

$$229. 4x^2 - 20x + 25;$$

$$230. a^4 - 8a^2 + 16;$$

$$231. 25a^4 - 10a^2b + b^2;$$

$$232. b^4 - 18b^2 + 81;$$

$$233. 16 - 8a^2b^2 + a^4b^4;$$

$$234. (\sqrt{a} - \sqrt{b})^2;$$

$$235. (\sqrt[3]{x} - \sqrt[3]{y})^2;$$

$$236. (\sqrt[4]{c} - \sqrt[4]{d})^2;$$

$$237. (\sqrt[6]{m} - \sqrt[6]{n})^2.$$

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

formulaga doir misollar.

Õqilishi: ikki son yig'indisining kubi birinchi sonning kubi nlyus birinchi son kvadrati bilan ikkinchi son kōpaytmasining uchlangani plyus birinchi son bilan ikkinchi son kvadratining uchlangani plyus ikkinchi son kubiga teng.

Quyidagi ifodalarning nimaga tengligini yozing.

238. $(x + y)^3$;

247. $x^3 + 3x^2 + 3x + 1$;

239. $(c + d)^3$;

248. $x + 3^3\sqrt{x^2} + 3^3\sqrt{x} + 1$;

240. $(m + n)^3$;

249. $z^3 + 9z^2 + 27z + 27$;

241. $(2x + y)^3$;

250. $t^3 + 15t^2 + 75t + 125$;

242. $(c + 3d)^3$;

251. $779^3 + 3 \cdot 779^2 \cdot 221 + 3 \cdot 779 \cdot 221^2 + 221^3$;

244. $\left(a + \frac{1}{3}b\right)^3$;

252. $(\sqrt{a} + \sqrt{b})^3$;

245. $\left(\frac{2}{5}c + d\right)^3$;

253. $(\sqrt[3]{x} + \sqrt[3]{y})^3$;

254. $(\sqrt[4]{c} + \sqrt[4]{d})^3$;

246. $\left(\frac{2}{3}m + \frac{1}{2}n\right)^3$;

255. $(\sqrt[6]{m} + \sqrt[6]{n})^3$.

$$a^3 + b^3 = (a + b) \cdot (a^2 - ab + b^2)$$

formulaga doir misollar.

Quyidagi ifodalarning nimaga tengligini yozing.

273. $x^3 + y^3$;

283. $1 + 27b^3$;

274. $c^3 + d^3$;

284. $\frac{1}{27}m^3 + 64b^6$;

275. $m^3 + n^3$;

285. $(a + 5)(a^2 - 5a + 25)$;

276. $x^3 + 27$;

286. $(y^2 + 1) \cdot (y^4 - y^2 + 1)$;

277. $8 + c^3$;

287. $(2x + 3)(4x^2 - 6x + 9)$;

278. $8m^3 + 27n^3$;

288. $(x + y) \cdot (x^2 - xy + y^2)$;

279. $a^3 + 1$;

289. $(y^4 - y^2 + 1)(y^2 + 1)$;

280. $1 + c^3$;

290. $\left(\frac{4}{9}x^2 - \frac{1}{2}x + \frac{9}{16}\right) \cdot \left(\frac{2}{3}x + \frac{3}{4}\right)$;

281. $125 \cdot \frac{1}{27} + m^3$;

291. $(z^4 - z^2t^3 + t^6) \cdot (z^2 + t^3)$.

282. $8a^3 + 1$;

$$(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

formulaga doir misollar.

Õqilishi: ikki son ayirmasining kubi birinchi sonning kubi minus birinchi son kvadrati bilan ikkinchi son kōpaytmasining uchlangani plyus birinchi son bilan ikkinchi son kvadrati kōpaytmasining uchlangani minus ikkinchi son kubiga teng.

Quyidagi ifodalarning nimaga tengligini yozing.

256. $(x - y)^3$;

265. $8 - 12x + 6x^2 - x^3$;

257. $(c - d)^3$;

266. $a^3 - 15a^2 + 75a - 125$;

258. $(m - n)^3$;

267. $z^3 - 6z^2t + 12zt^2 - 8t^3$;

259. $(2x - y)^3$;

268.

260. $(c - 4d)^3$;

$8m^3 - 36m^2n + 54mn^2 - 27n^3$;

261. $(3m - 5n)^3$;

269. $(\sqrt{a} - \sqrt{b})^3$;

262. $\left(a - \frac{3}{4}b\right)^3$;

270. $(\sqrt[3]{x} - \sqrt[3]{y})^3$;

263. $\left(\frac{2}{3}c - d\right)^3$;

271. $(\sqrt[4]{c} - \sqrt[4]{d})^3$;

272. $(\sqrt[6]{m} - \sqrt[6]{n})^3$.

264. $\left(\frac{3}{4}m - \frac{2}{3}n\right)^3$;

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

formulaga doir misollar.

Quyidagi ifodalarning nimaga tengligini yozing.

292. $x^3 - y^3$;

301. $(x - 3)(x^2 + 3x + 9)$;

293. $c^3 - d^3$;

302. $(b - c)(b^2 + bc + c^2)$;

294. $m^3 - n^3$;

303. $(3x - 1)(9x^2 + 3x + 1)$;

295. $a^3 - 1$;

304. $(1 - 2t^2) \cdot (1 + 2t^2 + 4t^4)$;

296. $1 - c^3$;

305. $(a^2 - b) \cdot (a^4 + a^2b + b^2)$;

297. $27m^3 - 125n^3$;

306. $(m^2 + 2mn^2 + 4n^4) \cdot (m - 2n^2)$;

298. $\frac{1}{8} - a^3$;

307.

$(x^4 + 3x^2y + 9y^2) \cdot (x^2 - 3y)$;

299. $\frac{a^3}{b^3} - \frac{c^3}{d^3}$;

308. $\left(\frac{a^2}{9} + \frac{5a}{3b} + \frac{25}{b^2}\right) \cdot \left(\frac{a}{3} - \frac{5}{b}\right)$.

300. $\frac{8m^3}{n^3} - \frac{t^3}{27}$;

Aralash misollar.

Misollarni bajaring.

$$\underline{309.} \quad \frac{1^2 - 0,4^2}{2,8 \cdot 0,4 - 2,8};$$

$$310. \quad \frac{0,2^2 + 2 \cdot 0,2 \cdot 0,3 + 0,3^2}{0,5 \cdot 0,4 - 0,5 \cdot 0,6};$$

$$311. \quad 3,104 \cdot 10^{-2} + 1,81 \cdot 10^{-3};$$

$$312. \quad 2,701 \cdot 10^{-4} + 3,205 \cdot 10^{-3}$$

$$313. \quad 1,011 \cdot 10^{-3} + 2,1 \cdot 10^{-4}.$$

$$314. \quad 1,015 \cdot 10^{-4} + 3,14 \cdot 10^{-5};$$

$$315. \quad \frac{3 - \sqrt{5}}{3 + \sqrt{5}} + \frac{3 + \sqrt{5}}{3 - \sqrt{5}};$$

$$316. \quad \frac{3 + \sqrt{7}}{3 - \sqrt{7}} - \frac{3 - \sqrt{7}}{3 + \sqrt{7}};$$

$$317. \quad \frac{4 - \sqrt{2}}{4 + \sqrt{2}} - \frac{4 + \sqrt{2}}{4 - \sqrt{2}};$$

$$318. \quad \frac{4 + \sqrt{6}}{4 - \sqrt{6}} + \frac{4 - \sqrt{6}}{4 + \sqrt{6}};$$

$$\underline{319.} \quad \sqrt{\frac{65^3 + 35^3}{100}} - 65 \cdot 35;$$

$$320. \quad \sqrt{\frac{68^3 - 32^3}{36}} - 68 \cdot 32;$$

$$321. \sqrt{\frac{82^3 - 18^3}{64}} - 82 \cdot 18;$$

$$322. \frac{1000^3 + 3 \cdot 1000 \cdot 995 \cdot 1995 + 995^3}{1000^2 + 2 \cdot 1000 \cdot 995 + 995^2};$$

$$323. \frac{{}^3\sqrt{x^2} + 2^3\sqrt{x} + 1}{x + 3^3\sqrt{x^2} + 3^3\sqrt{x} + 1} - \frac{1}{{}^3\sqrt{x+1}};$$

$$324. \frac{x^3 + x^2 + x + 1}{x^2 + 1};$$

$$325. \frac{x^3 + 2x^2 + x}{(x+1)^2};$$

$$326. \frac{1 - x^{-1} + x^{-2}}{1 - x + x^2};$$

$$327. (x^{-1} + y^{-1}) \cdot \frac{xy}{(x+y)^2};$$

$$328. \frac{(x + \sqrt{y}) \cdot \sqrt{y - 2\sqrt{y} \cdot x + x^2}}{y - x^2}, x = \sqrt{24}, y = 23$$

$$329. \frac{(\sqrt{m+n})\sqrt{m-2\sqrt{mn}+n^2}}{m-n^2}, m=15; n=\sqrt{18};$$

$$330. \left(x - \frac{1+x^2}{x-1}\right) : \frac{x^2+2x+1}{x-1};$$

$$331. \left(m^2 - \frac{1+m^4}{m^2-1}\right) : \frac{m^2+1}{m+1};$$

$$332. \left(b^2 - \frac{1+b^4}{b^2+1} \right) : \frac{1-b}{1+b^2};$$

$$333. \left(\frac{3a}{a+6} - \frac{2a}{a^2+12a+36} \right) : \frac{3a+16}{a^2-36} + \frac{6(a-6)}{a+6};$$

$$334. \left(\frac{3a}{a-4} + \frac{10a}{a^2-8a+16} \right) : \frac{3a-2}{a^2-16} - \frac{4(a+4)}{a-4};$$

$$335. \left(\frac{5m}{m+3} - \frac{14n}{m^2+6m+9} \right) : \frac{5m+1}{m^2-9} + \frac{3(m-3)}{m+3};$$

$$336. \left(\frac{2x}{x-5} + \frac{x}{x^2-10x+25} \right) : \frac{2x-9}{x^2-25} - \frac{5(x+5)}{x-5};$$

$$337. \left(\frac{\overset{1}{x^2} - \overset{1}{y^2}}{x-y} - \frac{1}{\overset{1}{x^2} - \overset{1}{y^2}} \right) : \frac{\overset{1}{x} + \overset{1}{2x^2} \overset{1}{y^2} + \overset{1}{y}}{4 \cdot \overset{1}{y^2}};$$

$$338. \left(\frac{a^{0.5} - b^{0.5}}{a^{0.5} + b^{0.5}} + \frac{2 \cdot a^{0.5} \cdot b^{0.5}}{a-b} \right) : \frac{b - 2 \cdot a^{0.5} \cdot b^{0.5} + a}{a+b};$$

$$339. \frac{a+b}{a+2 \cdot a^{0.5} \cdot b^{0.5} + b} : \left(\frac{a^{0.5} + b^{0.5}}{a^{0.5} - b^{0.5}} - \frac{2 \cdot a^{0.5} \cdot b^{0.5}}{a-b} \right).$$

Tõla kvadrat tenglama berilgan:

1) diskriminant yordamida ildizlari sonini aniqlang;

2) ildizlarini toping;

3) chiziqli kōpaytuvchilarga ajrating.

$$340. 3x^2 - 13x + 4 = 0;$$

$$341. 2x^2 - 5x - 12 = 0;$$

$$342. 2x^2 - 3x - 9 = 0;$$

$$343. 4x^2 - 11x - 3 = 0;$$

$$344. 7x^2 - 5x - 2 = 0;$$

$$345. 5x^2 - 11x + 2 = 0;$$

$$346. 4x^2 - 17x + 4 = 0;$$

$$347. 2x^2 - 5x - 3 = 0;$$

$$348. 4x^2 - 9x + 2 = 0;$$

$$349. 4x^2 + 9x + 2 = 0;$$

$$350. 16y^2 - 120y + 125 = 0;$$

$$351. 4x^2 + 3x - 27 = 0;$$

$$352. 5n^2 - 9n - 44 = 0;$$

$$353. 9a^2 - a - 38 = 0;$$

$$354. 3t^2 + t - 2 = 0;$$

$$355. 3t^2 - 5t + 2 = 0;$$

$$356. 3m^2 + 10m - 8 = 0.$$

Keltirilgan kvadrat tenglama berilgan:

1. diskriminant yordamida ildizlari sonini aniqlang;
2. yechimlarini toping;
3. chiziqli kōpaytuvchilarga ajrating.

$$357. x^2 + 4x - 5 = 0;$$

$$363. x^2 + 5x + 6 = 0;$$

$$358. x^2 - 6x - 7 = 0;$$

$$364. x^2 - 6x + 5 = 0;$$

$$359. x^2 - 8x - 9 = 0;$$

$$365. x^2 - 8x + 15 = 0;$$

$$360. x^2 + 6x - 40 = 0;$$

$$366. x^2 - 7x + 12 = 0;$$

$$361. x^2 + x - 6 = 0;$$

$$367. x^2 + 8x + 7 = 0;$$

$$362. x^2 - x - 2 = 0;$$

$$368. x^2 + 2x - 15 = 0.$$

Bikvadrat tenglamani yeching.

$$369. x^4 - 10x^2 + 9 = 0;$$

$$373. x^4 - 3x^2 - 4 = 0;$$

$$370. x^4 - 5x + 4 = 0;$$

$$374. x^4 + 3x^2 - 4 = 0;$$

$$371. x^4 - 13x^2 + 36 = 0;$$

$$375. x^4 + x^2 - 20 = 0;$$

$$372. x^4 - 50x^2 + 49 = 0;$$

$$376. x^4 - 4x^2 - 5 = 0.$$

Foydalanilgan adabiyotlar.

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§12. FOIZLAR

Foizga doir uch masala.

1. Berilgan a sonning kōrsatilgan p foizini topish uchun a sonni p foiziga kōpaytirib 100 ga bōlinadi:

$$\frac{a \cdot p}{100}.$$

2. a sonning foizdagi miqdori b va foizi p ga asosan a sonning ōzini topish uchun foizdagi miqdori b ni p foizga bōlib 100 ga kōpaytiriladi.

$$a = \frac{b}{p} \cdot 100.$$

3. Biror a sonning boshqa b songa nisbatan foizini topish uchun a sonni 100 ga kōpaytirib, b songa bōlinadi:

$$\frac{100 \cdot a}{b}$$

Murakkab foiz formulasi:

$$A = a \cdot \left(1 + \frac{p}{100} \right)^t.$$

a - omonatga qōyilayotgan pul miqdori;

p - foiz;

t - muddat (yil, oy).

Muddatli tōlavlar formulasi:

$$x = \frac{A \cdot r^n \cdot (1 - r)}{1 - r^n}$$

A - pul miqdori;

$$r = 1 + \frac{p}{100};$$

p - foiz;

n - mudat (yil, oy).

Misol 377. Dōkonga 96 t karam keltirildi. Agar karamning 80% i sotilgan bōlsa, dōkonda qancha karam qolgan?

Yechilishi.

$$100 - 80 = 20\% \text{ karam qolgan.}$$

1- Usul.

$$\frac{a \cdot p}{100} = \frac{96 \cdot 20}{100} = 19,2 t.$$

2- Usul

$$96 t \text{ — } 100\%$$

$$x t \text{ — } 20\%$$

$$100 \cdot x = 96 \cdot 20$$

$$x = \frac{96 \cdot 20}{100} = 19,2t.$$

Misol 378. Ishchining oylik maoshi 35 000 sōm. Agar uning maoshi 30% ortsa, u qancha maosh oladi?

Yechilishi.

1-Usul.

$$A = a \cdot \left(1 + \frac{p}{100}\right)^t = 35000 \left(1 + \frac{30}{100}\right)^1 = 35000 \cdot 1,3 = 45500 \text{ sōm.}$$

2-Usul. Masala shartida “ortdi” sōzi ishlatilsa, 100 ga ōsha ortgan foiz qōshiladi, aksincha “kamaydi” sōzi bolsa ayriladi.

$$100 + 30 = 130\%$$

$$35000 - 100\%$$

$$x - 130\%$$

$$100 \cdot x = 35000 \cdot 130$$

$$x = \frac{35000 \cdot 130}{100} = 45500 \text{ sōm.}$$

Misol 379. Oraliq nazoratning maksimal bali 10 ga teng. Talaba ushbu nazoratdan 8 ball to'plagan bo'lsa, u necha bahoga to'g'ri keladi?

Agar 55% — 70,9% uchun “3”, 71% — 85,9% uchun “4”, 86% — 100% uchun “5” baho qo'yilsa.

Yechilishi.

$$10 \quad \text{—} \quad 100\%$$

$$8 \quad \text{—} \quad x\%$$

$$10 \cdot x = 8 \cdot 100$$

$$x = \frac{8 \cdot 100}{10} = 80\%.$$

To'plangan ball 4 bahoga to'g'ri kelar ekan.

Misol 380. Massasi 400 g va konsentratsiyasi 8% bo'lgan eritma massasi 600g va konsentratsiyasi 13% bo'lgan eritma bilan aralashtirildi. Hosil bo'lgan aralashmaning konsentratsiyasini (%) toping.

Yechilishi.

$$1) 400\text{g} \quad \text{—} \quad 100\%$$

$$x \text{ g} \quad \text{—} \quad 8\%$$

$$100 \cdot x = 400 \cdot 8;$$

$$x = \frac{400 \cdot 8}{100} = 32g.$$

$$2) \quad 600g \quad \text{—} \quad 100\%$$

$$x \text{ g} \quad \text{—} \quad 13\%$$

$$100 \cdot x = 600 \cdot 13;$$

$$x = \frac{600 \cdot 13}{100} = 78g.$$

$$3) \quad 400g + 600g = 1000g.$$

$$32g + 78g = 110g.$$

$$1000g \quad \text{—} \quad 100\%$$

$$110g \quad \text{—} \quad x\%$$

$$1000 \cdot x = 110 \cdot 100;$$

$$x = \frac{110 \cdot 100}{1000} = 11\%.$$

Misol 381. Gösht qaynatilganda öz vaznining 40% ini yõqotadi. 6 kg pishgan gõsht hosil qilish uchun qozonga necha kg gõsht solish kerak?

Yechilishi.

1- Usul

$$100 - 40 = 60\%.$$

$$\frac{x \cdot 60}{100} = 6 \Rightarrow x = 10 \text{ kg}.$$

2- Usul

$$x \text{ kg} \quad - \quad 100\%$$

$$6 \text{ kg} \quad - \quad 60\%$$

$$60 \cdot x = 100 \cdot 6;$$

$$x = \frac{100 \cdot 6}{60} = 10 \text{ kg}.$$

Misol 382. Magazinga keltirilgan tarvuzlarning 56% i birinchi kuni, qolgan 132 tasi ikkinchi kuni sotildi. Birinchi kuni qancha tarvuz sotilgan?

Yechilishi.

$$100 - 56 = 44\%$$

1- Usul

$$x \text{ ----- } 56 \%$$

$$132 \text{ ----- } 44 \%$$

$$44 \cdot x = 132 \cdot 56 \Leftrightarrow x = \frac{132 \cdot 56}{44} = 168.$$

2-usul

$$0,56 \cdot x + 132 = x \Leftrightarrow x - 0,56x = 132 \Leftrightarrow$$

$$0,44x = 132 \Rightarrow x = \frac{132}{0,44} = \frac{13200}{44} = 300 \Rightarrow$$

$$\Rightarrow 300 - 132 = 168.$$

Misol 383. Noma'lum sonning 28% i $3\frac{1}{3}$ ning 42% i ga teng. Noma'lum sonni toping.

Yechilishi.

Foizda berilgan son 100 ga bōlinib, songa kōpaytiriladi.

$$0,28 \cdot x = 3\frac{1}{3} \cdot 0,42 \Leftrightarrow 0,28 x = \frac{10}{3} \cdot 0,42 \quad | \cdot 100 \Leftrightarrow$$

$$\Leftrightarrow 28x = \frac{10}{\cancel{3}^1} \cdot \overset{14}{\cancel{42}} \Rightarrow x = \frac{140}{28} \Rightarrow x = 5$$

Misol 384. Omonat kassaga 60% bilan 10 000 sōm qōyildi. 3 yilgan sōng necha sōm bōlishini hisoblang.

Yechilishi.

$$a = 10000 \text{ s\o{m}}$$

$$p = 60 \%$$

$$t = 3 \text{ yil}$$

$$A = ?$$

$$A = a \left(1 + \frac{p}{100} \right)^t = 10000 \left(1 + \frac{60}{100} \right)^3 =$$

$$= 10000 \cdot 1,6^3 = 10000 \cdot 4,096 = 40960 \text{ s\o{m}}.$$

Misol 385. 20 yildan s\o{ng} 2 million s\o{m} b\o{lishi} uchun omonat kassaga muddatli omonat sifatida qancha omonat q\o{yish} kerak. Yillik daromad 60 % b\o{lsin}.

Yechilishi.

$$A = 2000000$$

$$p = 60 \%$$

$$t = 20$$

$$a = ?$$

$$2000000 = a \left(1 + \frac{60}{100} \right)^{20};$$

$$2000000 = a \cdot 1,6^{20};$$

$$a = \frac{2000000}{1,6^{20}} = \frac{2000000}{12089} \approx 166.$$

$$a \approx 166 \text{ s\o{m}.}$$

Misol 386. Talaba bankdan kontrakt pulini t\o{lash uchun 30% bilan 500000 som olsa, bankdan bir yildan s\o{ng necha s\o{m qarz boladi?}

Yechilishi.

$$100 + 30 = 130\%$$

$$500000 - 100 \%$$

$$x - 130 \%$$

$$100 \cdot x = 500000 \cdot 130;$$

$$x = \frac{500000 \cdot 130}{100} = 650000;$$

$$650000 - 500000 = 150000 \text{ s\o{m}.}$$

Misol 387. Talaba yillik daromadidan 510000 s\o{m kontrakt pulini t\o{lashi uchun 60% bilan bankka necha s\o{m pul q\o{yishi kerak?}

Yechilishi.

$$a + 510000 = a \left(1 + \frac{60}{100} \right);$$

$$a + 510000 = 1,6a;$$

$$1,6a - a = 510000;$$

$$0,6a = 510000;$$

$$a = 850000 \text{ s\o{m}.}$$

Misol 388. Talaba bankdan kontrakt nulini t\o{lash uchun 30% bilan birichi yili 400000 s\o{m, ikkinchi yili 450 000 s\o{m, uchinchi yili 500 000 s\o{m, tortinchi yili 510000 s\o{m olsa, \o{qishni bitirgandagi qarzini hisoblang.

Yechilishi.

$$r = 1,3$$

$$a = 400000$$

$$b = 450000$$

$$m = 500000$$

$$n = 510000$$

$$A = ?$$

$$\begin{aligned} A &= ar^4 + br^3 + mr^2 + nr = \\ &400000 \cdot 1,3^4 + 450000 \cdot 1,3^3 + \\ &+ 500000 \cdot 1,3^2 + 510000 \cdot 1,3 = \\ &= 1142440 + 988650 + 845000 + \\ &+ 663000 = 3639090 \text{ so' m.} \end{aligned}$$

Ushbu pul bankdan olinmasdan t\o{gridan- t\o{gri t\o{langanda 1860 000 s\o{m bolar edi.

Misol 389. Talaba bankdan 30% bilan olgan 3639090 sōm qarzini, tuzilgan shartnomaga asosan 10 yilda uzishi uchun har yili necha sōmdan vzos to'lashi kerak?

Yechilishi.

$$A = 3639090 \text{ sōm}$$

$$n = 10 \text{ yil}$$

$$p = 30\%$$

$$r = 1 + \frac{30}{100} = 1,3$$

$$x = ?$$

$$\begin{aligned} x &= \frac{A \cdot r^n (1-r)}{1-r^n} = \frac{3639090 \cdot 1,3^{10} (1-1,3)}{1-1,3^{10}} = \\ &= \frac{3639090 \cdot 1,38 (-0,3)}{1-13,8} = \\ &= \frac{-3639090 \cdot 1,38 \cdot 0,3}{-12,8} = \\ &= 1177018 \text{ sōm.} \end{aligned}$$

Misol 390. Qiymati 6000 000 sōm bōlgan uy ōsib boruvchi 30% bilan 10 yil muddatga qarzga berildi. Uy oluvchi qarzidan qutilishi uchun har yili necha sōmdan vzos tōlab borishi kerak?

Yechilishi.

$$A = 6000000 \text{ s\o{m}}$$

$$n = 10 \text{ yil}$$

$$p = 30\%$$

$$\underline{r = 1,3}$$

$$x = ?$$

$$x = \frac{A \cdot r^n (r - 1)}{r^n - 1} = \frac{6000000 \cdot 1,3^{10} (1,3 - 1)}{1,3^{10} - 1} =$$

$$= \frac{24840000}{12,8} = 1940625 \text{ s\o{m.}}$$

Oyiga: 161719 s\o{m.}

Misol 391. Ishchining ish normasini bajarishga ketadigan vaqti 12% ga qisqardi. Uning mehnat unumdorligi necha foiz ortgan?

Yechilishi.

$$u = \mu \cdot t;$$

u - ish; μ - mehnat unumdorlik; t - vaqt.

Masalani yechishda $\mu = \frac{100 \cdot t}{100 \pm t}$ formuladan

foydalanamiz.

Masala shartida vaqt 12% ga qisqarganligi uchun formula manfiy ishora bilan olinadi.

$$M = \frac{100 \cdot t}{100 - t} = \frac{100 \cdot 12}{100 - 12} = \frac{100 \cdot 12}{88} = \frac{150}{11} = 13 \frac{7}{11} \%$$

Misol 392. Ishchining mehnat unimdorligi 15% ga ortsa, uning ish normasini bajarishga ketadigan vaqti necha foizga qisqaradi ?

Yechilishi.

$$t = \frac{100 \cdot \mu}{100 \pm \mu}$$

formuladan foydalanamiz

Masala shartida mehnat unimdorlik 15% ortganligi uchun formula musbat ishora bilan olinadi.

$$t = \frac{100 \cdot \mu}{100 + \mu} = \frac{100 \cdot 15}{100 + 15} = \frac{100 \cdot 15}{115} = \frac{300}{23} = 13 \frac{1}{23} \%$$

Misol 393. Agar tezlik 25 % ga ortsa, ma'lum masofani bosib o'tish uchun ketadigan vaqt necha foiz kamayadi?

Yechilishi.

$\mu = \mu \cdot t$ va $S = v \cdot t$ formulalar o'xshash b'lganligi uchun

$$\mu = \frac{100 \cdot t}{100 \pm t} \quad \text{va} \quad t = \frac{100 \cdot \mu}{100 \pm \mu}$$

formulalarga o'xshash b'olgan

$$v = \frac{100 \cdot t}{100 \pm t} \text{ va } t = \frac{100 \cdot 9}{100 \pm 9}$$

formulalardan foydalanish mumkin.

$$t = \frac{100 \cdot 25}{100 + 25} = \frac{100 \cdot \overset{1}{\cancel{25}}}{\underset{5}{\cancel{125}}} = \frac{100}{5} = 20\%$$

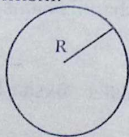
Misol 394. Myayyan masofani bosib o'tish uchun ketadigan vaqtni 25% ga qisqartirish uchun tezlikni necha foiz oshirish kerak?

Yechilishi.

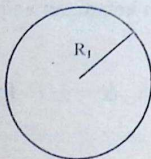
$$v = \frac{100 \cdot t}{100 - t} = \frac{100 \cdot 25}{100 - 25} = \frac{100 \cdot \overset{4}{\cancel{25}}}{\underset{3}{\cancel{75}}} = \frac{100}{3} = 33\frac{1}{3}\%$$

Misol 395. Doiraning radiusi 40% ga oshsa, uning yuzi necha foizga ortadi?

Yechilishi.



$$S = \pi R^2$$



$$S_1 = \pi R_1^2$$

R radius 40% oshganligi uchun 100 ga 40 ni qo'shib, 100 ga bo'linadi va R radiusga ko'paytiriladi, natijada katta doira-ning R_1 radiusi hosil bo'ladi.

$$R_1 = \frac{100 + 40}{100} \cdot R = 1,4 \cdot R.$$

U holda

$$\begin{aligned} S_1 &= \pi R_1^2 = \pi (1,4 R)^2 = \\ &= 1,96 \pi R^2 = 1,96 \cdot S \end{aligned}$$

Oxirgi natijadagi 1,96 sonining 1 butun qismi 100 foizni, ya'ni dastlabki S doira yuzini, 0,96 kasr qismi esa S doira yuzining 96 foizga ortganligini bildiradi.

Misol 396. Doiraning yuzi 96% ga ortishi uchun uning radiusini necha foizga oshirish kerak?

Yechilishi.

S doira yuzi 96% oshganligi uchun 100 ga 96 ni qo'shib, 100 ga bo'linadi va S ga ko'paytiriadi, natijada katta doira yuzi S_1 hosil bo'ladi.

$$S_1 = \frac{100 + 96}{100} \cdot S = 1,96 \cdot S.$$

U holda

$$\begin{aligned}\pi R_1^2 &= 1,96\pi R^2 \Leftrightarrow R_1^2 = 1,96 \cdot R^2 \Leftrightarrow \\ \Leftrightarrow \sqrt{R_1^2} &= \sqrt{1,96 R^2} \Leftrightarrow R_1 = 1,4R.\end{aligned}$$

Oxirgi natijadagi verguldan keyin turgan 4 raqami R radiusning 40% oshganligini bildiradi.

Quyida ifodalar va ularning o'qilishini keltiramiz:

$0,38 \cdot x$ — x ning 38 foizi;

$0,3 \cdot x$ — x ning 30 foizi;

$0,03 \cdot x$ — x ning 3 foizi;

$1,42 \cdot x$ — x ning 142 foizi;

$1,4 \cdot x$ — x ning 140 foizi;

$1,04 \cdot x$ — x ning 104 foizi;

$1,045 \cdot x$ — x ning 104,5 foizi;

$2,5 \cdot x$ — x ning 250 foizi, ya'ni x ning 150 foiz ortganligini bildiradi;

$3,05 \cdot x$ — x ning 305 foizi, yoki x ning 205 foiz ortganligini bildiradi.

MUSTAQIL BAJARISH UCHUN TOPSHIRIQLAR

379. Buğdoydan 90% un olinadi. 3 t buğdoydan qancha un olish mumkin?

398. Kilosi 600 sōmdan baliq sotib olindi. Tozalangandan keyin baliqning oğirligi dastlabki oğirligining 80% ini tashkil etdi. 1 kg tozalangan baliq necha sōmga tushgan?

399. Uy bekasi kilosi 650 sōmdam yongʻoq sotib oldi. Yongʻoqlar qobiğidan tozalangach, umumuy oğirligining 60% i qoldi. Uy bekasi bir kg tozalangan yongʻoq uchin necha sōm sarflagan?

400. Gōsht qaynatilganda òz vaznining 40% ini yōqotadi. 10 kg pishgan gōsht hosil qilish uchun qozonga necha kg gōsht solish kerak?

401. Gōsht qaynatilganda òz vaznining 40% ini yōqotadi. 6 kg gōsht qaynatilganda vazni necha kg kamayadi?

402. Olxōri quritilganda 35% olxōri qoqisi hosil bōladi. 64 kg olxōri quritilsa, qancha olxōri qoqisi olinadi?

403. Yangi uzilgan nokdan 16% qoqi tushadi. 48 kg nok qoqisi olish uchun necha kg yangi uzilgan nok olish kerak?

404. 800kg mevaning tarkibida 80% suv bor. Bir necha kundan sōng mevaning oğirligi 500kg ga tushdi. Endi uning tarkibida necha foiz suv bor?

405. Yiğilgan 1 t mevaning 82% i suvdan iborat. Ma'lum vaqtdan keyin bu mevadagi suvning miqdori 70% ga tushdi. Endi mevaning og'irligi necha kg chiqadi?

406. 21 kg shakar va 129 kg boshqa mahsulotlardan muzqaymoq tayyorlandi. Shakar muzqaymoqning necha foizini tashkil etadi?

407. 15 kg eritmaning 35 foizi tuzdan iborat. Tuzning miqdori 25 foiz bōlishi uchun eritmaga necha kg chuchuk suv qōshish kerak?

408. Massasi 300 g va konsentratsiyasi 15% bōlgan eritma massasi 500 g va konsentratsiyasi 9% bōlgan eritma bilan aralashtirildi. Hosil bōlgan aralashmaning konsentratsiyasini (%) toping.

409. Massasi 300 g va konsentratsiyasi 5% bōlgan eritma massasi 700 g va konsentratsiyasi 15% bōlgan eritma bilan aralashtirildi. Hosil bōlgan aralashmaning konsentratsiyasini (%) toping.

410. Bir idishda 40% li ikkinchi idishda 35% li eritma bor. Ular aralashtirilib 37% li 1 l eritma olish uchun har bir eritmada necha litrdan olish kerak?

411. 140 g suvga 60 g tuz qōshish natijasida hosil bōlgan tuzli eritmada necha foiz tuz bor?

412. Eritma tarkibida 60 g tuz bor. Unga 400 g toza suv qōshilsa, tuzning konsentratsiyasi 1,5 marta kamaydi. Dastlabki eritma necha gramm bōlgan?

413. Yoğliligi 2% bōlgan 80 l sut bilan yoğliligi 5% bōlgan necha l sut aralashtirilsa, yoğliligi 3% bōlgan sut olish mumkin?

414. Inflyatsiya natijasida mahsulotning narxi 25% ga oshirildi. Lekin mahsulotga talabning pastligi tufayli uning narxi 10 % ga kamaytirildi. Mahsulotning oxirgi narxi dastlabkisiga qaraganda necha foiz ortdi?

415. 12% ga arzonlashtirilgandan keyin mahsulotning bahosi 1100 sōm bōldi. Mahsulotning dastlabki bahosini toping.

416. Mahsulotning bozordagi narxi yning tannarxidan 20% ga qimmat. Bozorda mahsulot yaxshi sotilmaganligi uchun uning sotivdagi narxi 5% ga kamaytirildi. Shundan keyin uning narxi 285 sōmga teng bōldi. Mahsulotning tannarxini toping?

417. Mahsulotning narxi ketma-ket ikki marta 10% dan oshirildi. Keyinchalik bu mahsulotga talabning kamligi tufayli uning narxi 20% ga kamaytirildi. Mahsulotning keyingi bahosi dastlabki bahosiga qaraganda qanday òzgargan?

418. Biznesmen oʻz pulining 50% ini yōqotdi. Qolgan puliga aksiya sotib olgach, u 40% daromad (foyda) oldi. Uning oxirgi puli dastlabki pulining necha foizini tashkil etadi?

419. Korxonada mahsulot ishlab chiqarish birinchi yili 10% ga, ikkinchi yili 15% ga oshdi. Mahsulot ishlab chiqarish shu ikki yilda necha foizga ortgan?

420. Mahsulotning narxi birinchi marta 25% ga, ikkinchi marta yangi bahosi yana 20 % ga oshirildi. Mahsulotning oxirgi bahosi necha foizga kamaytirilsa, uning narxi dastlabki narxiga teng bōladi?

421. Firma mahsulotni 380 sōmga sotib 4% zarar qildi. Shu mahsulotning tannarxini toping.

422. Mahsulotni sotishdan olinadigan foyda uning sotuvdagi bahosining 10% ini tashkil etadi. Bu foyda mahsulot tannarxining necha foizini tashkil etadi?

423. Ishlab chiqarish samaradorligi birinchi yili 15% ga, ikkinchi yili 12% ga ortdi. Shu ikki yil ichida samaradorlik necha foiz ortgan?

424. Xōjalikda paxta ishlab chiqarish har yili 10% ga ortsa, 3 yilda paxta ishlab chiqarish necha foizga ortadi?

425. Mahsulotning narxi ketma-ket ikki marta 10% ga oshirilgandan sōng 484 sōm bōldi. Birinchi kōtarilgandan sōng mahsulotning narxi necha sōm bōlgan?

426. Xōjalikda 12120 ga yerga buğdoy, paxta va beda ekildi. Hamma yerning 30% iga buğdoy, bedadan 6244 ga ortiq yerga paxta ekilgan. Necha ga yerga paxta ekilgan?

427. Brigada ekin maydonining 180 gektariga paxta, 60 gektariga sholi ekdi. Sholi paxta maydonining necha foizini tashkil qiladi?

428. Ishchining ish normasini bajarishga ketadigan vaqti 20% ga qisqardi. Uning mehnat unumdorligi necha foiz ortgan?

429. Ishchining mehnat unumdorlidi 20% ortsa, uning ish normasini bajarishga ketadigan vaqti necha foizga qisqaradi?

430. Reja bōyicha ikki sex 230 ta kir yuvish mashinasi ishlab chiqarishi kerak. Birinchi sex reja bōyicha ishlab chiqargan mahsulotning $\frac{2}{9}$ qismi, ikkinchi sex reja bōyicha ishlab chiqargan mahsulotning 80% i ga teng. Ikkinchi sex reja bōyicha qancha mahsulot ishlab chiqaradi?

431. Qutiga 25 kg massali yuk joylangan. Agar qutining massasi yuk massasining 12% ini tashkil etsa, qutining massasini toping?

432. Boğdagi daraxtlarning 60% i teraklar. Qolgan daraxtlarning 30% i chinorlar бўlsa, boshqalari tollar. Boğdagi daraxtlarning nech foizini tollar tashkil etadi?

433. Qotishma mis va qōrğoshindan iborat. Qotishma-ning 60% i mis бўlib, mis qōrğoshindan 2 kg kōp. Qotishmada qancha mis bor?

434. Qōrğoshin va misdan quyilgan ikkita quyma bor. Birinchi quymada 3 kg qōrğoshin va 2 kg mis bor. Ikkinchi quymada 13 kg qōrğoshin va 7 kg mis bor. Qaysi quymada qōrğoshinning foiz miqdori kōp va u necha foiz kōp?

435. Qōrğoshin va misdan quyilgan ikkita quyma bor. Birinchi quymada 2 kg qōrğoshin va 6 kg mis bor. Ikkinchi quymada 12 kg qōrğoshin va 3 kg mis bor. Qaysi quymada qōrğoshinning foiz miqdori kōp va u necha foiz?

436. Massasi 36 kg бўlgan mis va rux qotishmasining tarkibida 45% mis bor. Qotishma tarkibida 60 % mis бўlishi uchun unga yana necha kg mis qōshish kerak?

437. Sement va qumdan iborat 30 kg qorishmaning 60% ini sement tashkil etadi. Qorishmaning 40% i sementdan iborat бўlishi uchun qorishmaga qancha qum qōshish kerak?

438. 2000 – 2001 ōquv yilida bakalavrlar tayyorlash bō-yicha umumiy qabul soni 49500, shu jumladan 19800 davlat

grantlari. Tölov – kontrakt asosida qabul kvotasi umumiy qabulning necha foizini tashkil qiladi?

439. 2000 – 2001 o'quv yilida magistrlar tayyorlash b'ycha umumiy qabul kvotalari 3600, shu jumladan 2200 tölov – kontrakt. Davlat granti soni tölov – kontrakt sonidan necha foiz kam?

440. Oraliq nazoratning maksimal bali 15 ga teng. Talaba ushbu nazoratdan 12 ball to'plagan bo'lsa, u necha bahoga to'g'ri keladi?

Agar 55% — 70,9% uchun “3”, 71% — 85,9% uchun “4”, 86% — 100% uchun “5” baho qo'yilsa.

441. Talabaning stipendiyasi 9750 s'om. Agar uning stipendiyasi 35 % ortsa, u qancha stipendiya oladi?

442. 30 talabadan 25 tasi qishki sinovlarning hammasini topshirdi. Ba'zi sinovlarni topshira olmagan talabalar barcha sinovlarni topshirgan talabalarning necha foizini tashkil qiladi?

443. Oddiy stipendiya miqdori 6200 s'om bo'lsa, qo'shimcha 25% lik namunali va 50% lik a'lo, stipendiyalar miqdorini aniqlang.

444. Institutdagi talabalarning 35% ini qizlar tashkil qiladi. Yigitlar qizlardan 252 ta ko'p. Talabalarning umumiy sonini toping.

445. Sinfdagi 35 o'quvchidan 28 tasi suzish seksiyasiga, 14 tasi voleybol seksiyasiga qatnashadi. Agar har bir o'quvchi, hech bilmaganda bitta seksiyaga qatnashsa, ikkala seksiyaga qatnashadigan o'quvchilar necha foizni tashkil etadi?

446. Yil boshida o'g'il bolalar sinfdagi o'quvchilarning 30% ini, qizlar esa 21 nafarini tashkil etardi. Yilning o'rtasida sinfga 6 ta yangi o'g'il bola keldi va 6 ta qiz boshqa sinfga o'tdi. Shundan so'ng o'g'il bolalar sinfdagi o'quvchilarning necha foizini tashkil etdi?

447. Bir o'quvchida bor pulning $\frac{1}{8}$ qismi ikkinchi o'quvchidagi pulning $\frac{1}{2}$ qismiga teng. Birinchi o'quvchi pulining necha foizini ikkinchi o'quvchiga bersa ularning pullari tenglashadi?

448. O'quvchi birinchi kuni 240 betlik kitobning 7,5 % ini, ikkinchi kuni undan 12 bet ortiq o'qidi. Kitobni o'qib tugatish uchun o'quvchi yana necha bet kitob o'qishi kerak?

449. Nafaqaxo'rning oylik nafaqasi 27500 sōm. Agar uning nafaqasi 40% ortsa, u qancha nafaqa oladi?

450. Ishchining maoshi dastlab 20% ga, so'ngra yana 20% ga oshirilgan bo'lsa, uning maoshi necha foizga oshgan?

451. Xodimning oylik maoshi ketma – ket ikki marta bir xil foizga oshirilgandan sōng dastlabki maoshidan 60% ga oshgan bōlsa, maosh har gal necha foizdan oshirilgan?

452. Sayyoh muayyan masofaning 70% ini poezdda, 29,8% ini paroxodda bosib oʻtgandan keyin, yōl oxirigacha yana 200 m qoldi. Sayyoh poezdda necha km yōl bosgan?

453. 100 kishidan iborat turistlar guruhida 70 kishi ingliz tilini, 45 kishi nemis tilini va 23 kishi ikkala tilni biladi. Ikkala tilni bilmaydigan turistlar necha foizni tashkil etadi?

454. Samarqandga kelgan sayyohlarning 75 % i ingliz tilini, 47 % i esa fransuz tilini biladi. Shu sayyohlardan 22 tasi ikkala tilni ham biladi. Agar sayyohlar ingliz va fransuz tilidan boshqa tilni bilishmasa, ularning umumiy soni qancha?

455. 17 ning 17% ini toping.

456. 40 dan 32 necha foiz kam?

457. 32 dan 60 necha foiz kōp?

458. 6 foizi, 30 ning 22 foiziga teng bōlgan sonni toping.

459. 200 ni 30% ga orttirildi, hosil bōlgan son 20% ga kamaytirildi. Natijada qanday son hosil bōladi?

460. 520 sonini shunday ikki bōlakka bōling –ki, ulardan birining 80% i ikkinchisining 24% ini tashkil qilsin. Bōlaklarning kattasini toping.

461. Agar ikki sondan biri 20% ga, ikkinchisi 12,5 % ga kamaytirilsa, ularning kōpaytmasi necha foizga kamayadi?

462. Ikki musbat sonning ōrta arifmetigi 7,5. Ularning ōrta geometirigi esa ōrta arifmetigining 80% iga teng. Shu sonlarni toping.

463. 11300 ning 36% i va 8400 ning 23% ining yiğindisi shu sonlar yiğindisining 40% idan qancha kam?

464. Yiğindisi 62 va 38 sonlarining ōrta arifmetigiga teng bōlishi uchun 62 ning 60% i olinsa, 38 ning necha foizini olish kerak?

465. Ikki sonning yiğindisi ularning ayirmasidan 50% ga ortiq. Bu sonlar kvadratlarining yiğindisi ularning kōpaytmasidan necha foizga kōp?

466. Ikki sonning ayirmasi 5 ga teng. Agar shu sonlardan kattasining 20% i kichigining $\frac{2}{9}$ qismiga teng bōlsa, shu sonlarni toping.

467. x soni y ning 50% ini tashkil etadi. y esa z dan 300% ga kōp. x soni z dan necha foiz kōp?

468. A sonning 25% i B sonning 15% iga teng bōlsa, A soni B sonning necha foizini tashkil etadi?

469. 720 ning 50% i 24 ning 500% idan necha foiz kōp?

470. x ($x > 0$) ga teskari bōlgan son x ning 36% ini tashkil etadi. x ning qiymatini toping.

471. Kvadratning perimetri 20% ga uzaytirilsa, uning yuzi necha foizga ortadi?

472. Rombning tomoni 10 ga teng. Agar uning balandligi 4 ga uzaytirilsa, yuzi 50% ga ortadi. Rombning yuzini toping.

473. Agar kubning qirrasi 10 % ga kamaytirilsa, uning hajmi necha foiz kamayadi?

474. Ōziga qōshni burchakning 44%i ga teng bōlgan burchakning kattaligini aniqlang.

475. Doiraning radiusi 20% ga kamaytirilsa, uning yuzi necha foizga kamayadi?

476. Teng yonli uchburchakning āsosidagi burchak uning uchidagi burchakning 75% iga teng. Uchburchakning uchidagi burchakni toping.

477. Teng tomonli silindir shaklidagi gōladan eng katta hajmdagi shar yōnib olingan. Gōlaning qancha foizi chiqindiga ketgan?

478. Teng tomonli konusga ichki va tashqi shar chizilgan. Ichki chizilgan shar hajmi tashqi chizilgan shar haj-mining necha foizini tashkil qiladi?

479. Teng yonli uchburchak asosining uzunligi yon tomoni uzunligining 40% iga teng. Asosga tushirilgan

balandligi 28 ga teng. Shu uchburchakning yon tomoniga tushirilgan balandligini toping.

480. Teng yonli uchburchakning uchidan asosiga tushirilgan balandligi 26 ga teng. Asosining uzunligi yon tomoni uzunligining 60% iga teng. Shu uchburchak bissektrisala-rining kesishgan nuqtasi uning uchidan qanday masofada joylashgan?

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