

## Matematika

### 10-sinf

#### 1-BILET

1. Tenglamani yeching:  $4^{3x+5} = 4^{3-5x}$
2. Bank dastlab 4000 AQSH dollari miqdorda qarz berib, 18 oyda 900 AQSH dollari daromad oldi. Agar to'lov yilma-yil amalga oshirilgan bo'lsa, yillik foiz stavka nechaga teng?
3. Parabolalarning absissalar o'qi bilan kesishish nuqtalarini toping:  
 $y = -x^2 - 4x + 21$
4. Konusning asosiy radiusi 12mm konus uchini asos markazi bilan tutashtiruvchi kesma uzunligi 35 mm ga teng. Konus yon sirtini toping.
5. O'lchamlari 25 sm, 30 sm, 40sm bo'lgan to'g'ri burchakli parallelepipedining hajmini toping.

#### 2-BILET

1. Tenglamalar sistemasini yeching.  
$$\begin{cases} 2\sqrt{x} = 3y \\ y^2 + 2\sqrt{x} = 4 \end{cases}$$
2. Parabolaning simmetriya o'qini toping:  $y=(x-2)(x-6)$
3. 16000000 so'm yiliga 7 foiz stavkada 18 oyga olingan bo'lsa, foiz to'lovlarini hisoblang.
4. Tekislikda A(5;9) va B(-6;7) nuqtalardan teng uzoqlikda joylashgan C(x;0) nuqtani toping.
5. Radiusi 8 dm bo'lgan shar sirtining yizini toping.

#### 3-BILET

1.  $9^x + 6^x = 2 \cdot 4^x$  tenglamani yeching.
2. Badminton klubida 41 nafar qatnashchidan 31 nafari yakka tartibda va 16nafari juftlikda o'ynadilar. Nechta qatnashchi ham yakka tartibda, ham juftlikda o'ynagan?
3. Funksiyaning aniqlanish sohasini toping:  $y = \log_5(4 - x^2)$
4. Konusning yasovchisi 10 sm ga teng bo'lib, u asos tekisligi bilan  $30^\circ$  li burchak tashkil qiladi. Konus asosining yuzini toping.
5. To'g'ri burchakli uchburchakning perimetri 36 sm ga teng. Gipotenuzasining katetga nisbati 5:3 nisbatda. Uchburchak tomonlarini toping.

#### 4-BILET

1. A va B to'plamlarni Venn diagrammasida tasvirlang.  
 $U = \{2, 3, 4, 5, 6, 7\}$ ,  $A = \{2, 4, 6\}$  va  $B = \{5, 7\}$
2. Tenglamani yeching:  $tg\left(x - \frac{\pi}{6}\right) = -\sqrt{3}$
3. Hisoblang:  $(3+4i)(2-5i) + (3-4i)(2+5i)$
4. Konusning yasovchisi 12sm. Asosining radiusi 5sm bo'lsa, uning to'la sirtini toping.
5. Diagonallari 10m va 36m bo'lgan rombning yuzini toping.

#### 5-BILET

1. Birinchi kuni ish normasining  $\frac{1}{2}$  qismi bajarildi. Ikkinchi kuni birinchi kunda bajarilgan ishning  $\frac{1}{4}$  qismicha ko'p ish bajarildi. Shu ikki kunda qancha ish normasi bajarilgan?
2. Tengsizlikni yeching:  $\frac{x^2(x+1)(x-3)}{(x-2)(x-4)} > 0$
3. Tenglamalar sistemasini yeching:  
$$\begin{cases} \lg x + \lg y = 4 \\ \lg x - \lg y = 6 \end{cases}$$
4. Kvadratga ichki chizilgan aylana radiusi 5 sm. Kvadrat diagonalini toping.
5. Yuzi  $96\text{sm}^2$  bo'lgan ABCD kvadrat tekisligiga uzunligi 10 sm bo'lgan DM perpendikulyar tushirilgan. MA og'ma uzunligini toping.

#### 6-BILET

1.  $y = \sqrt{\frac{(x-2)(5-x)}{(x-3)(x-4)}}$  funksiyasining aniqlanish sohasini toping.
2.  $\{b_n\}$  geometrik progressiyada  $q=2$ ,  $S_4 = 5$  bo'lsa,  $b_2$  ni toping.
3.  $\frac{2\sqrt{x}-\sqrt{2x}}{2} + 3 = \sqrt{x} + 1$  tenglamani yeching.
4. Agar teng yonli uchburchakning burchaklari 3:4:3 nisbatda bo'lsa, uning uchining bissektrisasi va tomoni orasidagi burchakni toping.
5. Muntazam to'rtburchakli piramida asosining tomoni 4dm ga va apofemasi 6 dm ga teng. Piramidaning yon sirti yuzini toping.

### 7-BILET

1.  $(1 - \frac{1}{5^2}) \cdot (1 - \frac{1}{6^2}) \cdot \dots \cdot (1 - \frac{1}{14^2}) \cdot (x - 1) = \frac{3}{7}$  tenglamani yeching.
2.  $\sin x + \cos x = 0,5$  bo'lsa,  $16(\sin^3 x + \cos^3 x)$  ni toping.
3. Moddiy nuqta koordinatalari parametrik ko'rinishda berilgan x va y koordinatalar orasidagi bog'lanishni aniqlang:  
$$\begin{cases} x = 17t^2 + 1 \\ y = 13t \end{cases}$$
4. Tomoni 10 sm bo'lgan kvadratga ichki chizilgan doira yuzini toping.
5. Kub to'la sirtining yuzi  $96dm^2$  ga teng. Kubning hajmini toping.

### 8-BILET

1. Agar  $a + \frac{1}{a} = 2,5$  bo'lsa,  $\frac{a^4 - a^2}{3a}$  ning qiymatini toping.
2.  $(x^2 + 14x + 14)(x^2 + x + 14) = 14x^2$  tenglama haqiqiy ildizlari yig'indisini toping.
3.  $tg105^\circ$  ning qiymatini hisoblang.
4. Asoslari 17 va 7 ga teng bo'lgan trapetsiyaning diagonalari o'rtasini tutashtiruvchi kesmaning uzunligini toping.
5. Konusning yon sirti  $60\pi$  ga, to'la sirti  $96\pi$  ga teng. Konusning yasovchisini toping.

### 9-BILET

1. Tengsizlikni yeching:  $\sqrt{x + 18} < 2 - x$
2. Kreditor 4500 AQSH dollar miqdorda qarz berib, 3 yilda 900 AQSH dollariga teng daromad oldi. Yillik foiz stavkasini toping.
3. Tenglamani yeching:  $5tg^2 x - 4tgx - 1 = 0$
4. A(5;1) va B(-2;3) vektorlar berilgan  $|a+b|$  ni toping.
5. Tomoni 5ga teng bo'lgan kubni to'la sirti yuzini toping.

### 10-BILET

1.  $\frac{\sqrt{2+\sqrt{3}}}{\sqrt{2-\sqrt{3}}} + \frac{\sqrt{2-\sqrt{3}}}{\sqrt{2+\sqrt{3}}} - 2$  ni hisoblang.
2.  $f(x) = 5x + 7$  funksiyaga teskari funksiyani toping.
3. Agar  $\frac{\pi}{2} < 2 < \pi$  va  $\sin \alpha = \frac{3}{5}$  bo'lsa,  $tg \alpha$  ni toping.
4. Muntazam to'rtburchakli piramida asosining tomoni 4 ga va apofemasi 6 ga teng. Piramidaning diagonal kesimi yuzini toping.
5. Radiusi 15 sm bo'lgan aylanada uning markazidan 12 sm uzoqlikda bo'lgan vatar o'tkazilgan. Vatar uzunligini toping.

### 11-BILET

1. Hisoblang:  $\arccos\left(-\frac{1}{2}\right) - \arcsin\left(-\frac{\sqrt{2}}{2}\right)$
2. Tenglamalar sistemasini yeching: 
$$\begin{cases} 3^{x-y} - 2 = 1 \\ 9^{x-y} = 729 \end{cases}$$
3. Kompleks sonlarni ko'paytiring:  
$$z_1 = \frac{\sqrt{3}}{2} \left( \cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$$
$$z_2 = \frac{1}{2} \left( \cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right)$$
4. Rombning tomoni 10 sm, diagonallaridan biri 12 sm. Rombga ichki chizilgan aylana radiusini toping.
5. Tekislikka tushirilgan og'ma bilan perpendikular orasidagi burchak  $60^\circ$ , og'maning uzunligi  $20\sqrt{3}$ . Perpendikularning uzunligini toping.

### 12-BILET

1. Tenglamani yeching:  $2\cos^2 x + 5\sin x - 4 = 0$
2. Kompleks sonlarni bo'ling:  
$$z_1 = 8 \left( \cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right) \quad z_2 = 4 \left( \cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right)$$
3. Agar cheksiz kamayuvchi geometrik progressiyada  $b_1=3$  va  $S=3,75$  bo'lsa,  $q$  ni toping.
4. Kvadratga ichki chizilgan aylana radiusi 5 sm. Kvadratga tashqi chizilgan aylananing uzunligini toping.
5. To'g'ri prizmaning asosi rombdan iborat. Diagonal kesimlarning yuzalari esa 9 va 12 ga teng. Shu prizma yon sirtining yuzini toping.

### 13-BILET

1. Soddalashtiring:  $\cos(\pi + 2a) + \sin(\pi + 2a) \cdot \operatorname{tg}\left(\frac{\pi}{2} + a\right)$
2.  $2x^2 - 11x + 13 = 0$  tenglamaning ildizlari  $x_1$  va  $x_2$  bo'lsa,  $\frac{x_1}{x_2} + \frac{x_2}{x_1}$  ni hisoblang.
3.  $0, (3)^{12-5x} \leq 27$  tengsizlikning nechta natural yechimi bor?
4. Muntazam piramida yon sirtining yuzi 48ga, apofemasi 8ga teng. Piramida asosining perimetrini toping.
5. To'g'ri burchakli uchburchak gipotenuzasiga tushirilgan balandlik uni 4 sm va 9 sm li bo'laklarga bo'lsa, uchburchakning perimetrini toping.

## 14-BILET

1. Hisoblang:  $\frac{3\lg 2 + 3\lg 5}{\lg 1300 - \lg 0,13}$
2. Tengsizlikni yeching:  $\sqrt{2}\sin\left(\frac{x}{2} + \frac{\pi}{6}\right) \geq 1$
3. Korxonada 56 nafar ishchi ishlaydi. Bir hafta ichida shulardan 47 nafari kunduzgi va 29 nafari kechki smenalarda ishladilar. Nechta ishchi ham kunduzgi, ham kechki smenada ishlagan.
4. Teng tomonli uchburchakka radiusi  $3\sqrt{3}$  bo'lgan aylana tashqi chizilgan, shu uchburchakka ichki chizilgan aylananing uzunligini toping.
5. Silindr radiusi 5 sm, balandligi 12 sm bo'lsa, uning to'la sirtini toping.

## 15-BILET

1. Tengsizliklar sistemasini yeching: 
$$\begin{cases} \frac{5x}{3} - \frac{2x}{4} \geq 3\frac{1}{3} \\ 2 - \frac{5-4x}{2} < \frac{6x}{5} \end{cases}$$
2.  $z = \frac{1}{2} - \frac{\sqrt{3}}{2}i$  kompleks sonni trigonometrik ko'rinishida yozing.
3. Arifmetik progressiyaning oltinchi hadi 10ga, dastlabki 16ta hadining yig'indisi 200 ga teng. Shu progressiyaning to'qqizinchi hadini toping.
4. Uchburchak tomonlari 13dm, 14dm, 15dm bo'lsa, uchburchakning eng katta balandligini toping.
5. Konusning yasovchisi 4 smga teng, u asos tekisligi bilan  $60^\circ$  li burchak tashkil qiladi. Konusning to'la sirtini toping.

## 16-BILET

1. Tenglamalar sistemasini yeching: 
$$\begin{cases} x^2 + xy^2 = 20 \\ x\sqrt{y} + y\sqrt{x} = 6 \end{cases}$$
2.  $\text{tg}(\arctg 3 + \arctg 7)$  ni hisoblang.
3. Agar  $\log_a 8 = 3$  va  $\log_b 243 = 5$  bo'lsa,  $ab$  ni toping.
4. Uchburchakning uchlari radiuslari 6 sm, 7 sm, 8 sm bo'lgan jufti bilan urinadigan uchta aylana markazlarida yotadi. Uchburchak perimetrini toping.
5. Tekislikka tushirilgan og'ma va perpendikular orasidagi burchak  $60^\circ$ , og'maning uzunligi  $20\sqrt{3}$ . Perpendikularning uzunligini toping

### 17-BILET

1. Tengsizlikni yeching:  $\frac{(x+3)(x-5)}{x+1} \geq 0$
2. To'plamlar berilgan bo'lsa, ularning birlashmasini va kesishmasini toping.  
 $A = \{0, 1, 2, 3, 4, 5, 6, 7\}$   
 $B = \{6, 7, 9, 11, 12\}$
3. Mijoz bankka 9400 funt sterlingni yillik foiz stavkasi 6.75% bilan qo'ydi. 1800 funt sterling olishi uchun qancha vaqt kerak?
4. Uchburchakning medianalari kvadratlarning yig'indisini tomonlari kvadratlarning yig'indisiga nisbatini toping.
5. Qirradi 3 sm kubning to'la sirtini toping.

### 18-BILET

1. Tenglamani yeching:  $\sin\left(2x + \frac{\pi}{9}\right) = 1$
2. Tenglamalar sistemasini yeching: 
$$\begin{cases} 3^x \cdot 3^y = 81 \\ 3^x - 3^y = 24 \end{cases}$$
3. Funktsiyasining aniqlanish sohasini toping:  $y = \lg \frac{x-3}{x+8}$
4. Agar kesmaning bir uchi  $A(1; -5; 4)$  nuqtada, o'rtasi  $C(4; -2; 3)$  nuqtada bo'lsa, ikkinchi uchining koordinatalarini toping.
5. Qirradi 2 sm bo'lgan kubning yon sirtini toping.

### 19-BILET

1. Agar  $\operatorname{ctg} \alpha = \frac{13}{4}$  bo'lsa,  $\frac{2\cos \alpha + \sin \alpha}{\cos \alpha - 2\sin \alpha}$  ni hisoblang.
2.  $a$  ning qanday qiymatlarida tenglamalar sistemasi yechimga ega emas:  
$$\begin{cases} ax + 3y = 6 \\ 2x - y = 2 \end{cases}$$
3. Agar geometrik progressiyada  $b_1 = 7$ ,  $q = 3$ ,  $S_n = 847$  bo'lsa,  $n$  va  $b_n$  ni toping.
4. To'g'ri burchakli uchburchak o'tkir burchagining bissektrisasi qarama-qarshi katetni uzunliklari 4 va 5 ga teng bo'lgan qismlarga ajratadi. Shu uchburchakning perimetrini toping.
5. Konusning yon sirti  $60\pi$  ga, to'la sirti  $96\pi$  ga teng. Konusning yasovchisini toping.

### 20-BILET

1. Tenglamalar sistemasini yeching: 
$$\begin{cases} x + y + xy = 11 \\ x^2 + y^2 + xy = 19 \end{cases}$$
2. Agar  $f(a, b, c) = \frac{a}{b-c}$  bo'lsa,  $f(f(1, 2, 3), f(2, 3, 1), f(3, 1, 2))$  ni toping.
3. Ko'paytmani toping:  $(\frac{1}{3} - i)(\frac{1}{2} + i)(5 - 6i)$
4. Radiusi 2 ga, yasovchisi 5 ga teng bo'lgan konusning yon sirti yuzini toping.
5. Sharga asosining tomoni  $8\sqrt{2}$  ga, balandligi  $8\sqrt{6}$  ga teng bo'lgan, muntazam to'rtburchakli piramida ichki chizilgan. Sharning radiusini toping.

### 21-BILET

1.  $\operatorname{tg} x = -2$  bo'lsa,  $\frac{2\cos 2\alpha + 1}{1 - 3\cos^2 \alpha}$  - qiymatini toping.
2. Tengsizlikni yeching:  $(9x^2 + 12x + 4)(x - 2) < 0$
3.  $2^{2011}$  ni 5 gabo'lganda qoldiqni toping.
4.  $R_1 = 4$  va  $R_2 = 1$  ikkita aylana bir-biriga va to'g'ri chiziqqa urinadi. Shu to'g'ri chiziqqa va aylanalarga urinadigan kichik aylana radiusini toping.
5. Agar prizmaning uchlari soni bilan yoqlari soni yig'indisi 47 bo'lsa, uning diagonallari sonini toping.

### 22-BILET

1. Tenglama ildizlari yig'indisini toping:  $\frac{2x+1}{x} + \frac{4x}{2x+1} = 5$
2. Parabola uchining koordinatalari yig'indisini toping:  $f(x) = (x - 3)^2 + 5$
3.  $(x^2 + x + 1)(x^2 + x + 2) = 12$  tenglamaning haqiqiy ildizlari ko'paytmasini toping.
4. Parallelogrammning diagonallari 10 va 12, ular orasidagi burchak  $120^\circ$ . Parallelogrammning perimetrini toping.
5. To'g'ri burchakli parallelepipedning qirralari nisbati 2:1:3 kabi. Agar parallelepipedning to'la sirti  $198 \text{ dm}^2$  ga teng bo'lsa, uning hajmini ( $\text{dm}^3$ ) toping.

### 23-BILET

1. 8 nafar ishchilardan 3 ta ishchidan iborat brigada tuzish kerak. Bu ishni necha usulda amalga oshirsa bo'ladi?
2. Tengsizlikni yeching:  $|\frac{x+3}{2} - 1| > 21$
3.  $3x^4 - 5x^2 + 2 = 0$  tenglamaning eng katta va eng kichik ildizlari yig'indisini toping.
4. Bitta nuqtadan tekislikka og'ma va perpendikulyar o'tkazilgan. Og'maning uzunligi 5, perpendikularniki 3 sm. Og'maning tekislikdagi proyeksiyasini toping.
5. Tomonlari 8, 15 va 17 sm bo'lgan uchburchakka tashqi chizilgan aylananing radiusini toping.

## 24-BILET

1.  $\begin{cases} |x + 7| \leq 13 \\ |2x + 9| \geq 21 \end{cases}$  tengsizlar sistemasi nechta butun yechimga ega?
2. Sinfda 40 ta o'quvchi bor. Ulardan 32 tasi "Matematika" to'garagida, 21 tasi "Yosh rassomlar" to'garagida shug'ullanadi. 15 ta o'quvchi ikkalasida ham shug'ullansa, qancha o'quvchi ikkala to'garakda ham shug'ullanmaydi?
3. Hisoblang:  $\frac{\sin(\pi + \arcsin \frac{\sqrt{3}}{2})}{\sin(0,5\pi + \arcsin \frac{1}{2})}$
4.  $ABCD$  to'rtburchak aylanaga ichki chizilgan  $ABC$  burchak  $114^\circ$  ga,  $CAD$  burchak  $54^\circ$  ga teng bo'lsa,  $ABD$  burchakning gradus o'lchovini toping.
5.  $\vec{a}$  (2 ; 5) va  $\vec{b}$  (m ; -6) vektorlar m ning qanday qiymatlarida perpendikulyar bo'ladi?

## 25-BILET

1. 150 dan kata bo'lmagan 7 ga karrali barcha natural sonlarning yig'indisini toping.
2.  $\text{tg}(\arctg \frac{1}{3} + \arctg \frac{1}{9})$  ning qiymatlarini hisoblang.
3. Tenglamaning ildizlari ko'paytmasini toping:  $\sqrt{x^2 + 77} - 2\sqrt[4]{x^2 + 77} - 3 = 0$
4. Ikkita o'xshash uchburchak yuzlari  $65 \text{ m}^2$  va  $260 \text{ m}^2$ . Birinchi uchburchakning bir tomoni 6 m bo'lsa, ikkinchi uchburchakning unga mos tomonini toping.
5. To'g'ri burchakli parallelepiped asosining tomonlari 7 sm va 24 sm. Parallelepipedning balandligi 8 sm. Diagonal kesimining yuzini toping.

## 26-BILET

1. Tenglamani yeching:  $(x^2 + 3x - 10) \cdot \sqrt{x + 4} = 0$
2. k ning qanday qiymatida  $y = kx + b$  funksiyaning grafigi  $M(0,5 ; 4,5)$  nuqtadan o'tadi.
3. Ikkita natural sonning ko'paytmasi ularning yig'indisidan 8 marta katta. Ularning kvadratlarining yig'indisi esa 720 ga teng. Shu sonlarni toping.
4. Muntazam to'rtburchakli piramidaning balandligi 6 sm, apofemasi 6,5 sm bo'lsa, piramida asosining perimetrini toping.
5. Markazi (2 ; 3) nuqtada joylashgan va radiusi 2 ga teng bo'lgan aylananing tenglamasini tuzing.



## 27-BILET

1. Hisoblang:  $2 \cdot \frac{2}{3} \div 1 \frac{1}{7} \cdot 3 \frac{3}{7} \cdot \left(-\frac{1}{4}\right)$
2. Tenglamani yeching:  $\sin x \cdot \cos 3x + \cos x \cdot \sin 3x = 1$
3. Massasi 36 kg bo'lgan mis va rux qotishmasining tarkibida 45% mis bor. Qotishma tarkibida 60% mis bo'lishi uchun unga yana necha kg mis qo'shish kerak?
4. Konus asosining radiusi 5 sm, yasovchisi esa undan 8 sm uzun. Konusning to'la sirtini toping.
5. Balandligi  $5\sqrt{3}$  sm bo'lgan teng tomonli uchburchakning tomonini toping.

## 28-BILET

1. Soddalashtiring:  $\frac{3}{a-\sqrt{a^2-3}} - \frac{3}{a+\sqrt{a^2-3}}$
2. Agar  $\begin{cases} \frac{1}{\sqrt{x}} + \frac{1}{\sqrt{y}} = \frac{4}{3} \\ x \cdot y = 9 \end{cases}$  bo'lsa,  $x + y$  ning qiymatini toping.
3. Arifmetik progressiyada  $s_{20} - s_{19} = -30$  va  $d = -4$  bo'lsa,  $a_{25}$  ning qiymatini toping.
4. Ikkita o'xshash to'rtburchakning yuzlari  $50 \text{ sm}^2$  va  $32 \text{ sm}^2$ , perimetrlarining yig'indisi 117 sm. Har bir to'rtburchakning perimetrini hisoblang.
5. Silindr yoyilmasining yuzi  $24\pi \text{ dm}^2$ , silindrning balandligi 4 dm. Uning asosi radiusini toping.

## 29-BILET

1.  $m$  ning qanday qiymatlarida  $\frac{6x-m}{2} = \frac{7mx+1}{3}$  tenglamaning ildizi nolga teng bo'ladi?
2.  $y = x^2 - 4x + 7$  parabola  $\vec{a}(2; 3)$  vektor yordamida parallel ko'chirishdan hosil bo'lgan kvadrat funksiyani yozing.
3. Hisoblang:  $\sin\left(2 \arccos \frac{1}{3}\right)$
4. Uchburchakning tomonlari 6, 9, 12 ga teng. Eng katta burchak bissektrisasi uchburchakning tomonidan ajratgan kesmalarni kattasini toping.
5. Qirradi 6 ga teng bo'lgan muntazam tetraedrning to'la sirtini toping.

### 30-BILET

1.  $\frac{(x-4)(x+2)}{(x-1)^2} < 0$  tengsizlikning eng katta va eng kichik butun yechimlari ayirmasini toping.
2. Ikki sonning o'rta arifmetigi 22,5 ga, ularning o'rta geometrigi esa 18 ga teng. Shu sonlarni toping.
3. Tenglamani yeching:  $2\cos^2 x - 2 = 2\sin x - 2\sin^2 \alpha$
4. Muntazam to'rtburchkli prizmaning yon sirti 160 ga, to'la sirti 232 ga teng. Shu prizma asosining diagonallarini toping.
5. Uchburchak tomonlari uzunliklari 7 sm, 11sm, 12 sm. Uning eng katta medianasini toping.