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## JAVOBLAR

### I b o b

**1.9.**  $|\sin x| \leq 1$ ,  $|\cos x| \leq 1$ ,  $0 \leq 1 - \cos x \leq 2$  ekanligidan, foydalaning. **1.11.** 4)  $x = R(t - \sin t)$ ,  $y = R(1 - \cos t)$ . **1.16.** Ko'rsatma:  $BM^2 = OB^2 - OM^2 = OB^2 - (OA - MA)^2 = MA(2OA - MA)$ , bundan izlanayotgan munosabat chiqarib olinadi. **1.19.** 1) to'g'ri burchakli  $EVS$  uchburchak bo'yicha  $r_v = r_E \sin \alpha$ , endi hisoblashlarni bajaring. **1.23.** 1)  $\sin 5x$  ning  $T_1$  asosiy davrini  $\sin(5x + 2\pi) = \sin 5(x + T_1)$  bo'yicha topamiz:  $T_1 = \frac{2\pi}{5}$ ; shu kabi

$\cos 4x$  ning asosiy davri  $T_2 = \frac{2\pi}{4}$ ;  $T_1$  va  $T_2$  ning eng kichik umumiy bo'linuvchisi javobni beradi:  $T = 2\pi$ ; 2)  $20\pi$ ; 3)  $20\pi$ . **1.24.**  $1 - \cos t$  sahmi funksiya  $t = \pi$  da 0 ga teng, juft funksiya, ixtiyoriy  $t$  da nomanfiy,  $0 \leq t \leq \pi$  da 0 dan 2 gacha monoton o'sadi,  $\pi \leq t \leq 2\pi$  da 2 dan 0 gacha monoton kamayadi;  $1 - \cos(180^\circ \pm t) = 1 + \cos t = 2 - (1 - \cos t)$ . **1.25.** 1) mumkin; 2) mumkin, chunki

$$\left(-\frac{a}{\sqrt{a^2+b^2}}\right)^2 + \left(\frac{b}{\sqrt{a^2+b^2}}\right)^2 = 1, \quad 1 - \cos t = 1 - \frac{b}{\sqrt{a^2+b^2}}. \quad \mathbf{1.28.} \quad 1) \quad m \cdot \frac{3-m^2}{2};$$

2)  $m\sqrt{2-m^2}$ . **1.31.** a) 1), 7) lar toq, 2), 3), 4) lar juft, 5), 6) lar toq ham emas, juft ham emas. **1.34.** 1)  $\frac{\sqrt{5}}{3}$ ; 2)  $-0,6$ . **1.36.** 6)  $0,5$ ; 7)  $-3$ . **1.42.** 1)  $x = \pi k$ ,  $k \in \mathbb{Z}$ ; 2)  $x = \frac{\pi}{2} + \pi k$ ,  $k \in \mathbb{Z}$ ; 3)  $\frac{\pi}{2} + 2\pi k$ ,  $k \in \mathbb{Z}$ ; 4)  $\emptyset$ ; 5)  $2\cos x - 1 \neq 0$ ,  $x \neq \pm \frac{\pi}{3} + 2\pi k$ ,  $k \in \mathbb{Z}$ . **1.43.** 1) Ko'rsatma:  $\cos 4(x + T) = \cos(4x + 2\pi)$ , bundan

$T = \pi/2$ ; 2)  $T = 4\pi$ ; 3)  $2\pi/3$ ; 4) Ko'rsatma:  $\cos(\omega(t + T) + \varphi) = \cos(\omega t + \varphi + 2\pi)$ , bundan  $\omega t + \omega T + \varphi = \omega t + \varphi + 2\pi$ ,  $T = \frac{2\pi}{\omega}$ ; 5)  $T = 2\pi/5$ ; 6)  $T = \pi$ ; 7)  $T = 1/2$ ;

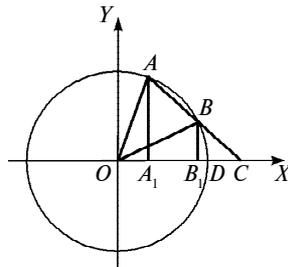
8)  $T = \frac{2\pi}{\omega}$ ; 9) Yechilishi:  $\cos 4x$  bo'yicha  $T_1 = \frac{\pi}{2}$ ,  $\sin\left(5x + \frac{\pi}{4}\right)$  bo'yicha  $T_2 = \frac{2\pi}{3}$ ;  $\frac{\pi}{2}$ ,  $\frac{2\pi}{3}$  larning eng kichik umumiy bo'linuvchisi  $T$  ni beradi,  $T = 2\pi$ ;

10)  $T = 4\pi$ ; 11)  $T = 2\pi$ ; 12)  $T = 2\pi$ . **1.45.** 3)  $a^2 + 3b^2 - \frac{c^2}{3}$ ; 4)  $0$ ; 5)  $a^2$ ; 6)  $\sqrt{3}a^2 - \frac{1}{3}b^2$ . **1.46.** 1)–5) mashqlarni yechishda  $\frac{a_1 + a_2 + \dots + a_n}{n} \geq \sqrt[n]{a_1 a_2 \dots a_n}$

tengsizlikdan foydalaning, bunda  $a_1, a_2, \dots, a_n$  — musbat sonlar. Masalan,  $\sqrt{a^2 \cdot 1} = a$ , bundan  $\frac{a^2+1}{2a} \geq 1$ . Bunday qiymatlarni tangens va kotangens qabul

qila oladi va faqat  $a = 1$  bo'lgandagina  $\frac{a^2+1}{2a} = 1$  bo'ladi va berilgan qiymatni sinus va kosinus ham qabul qiladi. **1.48.**  $\cos \alpha = \frac{a^2-b^2}{a^2+b^2}$ ,  $\operatorname{tg} \alpha = \frac{2ab}{a^2-b^2}$ . **1.49.**  $-2$ .

**1.52.** 1) 0; 3) 0; 4) 0. **1.56.**  $\cos^4 x + \sin^4 x = (\cos^2 x + \sin^2 x)^2 - 2\cos^2 x \sin^2 x = 1 - 2\cos^2 x \sin^2 x$ . Ikkinchi tomondan  $\cos^6 x + \sin^6 x = (\cos^2 x)^3 + (\sin^2 x)^3 = \dots = 1 - 3\cos^2 x \sin^2 x = q$ . Bundan  $\cos^2 x \sin^2 x = \frac{1-q}{3}$ . Javob:  $\cos^4 x + \sin^4 x = 1 - 2 \cdot \frac{1-q}{3} = \frac{1+2q}{3}$ .



I.54-rasm.

**1.57.** Agar  $0 < x < \frac{\pi}{2}$ ,  $h > 0$ ,  $x + h < \frac{\pi}{2}$  deb qo'yilsa, masalani hal qilish uchun  $\frac{\sin(x+h)}{x+h} < \frac{\sin x}{x}$  bo'lishini isbot qilish yetarli (geometrik isbotida 1-§, 1-banddagi ma'lumotlarga tayanish mumkin). Markazi koordinatalar boshida joylashtirilgan birlik aylanada  $A(x+h)$  va  $B(x)$  nuqtalar belgilangan bo'lsin (I.54-rasm).

$$\cup AB = h, \cup BD = x, \frac{\sin(x+h)}{\sin x} = \frac{AA_1}{BB_1} = \frac{AC}{BC} = \frac{BC+AB}{BC} =$$

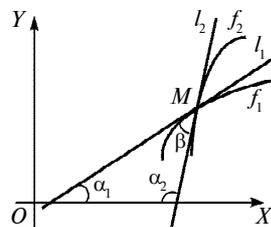
$$= 1 + \frac{AB}{BC} < 1 + \frac{h}{x} = \frac{x+h}{x}. \text{ Bundan } \frac{\sin(x+h)}{x+h} < \frac{\sin x}{x}.$$

**1.63.** Ko'rsatma: 1), 3), 4) larda  $y = \cos x$  funksiya grafigini almashtirishdan, 2), 5), 6), 9) larda  $y = \sin x$  funksiya grafigini almashtirishdan, 7), 8) larda esa  $[\alpha]$ ,  $\{\alpha\}$  larning ta'rifidan foydalaning. **1.64.** Ko'rsatma: 1), 2), 4), 5) larda  $y = \cos x$  funksiya grafigini almashtirishdan, 3) da  $y = \sin x$  funksiya grafigini almashtirishdan foydalaning. **1.69.** Ko'rsatma:  $y = \operatorname{tg} x$ ,  $y = \operatorname{ctg} x$  funksiyalarning grafigini almashtirishdan va  $|\alpha|$ ,  $[\alpha]$ ,  $\{\alpha\}$  larning ta'rifidan o'z o'rnida foydalaning.

**1.70.** 1)  $\frac{\sin \pi}{12} = \sin\left(\frac{\pi}{2} - \frac{5\pi}{12}\right) = \cos \frac{5\pi}{12} = \cos\left(\frac{\pi}{4} + \frac{\pi}{6}\right) = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{2}(\sqrt{3}-1)}{4}$ ; 2)  $-\frac{1}{2}$ ; 3)  $-\frac{\sqrt{2}}{2}$ ; 4)  $-\frac{\sqrt{3}}{2}$ . **1.75.**

Ko'rsatma: 1) Funksiyalar ifodasini  $y = \cos\left(x - \frac{x}{2}\right)$  yoki  $y = \cos \frac{x}{2}$  ko'rinishiga keltiring,  $\cos \frac{x+T}{2} = \cos\left(\frac{x}{2} + 2\pi\right)$  bo'yicha  $T = 4\pi$ . **1.84.**  $f_1(x)$  va  $f_2(x)$  chiziq'larga ularning  $M(x_0; y_0)$  kesishish nuqtasi orqali o'tkazilgan  $l_1$  va  $l_2$  urinmalar  $OX$  o'qining musbat yo'nalishi bilan  $\alpha_1$  va  $\alpha_2$  burchak tashkil qilsin (I.55-rasm). Kesishuvda hosil bo'ladigan  $\beta$  burchak  $\beta = \alpha_2 - \alpha_1$  bo'ladi.

$\operatorname{tg} \beta = \operatorname{tg}(\alpha_2 - \alpha_1) = \frac{k_2 - k_1}{1 + k_1 k_2}$  bo'ladi, bunda  $k_1 = \operatorname{tg} \alpha_1$ ,  $k_2 = \operatorname{tg} \alpha_2$  urinuvchi to'g'ri



I.55-rasm.

chiziq'larning burchak koeffitsiyentlari. 1)  $\frac{3}{4}$ ; 2)

$\frac{10\sqrt{2}}{13}$ . **1.85.**  $\operatorname{tg} A = x$  deb belgilaylik. U holda

$\operatorname{tg} B = 2x$ ,  $\operatorname{tg} C = 3x$ ;  $\operatorname{tg} C = \operatorname{tg}(\pi - (A + B)) = -\operatorname{tg}(A + B) =$

$= 3x$  yoki  $-3x = \frac{x+2x}{1-x \cdot 2x}$ . Tenglamani yechib,  $x_1 = 0$ ,

$x_2 = 1$ ,  $x_3 = -1$  ni topamiz. Uchburchak burchaklari 0 ga, yoki hammalari o'tmas, yoki  $180^\circ$  ga teng bo'lishlari mumkin emas. Shunga ko'ra masala

shartini faqat  $x = 1$  qanoatlantiradi. Javob:  $\operatorname{tg} A = 1$ ,  $\operatorname{tg} B = 2$ ,  $\operatorname{tg} C = 3$ ,

$$\sin A = \frac{\sqrt{2}}{2}, \quad \sin B = \frac{2\sqrt{5}}{5}, \quad \sin C = \frac{3\sqrt{10}}{10}. \quad \mathbf{1.88.} \quad 1) \frac{\sqrt{6}}{2}; 2) -\frac{\sqrt{3}}{1+\sqrt{3}}. \quad \mathbf{1.96.} \quad 10) \operatorname{tg} 55^\circ$$

$$\cdot \operatorname{tg} 65^\circ = \operatorname{tg}(60^\circ - 5^\circ) \cdot \operatorname{tg}(60^\circ + 5^\circ) = \frac{\operatorname{tg} 60^\circ - \operatorname{tg} 5^\circ}{1 + \operatorname{tg} 60^\circ \operatorname{tg} 5^\circ} \cdot \frac{\operatorname{tg} 60^\circ + \operatorname{tg} 5^\circ}{1 - \operatorname{tg} 60^\circ \operatorname{tg} 5^\circ} = \frac{3 - \operatorname{tg}^2 5^\circ}{1 - 3 \operatorname{tg}^2 5^\circ}, \quad \operatorname{tg} 75^\circ =$$

$$= \operatorname{ctg} 15^\circ = \operatorname{ctg} 3 \cdot 5^\circ = \frac{\operatorname{ctg}^3 5^\circ - 3 \operatorname{ctg} 5^\circ}{3 \operatorname{ctg} 5^\circ - 1} = \frac{1 - 3 \operatorname{tg}^2 5^\circ}{3 \operatorname{tg} 5^\circ - \operatorname{tg}^3 5^\circ}; \quad \operatorname{tg} 55^\circ \cdot \operatorname{tg} 65^\circ \cdot \operatorname{tg} 75^\circ = \frac{1}{\operatorname{tg} 5^\circ} =$$

$$= \operatorname{ctg} 5^\circ = \operatorname{tg} 85^\circ. \quad \mathbf{1.97.} \quad 1) \frac{1}{128}; 2) -1; 3) 2 \operatorname{tg} \alpha \cdot \sin^2 \alpha; 4) 2 \cos \alpha; 6) \frac{\sin 7\alpha}{\sin \alpha}; 7) 1;$$

$$8) \cos\left(\frac{\pi}{4} - 2\alpha\right). \quad \mathbf{1.99.} \quad \sin 15^\circ = \frac{\sqrt{2-\sqrt{3}}}{2}, \quad \sin 18^\circ = \frac{\sqrt{5}-1}{4}. \quad \mathbf{1.100.} \quad 1) |\sin 3\alpha|; 2) \sqrt{2} |\cos 5x|;$$

$$3) 1; 4) \operatorname{ctg} 2\alpha; 5) \left| \operatorname{tg} \frac{\alpha}{2} \right|. \quad \mathbf{1.101.} \quad 5) \text{Ko'rsatma: } \sin^4 \alpha + \cos^4 \alpha = (\sin^2 \alpha + \cos^2 \alpha)^2 -$$

$$- 2 \sin^2 \alpha \cos^2 \alpha \text{ dan foydalaning. } \mathbf{1.107.} \quad 1) \frac{1}{8}; 2) \text{Yechilishi: } \frac{\sin 35^\circ}{\cos 35^\circ} \cdot \frac{\sin 55^\circ}{\cos 55^\circ} =$$

$$= \frac{\frac{1}{2}(\cos 20^\circ - \cos 90^\circ)}{\frac{1}{2}(\cos 20^\circ + \cos 90^\circ)} = 1; 3) 2\sqrt{3} \sin 10^\circ; 5) \frac{1}{16}. \text{Ko'rsatma: dastlab } \cos 9^\circ \cos 81^\circ =$$

$$\text{va } \cos 27^\circ \cos 63^\circ \text{ ko'paytmalarni yig'indiga keltiring. } \mathbf{1.109.} \quad 5) \frac{1}{\sqrt{3}} =$$

$$= \operatorname{ctg} 60^\circ = \operatorname{ctg}(3 \cdot 20^\circ) = \frac{\operatorname{ctg}^3 20^\circ - 3 \operatorname{ctg} 20^\circ}{3 \operatorname{ctg}^2 20^\circ - 1} \text{ yoki kvadratga ko'tarilsa, } \operatorname{ctg}^6 20^\circ -$$

$$- 6 \operatorname{ctg}^4 20^\circ + 9 \operatorname{ctg}^2 20^\circ = 3 \operatorname{ctg}^4 20^\circ - 2 \operatorname{ctg}^2 20^\circ + \frac{1}{3} \text{ va hokazo; } 6) \cos 9^\circ \cos 81^\circ =$$

$$= \frac{1}{2}(\cos 90^\circ + \cos 72^\circ) = \frac{1}{2} \cos 72^\circ, \text{ shu kabi } \cos 27^\circ \cos 63^\circ = \frac{1}{2} \cos 36^\circ. \text{ U holda}$$

$$\cos 9^\circ \cos 27^\circ \cos 63^\circ \cos 81^\circ = \frac{1}{4} \cos 72^\circ \cos 36^\circ = \frac{1}{4} \cos 72^\circ \cdot \frac{2 \sin 36^\circ}{2 \sin 36^\circ} \cdot \cos 36^\circ =$$

$$= \frac{\sin 144^\circ}{16 \sin 36^\circ} = \frac{1}{16}, \quad \cos 12^\circ \cos 24^\circ \cos 48^\circ \cos 96^\circ = \dots = -\frac{1}{16}; 7) \text{ tenglikning chap qis-$$

$$\text{mini } 2 \sin \frac{\alpha}{2} \text{ ga ko'paytiramiz va bo'lamiz: } \frac{1}{2 \sin \frac{\alpha}{2}} \left( \sin \alpha \cdot 2 \sin \frac{\alpha}{2} + \sin 2\alpha \cdot 2 \sin \frac{\alpha}{2} + \right.$$

$$\left. + \dots + \sin n\alpha \cdot 2 \sin \frac{\alpha}{2} \right) = \frac{1}{2 \sin \frac{\alpha}{2}} \left( \left( \cos \frac{\alpha}{2} - \cos \frac{3\alpha}{2} \right) + \left( \cos \frac{3\alpha}{2} - \cos \frac{5\alpha}{2} \right) + \dots + \left( \cos \frac{2n-1}{2} \alpha - \cos \frac{2n+1}{2} \alpha \right) \right) =$$

$$= \frac{1}{2 \sin \frac{\alpha}{2}} \left( \cos \frac{\alpha}{2} - \cos \frac{2n+1}{2} \alpha \right) = \dots \quad \mathbf{1.110.} \quad 1) \frac{\cos n\alpha - 1 + 2n \sin \frac{\alpha}{2} \sin \frac{2n+1}{2} \alpha}{4 \sin^2 \frac{\alpha}{2}}; 2) \frac{2 \sin 9\alpha}{\sin 2\alpha \cos 10\alpha}.$$

$$\mathbf{1.111.} \quad 1) 5 \sin(5t + \alpha), \quad \alpha = \arccos 0,6; 2) 12 \sin(3t + \alpha), \quad \alpha = \arccos \frac{11}{12} - \frac{\pi}{6};$$

$$3) 13 \sin(2t + \alpha), \quad \alpha = \arccos \frac{12}{13} + \frac{\pi}{3}. \quad \mathbf{1.115.} \quad 1) \varphi_0 - t = 0 \text{ vaqt momentidagi boshlang'ich faza, } X = X_0 \cos \varphi \text{ yoki } X = X_0 \cos \omega t, \quad Y = Y_0 \sin \varphi \text{ yoki } Y = Y_0 \sin \omega t;$$

3)  $X = X_0 \cos(\omega t + \varphi_0)$ ,  $Y = Y_0 \sin(\omega t + \varphi_0)$ . **1.116.** 7)  $\sin x = \frac{7}{5} > 1$  bo'lgani uchun tenglamaning yechimi yo'q. **1.119.** 4)  $3\pi - 10$ . **1.122.** 1)  $\pm \frac{3\pi}{4} + 2k\pi$ ; 8)  $2 - \frac{\pi}{2}$ . **1.125.** 4) Yechimi yo'q. **1.127.** 3)  $\arccctg 0,2 + k\pi$ ,  $k \in \mathbb{Z}$ . **1.129.** 1)  $\sqrt{3}$ ;

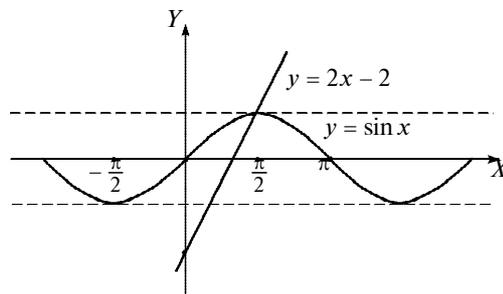
5)  $\operatorname{tg}\left(\arccctg\left(-\frac{2}{3}\right)\right) = \operatorname{tg}\left(\pi - \arccctg\frac{2}{3}\right) = -\operatorname{tg}\left(\arccctg\frac{2}{3}\right) = -\frac{1}{\operatorname{ctg}\left(\arccctg\frac{2}{3}\right)} = -\frac{3}{2}$ . **1.133.**

1)  $\frac{1}{10}(-1)^{k+1} \frac{\pi}{3} + \frac{k\pi}{10}$ ,  $k \in \mathbb{Z}$ ; 2)  $\frac{1}{10}\left(\pm \frac{\pi}{6} + 2k\pi\right)$ ,  $k \in \mathbb{Z}$ ; 3)  $\frac{1}{10}\left(\frac{\pi}{3} + k\pi\right)$ ,  $k \in \mathbb{Z}$ ; 5)  $-5^\circ + 60^\circ k$ ,  $k \in \mathbb{Z}$ ; 9)  $22^\circ 30' \pm 30' + 90^\circ k$ ,  $k \in \mathbb{Z}$ ; 11)  $\emptyset$ . **1.134.** Ko'rsatma: 3)  $5x = -\frac{x}{3} + \pi k$ ,  $k \in \mathbb{Z}$ ; 6)  $3x = -\frac{\pi}{2} + 5x + \pi k$ ,  $k \in \mathbb{Z}$ ; 8)  $\operatorname{tg}(5\pi - x) = \operatorname{tg}(\pi - x) = -\operatorname{tg}x$ ;  $-\operatorname{ctg}\left(2x + \frac{\pi}{6}\right) = \operatorname{tg}\left(\frac{2\pi}{3} + 2x\right)$ ; 12)  $\sqrt{x} = \frac{\pi}{2} - 2x + \pi k$ ,  $k \in \mathbb{Z}$ ; ...; 13) kvadrat tenglamani yeching; 15)  $x^2 = (-1)^k(-3x^2) + \pi k$ ,  $k \in \mathbb{Z}$ ; 17)  $\sqrt{2}(\sin x + \cos x) \left(1 - \frac{1}{2} \sin 2x\right) = \sin 2x$ . **1.136.** 1)  $(\sin x - \cos x)^2 = 0$ , ...; 3)  $\operatorname{ctg} 2x = 3$ ;  $\operatorname{ctg} 2x = 7$ ; ...

8)  $2\operatorname{tg}^2 x - 6\operatorname{tg} x - 23 = 0$ ,  $x = \pi k$ ,  $k \in \mathbb{Z}$ ; 10)  $\cos^4 x - \sin^4 x = (\cos^2 x - \sin^2 x)(\cos^2 x + \sin^2 x) = \cos^2 x - \sin^2 x = \dots$ ; 11)  $x = \frac{\pi}{4} + \frac{n\pi}{2}$ ,  $n \in \mathbb{Z}$ ; 12)  $x = \frac{n\pi}{2}$ ,  $n \in \mathbb{Z}$ . **1.137.** 1)  $\frac{\pi}{2} + k\pi$ ,  $k \in \mathbb{Z}$ ; 2)  $\sin x = 1$ ,  $\cos^2 x = \frac{1}{3}$ ; 3)  $x_1 = 2\pi k$ ,  $k \in \mathbb{Z}$ ,  $x_2 = \pm \frac{\pi}{4} + 2\pi k$ ,  $k \in \mathbb{Z}$ ,  $x_3 = \pm \frac{3\pi}{4} + 2\pi k$ ,  $k \in \mathbb{Z}$ ; 4)  $\emptyset$ ; 5)  $\frac{\pi}{2} + 2\pi k$ ,  $k \in \mathbb{Z}$ . **1.138.** 2)  $x = (-1)^{k+1} \arcsin \frac{1}{5} + \pi k$ ,  $k \in \mathbb{Z}$ ,  $x = \pm \frac{\pi}{6} + \pi k$ ,  $k \in \mathbb{Z}$ ; 3)  $\frac{\pi}{4} + \pi k$ ,  $\arctg 3 + \pi k$ ,  $k \in \mathbb{Z}$ ; 4)  $\frac{\pi}{4} + \pi k$ ,  $\arctg 2 + \pi k$ ,  $k \in \mathbb{Z}$ ; 5)  $\frac{\pi}{4} + \frac{\pi}{2} k$ ,  $k \in \mathbb{Z}$ ; 7) berilgan tenglama  $\cos 5x + \cos 7x = \pm(\sin 5x + \sin 7x)$  tenglamaga teng kuchli; 8) tenglamani  $\sin^2 4x - 2\sin 4x \cos^4 x + \cos^8 x = \cos^8 x - \cos^2 x$  yoki  $(\sin 4x - \cos^4 x)^2 = -\cos^2 x(1 - \cos^6 x)$  ko'rinishda qaytadan yozamiz.  $(\sin 4x - \cos^4 x)^2 \geq 0$ ,  $-\cos^2 x(1 - \cos^6 x) \leq 0$  bo'lganiga ko'ra tenglik  $\cos^2 x(1 - \cos^6 x) = 0$  bo'lganda o'rinli bo'ladi. Bu tenglama ikki tenglamaga ajraladi:  $\cos x = 0$ ,  $1 - \cos^6 x = 0$ . Javob:  $x = \frac{\pi}{2} + \pi k$ ,  $k = 0, \pm 1, \pm 2, \dots$ ; 9) Yechilishi:  $\sin 2x = 1$  tenglamani qanoatlantirmoqda. Shunga ko'ra  $(\sin 2x - 1)(\sin^2 2x - 4\sin 2x - 4) = 0 \Rightarrow \begin{cases} \sin 2x = 1, \\ \sin 2x = 2(1 \pm \sqrt{2}) \end{cases} \Rightarrow \begin{cases} \sin 2x = 1, \\ 1 + \sqrt{2} > 1 \text{ bo'lmogda} \Rightarrow \left\{ x_1 = 45^\circ + 180^\circ k, \right. \\ \left. \sin 2x = 2(1 - \sqrt{2}) \right\} \end{cases}$

$x_2 = \frac{1}{2}(-1)^k \arcsin 2(1 - \sqrt{2}) + \frac{\pi}{2} k$ ,  $k \in \mathbb{Z}$ . **1.139.** 1)  $x = -\frac{\pi}{4} + n\pi$ ; 2)  $x = \frac{\pi}{2} + 2n\pi$ ,  $x = 2\pi k$ ,  $k \in \mathbb{Z}$ ; 3)  $x = \frac{\pi}{8} + \frac{\pi}{2} n$ ,  $n \in \mathbb{Z}$ . **1.140.** 1)  $\emptyset$ ; 2)  $x = \frac{\pi}{2} + \pi k$ ; 3)  $x = \frac{\pi}{2} + 2\pi k$ ,  $k \in \mathbb{Z}$ . **1.141.** 1)  $x = -\arccos\left(\frac{12}{13}\right) + \frac{\pi}{2} + 2n\pi$ ; 2)  $x = \frac{\pi}{4} + 2n\pi$ ,

$n \in Z$ ; 3)  $x = (-1)^k \frac{\pi}{6} + \frac{\pi}{6} + \pi k$ ,  $k \in Z$ . **1.143.** 12) Ko'rsatma: ildiz ostidagi ifodalar soddalashtirilsin. Natijada:  $\sqrt{(2\sin x + 1)^2} + \sqrt{(2\sin x - 1)^2} = 2$ ,  $|2\sin x + 1| + |2\sin x - 1| = 2$ . Tenglama faqat  $|\sin x| \leq \frac{1}{2}$  da o'rinli. Undan:  $-\frac{\pi}{6} + \pi n \leq x \leq \frac{\pi}{6} + \pi n$ ,  $n = 0, \pm 1, \pm 2, \dots$ . **1.144.** 3) Yechish. Tenglamani  $\sin x = 2x - 2$  ko'rinishda yozib olamiz va  $y = \sin x$ ,  $y = 2x - 2$  funksiyalar grafiklarini bitta koordinatalar tekisligida yasaymiz (I.56-rasm).



I.56-rasm.

Grafiklar bitta nuqtada kesishadi. Bu nuqtaning absissasi berilgan tenglamaning yagona ildizidir. Grafiklar kesishish nuqtasining absissasi  $\approx 1,5$  ga teng. Shunday qilib,  $x \approx 1,5$ . **1.145.** 1)  $x = \frac{\pi}{6} + 2n\pi$ ,  $n \in Z$ ,  $y = \frac{\pi}{6} - 2n\pi$ ,  $n \in Z$ ; 2)  $x = -\frac{\pi}{6} + \pi(k + l)$ ,  $y = \frac{2\pi}{3} + \pi(k - l)$ ,  $k, l \in Z$ ; 3)  $x = \pm \frac{\pi}{6} + \pi(m + n)$ ,  $y = \pm \frac{\pi}{6} + \pi(n - m)$ ,  $m, n \in Z$ ; 4)  $\emptyset$ . **1.146.** 1)  $\text{ctg} 2\alpha = \frac{\text{ctg}^2 \alpha - 1}{2\text{ctg} \alpha} < \frac{\text{ctg}^2 \alpha}{2\text{ctg} \alpha} = \frac{1}{2} \text{ctg} \alpha$ ; 2)  $\sin^6 \alpha - \sin^3 \alpha + 0,5^2 = (\sin^3 \alpha - 0,5)^2 \geq 0$ ; 3) Har doim  $2 + \cos \alpha > 0$ . Tengsizlik  $-\sqrt{3}(2 + \cos \alpha) \leq 3 \sin \alpha \leq \sqrt{3}(2 + \cos \alpha)$ , bundan  $3|\sin \alpha| \leq 2 + \cos \alpha$ , yoki  $4\cos^2 \alpha + 4\cos \alpha + 1 \geq 0$ , yoki  $(2\cos \alpha + 1)^2 \geq 0$ ; 4)  $\cos A \cdot \cos B \cdot \cos C = \frac{1}{2}[\cos(A - B) + \cos(A + B)] \cos C = \frac{1}{2}[\cos(A - B) - \cos C] \cos C = -\frac{1}{2}[\cos^2 C - \cos(A - B) \cos C] = \frac{1}{8} \cos^2(A - B) - \frac{1}{2} \left[ \cos C - \frac{\cos(A - B)}{2} \right]^2 \leq \frac{1}{8} \cos^2(A - B) \leq \frac{1}{8}$ ; 9)  $|a \sin x + b \cos x| \leq \sqrt{a^2 + b^2}$  bo'lganiga ko'ra  $|3 \sin x - 4 \cos x| \leq \sqrt{3^2 + 4^2} = 5$ ; 10)  $\sin \alpha > \sin \alpha \cos \beta$ ,  $\sin \beta > \sin \beta \cos \alpha$  ekani ma'lum. Ular hadlab qo'shilsa:  $\sin \alpha + \sin \beta > \sin \alpha \cos \beta + \cos \alpha \sin \beta = \sin(\alpha + \beta)$ ; 11) oldingi misolga asoslanilsa,  $2\sin \alpha = \sin(\alpha + \beta) < \sin \alpha + \sin \beta$ ,  $\sin \alpha < \sin \beta$ , demak,  $\alpha < \beta$ . **1.153.** 1) 0,2376; 2) 0,9832; 3) 0,1510; 4) 0,5150, darajalarni radianlarga o'tkazing. **1.157.** 1)  $\text{tg}(\text{arctg} 3) = 3$  bo'lishini bilamiz. Lekin  $\text{arctg}(\text{tg} 3) = 3$  deyilishi qo'pol xatolik bo'ladi, chunki  $-\frac{\pi}{2} < \text{arctg} m < \frac{\pi}{2}$ .

Demak,  $\arctg(\operatorname{tg}3) \in \left(-\frac{\pi}{2}; \frac{\pi}{2}\right)$  bo'lishi kerak:  $\operatorname{tg}\alpha = \operatorname{tg}(\arctg(\operatorname{tg}3)) = \operatorname{tg}3$ .

Tangenslarning tenglik shartiga ko'ra  $\alpha = 3 + \pi k$ . Lekin shart bo'yicha  $-\frac{\pi}{2} < 3 + k\pi < \frac{\pi}{2}$  yoki  $\frac{-\pi-3}{\pi} < k < \frac{\pi-3}{\pi}$  yoki  $-1,43\dots < k < -0,45\dots$ , bundan  $k = -1$ .

Demak,  $\arctg(\operatorname{tg}3) = 3 - \pi$ ; 2)  $\alpha = \arcsin(\sin 4)$ ,  $\sin\alpha = \sin 4$ ,  $\alpha = (-1)^k \cdot 4 + \pi k$ ,

$-\frac{\pi}{2} \leq (-1)^k \cdot 4 + k\pi \leq \frac{\pi}{2}$ , bundan  $k = 1$ . Demak,  $\alpha = -4 + \pi$ ; 5)  $\arccos\left[\cos\left(\frac{\pi}{2} + \frac{\pi}{8}\right)\right] = \arccos\left[\cos\frac{5\pi}{8}\right] \frac{5\pi}{8} \in [0; \pi]$ ; 6)  $\arcsin\left[\cos\left(4\pi + \frac{2}{7}\pi\right)\right] = \arcsin\left[\cos\frac{2}{7}\pi\right] =$

$= \arcsin\left[\sin\left(\frac{\pi}{2} - \frac{2}{7}\pi\right)\right] = \arcsin\left(\sin\frac{3\pi}{14}\right) = \frac{3\pi}{14} \in \left[-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}\right]$ ; 7)  $\arctg\left[\operatorname{tg}\left(\frac{\pi}{2} - \frac{3\pi}{7}\right)\right] = \arctg\left[\operatorname{tg}\left(\frac{\pi}{2} - \frac{3\pi}{7}\right)\right] = \arctg\left[\operatorname{tg}\frac{\pi}{14}\right] = \frac{\pi}{14}$ ; 9)  $\cos 2\alpha = \cos^2 \alpha - 1$ ,  $\alpha \in \left(-\frac{\pi}{2}; \frac{\pi}{2}\right)$  bo'yicha ayniyat  $2\cos^2(\arccos x) - 1 = 2x^2 - 1$ ; 10)  $\cos 3\alpha = \cos \alpha = (4\cos^2 \alpha - 3)$

bo'yicha:  $\cos(\arccos x) \cdot (4\cos^2(\arccos x) - 3) = x(4x^2 - 3)$ ,  $-1 \leq x \leq 1$ ; 12) Ko'rsatma:  $\arcsin(\sin 100) = (-1)^k(k\pi - 100)$ , bunda  $k$  bunday aniqlandi:  $-\frac{\pi}{2} \leq k\pi - 100 \leq \frac{\pi}{2}$ ,  $\frac{100}{\pi} - \frac{1}{2} \leq k \leq \frac{100}{\pi} + \frac{1}{2}$ ,  $31,3 \leq k \leq 32,3$ ,  $k = 32$ .  $\arcsin(\sin 100) = 32\pi - 100$ ; 13)  $\sin 3\alpha = 3\sin \alpha - 4\sin^3 \alpha$ , bunda  $\alpha = \arcsin x$ , bundan  $\sin(3\arcsin x) = 3x - 4x^3$ . **1.158.** 1)  $\frac{\sqrt{2}}{2}$ ; 2) 0 va  $\frac{\sqrt{3}}{2}$ ; 3)  $\sqrt{3}; 1$ ; 7) Ko'rsatma:

$y = 2\arcsin x$  almashtirish kiritilgandan so'ng  $\sin y + \cos y = 1$ ;  $\sqrt{2}\left(\frac{\sqrt{2}}{2}\sin y + \frac{\sqrt{2}}{2}\cos y\right) = 1 \Rightarrow \sqrt{2}\sin\left(y + \frac{\pi}{4}\right) = 1$ , bundan  $y = k\pi + (-1)^k \cdot \frac{\pi}{4} - \frac{\pi}{4}$ . Ikki holni qarang:  $k = 2m$ ,  $k = 2m - 1$ . 8) Ko'rsatma:  $x \in \emptyset$ . **1.159.** 1)  $-\frac{\sqrt{2}}{2} \leq x^2 - 4x \leq \frac{\sqrt{3}}{2} \dots$ ; 2)  $\left[-\frac{\pi}{12}; -\frac{\arctg 0,5}{3}\right] \cup \left[\frac{\arctg 2,5}{3}; \frac{\arctg 3}{3}\right]$ ; 3)  $\sin(\arcsin x - \arccos x) > \sin 0 = 0$  ni isbot qilish kerak.  $\sin(\arcsin x - \arccos x) = \sin(\arcsin x) \cdot \cos(\arccos x) - \sin(\arccos x) \cos(\arcsin x) = x^2 - (\sqrt{1-x^2})^2 = 2x^2 - 1 > 0 \Rightarrow |x| > \frac{1}{\sqrt{2}}$  yoki  $x < -\frac{\sqrt{2}}{2}$ ,  $x > \frac{\sqrt{2}}{2}$ , lekin tengsizlik  $|x| \leq 1$  da ma'noga ega. Demak,  $\frac{\sqrt{2}}{2} < x \leq 1$ . 4)  $(-\infty; 1)$ . **1.160.** 2)  $6(\sqrt{3} + 1)$ .

## II b o b

**2.1.**  $\emptyset$ . **2.2.**  $x=0$ . **2.3.**  $\emptyset$ . **2.4.**  $x=1$ . **2.5.**  $x = \pm \frac{\pi}{3} + 2\pi n$ ,  $y = \pm \frac{\pi}{3} + 2(n-k)\pi$ ,  $n$ ,

$k \in \mathbb{Z}$ . Ko'rsatma: tenglamani  $4\cos^2 \frac{x+y}{2} - 4\cos \frac{x-y}{2} \cdot \cos \frac{x+y}{2} + 1 = 0$

ko'rinishga keltirib, chap tomonda to'la kvadrat ajrating. **2.6.**  $x = \frac{\pi}{4} + \frac{k\pi}{2}$ ,  
 $y = \frac{\pi}{2} + 2\pi n$ ,  $n, k \in \mathbb{Z}$ . Ko'rsatma: tenglamani  $\sin y = 2\left(1 - \frac{1}{2}\sin^2 2x\right) \cdot$   
 $\cdot \left(1 + \frac{16}{\sin^4 2x}\right) - 16$  ko'rinishga keltiring va  $-1 \leq \sin y \leq 1$  ekanligidan foyda-  
lanib,  $\begin{cases} \sin^2 2x = 1, \\ \sin y = 1 \end{cases}$  sistemani hosil qiling. **2.7.**  $x = \frac{\pi}{4}(2k+1)$ ,  $y = \frac{\pi}{4}(2k+1)$ .  
Ko'rsatma: tenglamani  $(\operatorname{tg}^2 x - \operatorname{tg}^2 y) + 2(\operatorname{tg} x \cdot \operatorname{tg} y - \operatorname{ctg} x \cdot \operatorname{ctg} y)^2 + 1 =$   
 $= \sin^2(x+y)$  ko'rinishga keltiring. **2.8.**  $x=2$ . Ko'rsatma: tenglamani  $x \cdot 2^x =$   
 $= 8$  ko'rinishga keltiring. **2.9.**  $x_1=0$ ,  $x_2=2$ . Ko'rsatma: tenglamani  $(x-2)$   
 $(2^x + x - 1) = 0$  ko'rinishga keltiring. **2.10.**  $x = k\pi$ ,  $y = 1$ ,  $k \in \mathbb{Z}$ . **2.11.**  $\emptyset$ . **2.12.**  
 $x = \frac{\pi}{2} + k\pi$ ,  $x = 2k\pi$ ,  $k \in \mathbb{Z}$ . **2.13.**  $\emptyset$ . **2.14.**  $x = \frac{\pi}{4} + \frac{2\pi k}{3}$ ,  $k \in \mathbb{Z}$ . **2.15.**  $\emptyset$ . **2.16.**  $x=1$ ,  
 $y=0$ . **2.17.**  $x=1$ ,  $y=0$ . **2.18.**  $2k\pi < x < \frac{\pi}{2} + 2k\pi$ ,  $k \in \mathbb{Z}$ . **2.19.**  $(-\infty; -1] \cup [1; +\infty)$ .  
Ko'rsatma: tengsizlikning aniqlanish sohasini toping va unda  $\sqrt{x^2 - 1} \geq 0$   
bo'lishini e'tiborga oling. **2.20.**  $[1; +\infty)$ . **2.21.**  $(-\infty; -1] \cup [1; +\infty)$ . **2.22.**  $(-\infty; 1]$ .  
**2.23.**  $[1; +\infty)$ . Ko'rsatma:  $x \geq 1$  bo'lsa,  $\sqrt{x} \leq x$  va  $2^x \geq 2$  bo'ladi. **2.24.**  $(-\infty; 1]$ .  
Ko'rsatma:  $x \leq 1$  bo'lganda  $2^{\sqrt{1-x}} \geq 2^0 = 1 \geq x$  bo'ladi. **2.26.**  $[1; 2)$ . **2.27.**  
 $x = \frac{\pi}{2} + 2\pi k$ ,  $k = 7, 8, 9, \dots$ . Yechilishi. Tengsizlik  $\sin x = 1$  bo'ladigan  $x$  larda  
aniqlangan, ya'ni tengsizlikning aniqlanish sohasi  $x = \frac{\pi}{2} + 2\pi k$ ,  $k \in \mathbb{Z}$  lar-  
dan tashkil topadi. Bu  $x$  lar ichidan tengsizlikning yechimi bo'ladiganlarini  
bevosita qo'yib ko'rish bilan aniqlaymiz:  $0 < \left(\frac{\pi}{2} + 2\pi k\right) - 13\pi$ ,  $k \in \mathbb{Z}$ . Bundan,  
 $k \geq 7$  ekani kelib chiqadi. **2.28.**  $(-\infty; -2) \cup (2; +\infty)$ . **2.29.**  $x = -1$ . **2.30.**  $x = 2$ . **2.32.**  $(-\infty;$   
 $+\infty)$ . Ko'rsatma:  $\sin(\sin x) < \sin 1 < \sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$ . **2.33.**  $(-\infty; +\infty)$ . Ko'rsatma:  
 $[\sin x + \cos x] \leq 1 \leq 2^{|\cos x|}$ . **2.34.**  $(-\infty; +\infty)$ . Ko'rsatma:  $\frac{4}{3}\sin^2\{5x\} \leq \frac{4}{3}\sin^2 1 \leq$   
 $\leq \frac{4}{3}\sin^2 \frac{\pi}{3} = 1$ . **2.35.**  $(-\infty; +\infty)$ . Ko'rsatma:  $\sin(\{x\} + 1) - \sin\{x\} =$   
 $= 2\sin \frac{1}{2} \cos\left(\{x\} + \frac{1}{2}\right) > 2\cos\left(1 + \frac{1}{2}\right)\sin \frac{1}{2} > 2\cos \frac{\pi}{2}\sin \frac{1}{2} = 0$ . **2.36.**  $[1; +\infty)$ .  
Ko'rsatma:  $y = \sqrt{x-1} + 2^x + \log_2 x$ ,  $\uparrow$ . **2.37.**  $[1; 2)$ . **2.38.**  $(-\infty; 1]$ . Ko'rsatma:  
 $y = \sqrt{1-x} + 3 - x - 2^x$  funksiya  $D(y) = (-\infty; 1]$  da  $\downarrow$  va  $y(1) = 0$ . **2.39.**  
 $\left[k + \frac{1}{2}; k + 1\right)$ ,  $k \in \mathbb{Z}$ . **2.40.**  $1 - \frac{\sqrt{2}}{2} < x < 1$ . **2.41.**  $x = \log_3 2 - 4$ ;  $y = 1$ . **2.42.**  $x=y=$   
 $2$ ,  $z = -2$ . Ko'rsatma: Tenglamalar sistemasini  $\begin{cases} x + z = 2 - y, \\ 2yx - z^2 = 4 \end{cases}$  ko'rinishda  
yozib, bu sistemani  $y$  parametrli sifatida qarang yoki berilgan sistemaning

birinchi tenglamasini kvadratga ko'tarishdan hosil bo'lgan tenglamadan sistemaning ikkinchi tenglamasini ayiring. **2.43.**  $x = y = 4, z = -4$ . **2.44.**  $x = 3, y = 1, z = 0$ . **2.45.**  $x = y = z = 1$ . **2.46.**  $(1,5; 0,5)$ . **2.47.**  $(\frac{1}{4}; \frac{1}{3})$ . **2.48.**  $x = \pm \frac{\pi}{8}; y = \pm \frac{\pi}{8}$ . **2.49.**  $(2; 9)$  va  $(-2; -9)$ . **2.50.**  $(2; \frac{17}{2})$  va  $(-2; -\frac{17}{2})$ .

### III b o b

**3.1.** 1) 3; 17; 55. 3)  $\sqrt{2}; \sqrt{5}; \sqrt{10}; \sqrt{17}$ . **3.5.**  $\frac{\sqrt{5}}{5} \left( \left( \frac{1+\sqrt{5}}{2} \right)^n - \left( \frac{1-\sqrt{5}}{2} \right)^n \right)$ . **3.8.** 1) chegaralanmagan; 2), 3), 4) chegaralangan bo'lishi ham, chegaralanmagan bo'lishi ham mumkin. **3.9.** 1) Yo'q (Masalan  $x_n = -n; y_n = 1$  ketma-ketliklarni qarang); 2) Ha. **3.13.** Ko'rsatma:  $a_{n-1} - a_n = \frac{ad-bc}{(cn+d)^2 + c(cn+d)}$  ekanidan foydalaning. 1)  $ad > bc$ ; 2)  $ad < bc$ . **3.21.** 1) Yo'q; 2) Yo'q; 3) Ha; 4) Ha. **3.23.** 1) Ko'rsatma.  $x_n = \frac{1}{18 + \frac{15}{n} + \frac{6}{n^2}}$  ketma-ketlikning chegaralanganligidan foydalaning. **3.24.**  $\frac{1}{2} + \frac{5}{2(4n-3)}$ . **3.27.** 1)  $x_n = 2 + \frac{5}{n+2}; \lim_{n \rightarrow \infty} x_n = 2$ ; 2)  $x_n = 0 + \left( \frac{1}{n} - \frac{1}{n^2} \right); \lim_{n \rightarrow \infty} x_n = 0$ . **3.30.** 1) 2; 2) 0; 3)  $+\infty$ ; 4)  $+\infty$ ; 5) 0; 6) 0; 7) 0; 8) 1. **3.31.** 1)  $\frac{1-b}{1-a}$ ; 2)  $\frac{1}{2}$ ; 3) 5; 4) 1. **3.34.** 1) 1.

### IV b o b

**4.3.** 1)  $\lim_{x \rightarrow 4-0} f(x) = 8, \lim_{x \rightarrow 4+0} f(x) = 2$ ; 2)  $\lim_{x \rightarrow \frac{\pi}{2}-0} f(x) = 1, \lim_{x \rightarrow \frac{\pi}{2}+0} f(x) = 0$ . **4.5.** 1) 3; 2) 4; 3) 10; 4) 724; 5) 6; 6) 1. **4.6.** 1) 15; 3) 4; 5)  $\frac{1}{4}$ . **4.7.** 1) Ha; 2) Ha; 3) Yo'q; 4) Ha; 5) Yo'q; 6) Ha; 7) Ha; 8) Ha; 9) Yo'q; 10) Yo'q; 11) Ha; 12) Ha. **4.8.** 1) 8; 2) 1; 3) 1; 4)  $\infty$ ; 5) 0; 6) 0; 7) 72; 8)  $\infty$ ; 9) 2; 10) 0; 11) 2; 12) 1. **4.9.**  $y = 1$ . **4.10.**  $x = -\sqrt[3]{6}$ . **4.11.**  $y = x$ . **4.12.** 1)  $x = 2, y = 0$ ; 2)  $y = x$ ; 3)  $y = -x, y = x$ ; 4)  $y = -1, y = 1$ ; 5)  $x = -1, x = 1, y = -x$ ; 6)  $y = 0$ ; 7)  $y = -\frac{\pi}{2}x - 1, y = \frac{\pi}{2}x - 1$ ; 8)  $y = 2x + 1$ ; 9)  $y = 0$ ; 10)  $y = \frac{\pi}{2}$ . **4.13.** 1) uzluksiz; 2) uzluksiz emas; 3) uzluksiz emas; 4) uzluksiz emas; 5) uzluksiz emas; 6) uzluksiz emas. **4.16.** 1)  $x = 0$ ; 2)  $x = \frac{\pi}{2} + \pi k, k \in \mathbb{Z}$ ; 3)  $x = \pm 1$ ; 4)  $x = \pm 1$ ; 5)  $x = n, n \in \mathbb{Z}$ . 6)  $\frac{\pi n}{2}, n \in \mathbb{Z}$ . **4.17.** 1) Masalan,  $y = \frac{1}{x(x-1)(x-2)}$ ; 3) Masalan,  $y = \frac{1}{\sin x}$ . **4.20.** 1)  $A = 1$ ; 2)  $A = \frac{1}{3}$ ; 3)  $A = -6$ ; 4)  $A = 2$ . **4.23.**  $x = 1$ . **4.28.** 1) 1; 2) 1,5; 3)  $\frac{4}{3}$ ; 4)  $\frac{5}{6}$ ; 5)  $\frac{8}{7}$ ;

- 6)  $\frac{1}{3}$ . **4.29.** 1)  $\frac{2}{3}$ ; 2) 2; 3)  $\frac{3}{4}$ ; 4) 15; 5) 1; 6)  $\frac{2}{9}$ ; 7)  $\frac{1}{5}$ ; 8)  $\frac{3}{5}$ ; 9)  $\sqrt{2}$ ; 10) 5;  
 11) 1; **12)**  $\frac{1}{6}$ ; 13) 3; 16) 12; 17)  $\frac{2}{\pi}$ ; 18) 1. **4.30.** 1)  $e^3$ ; 2)  $e^{56}$ ; 3) 4; 4)  $\frac{9}{7}$ .

### V b o b

**5.2.** Ko'rsatma: qirraning  $x$  uzunligi va  $\Delta x$  orttirmaga muvofiq hajmning  $\Delta V$  o'zgarishi jadvalda ko'rsatilgan.

$x \backslash \Delta x$	1	0,5	0,2
1	7	2,375	0,728
5	91	41,375	15,608
10	331	157,625	61,218

**5.11.**  $f'(x) = 3x^2 - \frac{6}{5}x + 10$ ,  $f'(0) = 10$ ,

$f(-1) = 14,2$ ,  $f'(1) = 11,8$ . **5.13.** Ko'rsatma:

$$\Delta x = h, \frac{\Delta y}{h} = \frac{\sqrt[3]{x+h} - \sqrt[3]{x}}{h} = \frac{(\sqrt[3]{x+h} - \sqrt[3]{x})(\sqrt[3]{(x+h)^2} + \sqrt[3]{(x+h)x} + \sqrt[3]{x^2})}{h(\sqrt[3]{(x+h)^2} + \sqrt[3]{(x+h)x} + \sqrt[3]{x^2})} = \frac{1}{\sqrt[3]{(x+h)^2} + \sqrt[3]{(x+h)x} + \sqrt[3]{x^2}}.$$

Javob:  $y' = \frac{1}{3\sqrt[3]{x^2}}$ . **5.16.** Ko'rsatma:  $h'(t) = v(t) = v_0 - gt$ ,  $\frac{v_0}{2} = v_0 - gt$ , bundan

$t$  aniqlanib,  $h(t)$  ifodaga qo'yiladi. Javob:  $5,234375 \approx 5,234$  m. **5.22.** Ko'rsatma:  $x^2 - 4x + 1 = -2$  bo'yicha  $x_0 = 1$  va  $x_0 = 3$  aniqlanadi. (1; -2) va (3; -2) nuqtalarda berilgan egri chiziqqa urinuvchi to'g'ri chiziqlar  $y = -2x$  va  $y = 2x - 8$ . **5.31.**

$y = 6x - 4$ ,  $d = \frac{\sqrt{37}}{3}$ . **5.32.**  $y = 12x - 28$ . **5.33.** Ko'rsatma:  $x^3 - 1\frac{3}{4}x - 1\frac{1}{4} = -2 \Rightarrow$

$\Rightarrow x^3 - 1 - 1\frac{3}{4}x + 1\frac{3}{4} = 0$ . Endi ko'paytuvchilarga ajrating. Javob:  $y = 1,25x - 3,25$ ,

$y = 5x + 5,5$ ,  $y = -x - 1,5$ . **5.41.**  $v(t) = x'(t) = 10 - 0,6t$ ,  $v(6) = 10 - 3,6 = 6,4$  (m/s);

$10 - 0,6t = 0$ , bundan  $t = 16\frac{2}{3}$  (s). **5.44.**  $(uvw)' = u'vw + uv'w + uvw'$ . **5.45.**

Ko'rsatma:  $k = \text{tg}45^\circ = 1$ ,  $y' = (\sqrt[3]{x} - 1)' = \left(x^{\frac{1}{3}} - 1\right)' = \frac{1}{3}x^{-\frac{2}{3}} = k = 1$ , bundan

$x = \pm 3\sqrt{3}$ . Endi  $y = \sqrt[3]{x} - 1$  munosabatdan foydalaning. **5.47.** Ko'rsatma:  $f(a+h) \approx f(a) + f'(a)h$  dan foydalaning. Chetlanish  $\alpha h$  ga teng, bunda

$a = \frac{\Delta f}{h} - f'(a)$ . **5.51.** 1)  $-4\cos^3 x \sin x$ ; 2)  $\frac{\text{tg}x}{\cos x}$ ; 3)  $-\frac{4\text{tg}2x}{\sin 2x}$ ; 7)  $(x^3 + 6x + 5)\cos x$ .

**5.55.** 2)  $5\cos\left(5x + \frac{\pi}{3}\right)$ ; 3)  $42x \sin^2\left(7x^2 - \frac{\pi}{6}\right)\cos\left(7x^2 - \frac{\pi}{6}\right)$ ; 10)  $-\frac{\cos\frac{1}{x}}{x^2}$ ; 11)

$\cos(\sin x)\cos x$ ; 12)  $\frac{1}{4\sqrt{\text{tg}\frac{x}{2}\cos^2\frac{x}{2}}}$ ; 13)  $\frac{x \cos\sqrt{1+x^2}}{\sqrt{1+x^2}}$ ; 14)  $\frac{x^2-1}{2x^2 \cos^2\left(x+\frac{1}{x}\right)\sqrt{1+\text{tg}\left(x+\frac{1}{x}\right)}}$ ;

15)  $\frac{\sin\left(2\frac{1-\sqrt{x}}{1+\sqrt{x}}\right)}{\sqrt{x}(1+\sqrt{x})}$ . **5.59.**  $\frac{\sqrt{s}}{2}$ . **5.60.** 8)  $\frac{\pi}{2(\arccos x)^2\sqrt{1-x^2}}$ ; 9)  $\arcsin x$ ; 10)

$\sin x \cdot \arctg x + x \cdot \cos x \cdot \arctg x + \frac{x \sin x}{1+x^2}$ ; 11)  $\frac{\arctg x}{2\sqrt{x}} + \frac{\sqrt{x}}{1+x^2}$ ; 12)  $-\frac{2}{|x|\sqrt{x^2-4}}$ ;

13)  $-\frac{1}{(1+x)\sqrt{2x(1-x)}}$ . **5.63.** 11) Ko'rsatma:  $\left(\frac{1}{x^2+9x+20}\right)^{48} = \left(\frac{1}{x+4} - \frac{1}{x+5}\right)^{48} =$

$= (3-b, (1))$  munosabat bo'yicha  $\left(\frac{-1}{(x+4)^2} + \frac{1}{(x+5)^2}\right)^{47} = \dots$  **5.65.**  $s' = v = \frac{2\pi A}{T} \cos \frac{2\pi t}{T},$

$s'' = v' = -\frac{4\pi^2 A}{T^2} \sin \frac{2\pi t}{T}$  yoki  $s'' = -\frac{4\pi^2}{T^2} s$ . **5.66.** 1)  $2^x \ln 2$ ; 2)  $4^{-x}(1 - x \ln 4)$ ;

3)  $10^x(1 + x \ln 10)$ ; 4)  $e^x(\cos x - \sin x)$ ; 5)  $-\frac{\sin x + \cos x}{e^x}$ ; 6)  $-\frac{2 \cdot 10^x \ln 10}{(1+10^x)^2}$ ;

7)  $\frac{e^x(x-1)^2}{(x^2+1)^2}$ ; 8)  $2^x \ln 2 \cdot \cos(2^x)$ . **5.67.** 1)  $2x \log_3 x + \frac{x}{\ln 3}$ ; 2)  $\frac{2 \ln x}{x}$ ; 3)  $\frac{\ln x + 1}{\ln 10}$ ;

4)  $\frac{x \ln x - x + 1}{x \ln^2 x} \ln 2$ ; 5)  $\sin x \ln x + x \cos x \ln x + \sin x$ ; 6)  $-\frac{1}{x \ln^2 x}$ ; 7)  $-\frac{2}{x(1+\ln x)^2}$ ;

8) ctgx. **5.68.** 1)  $\frac{(x+2)(x+4)}{(x+3)^2}$ ; 2)  $\frac{(3-x)x^2}{(1-x)^2}$ ; 3)  $\frac{1-\sqrt{2}}{2\sqrt{x}(1+\sqrt{2x})^2}$ ; 4)  $-\frac{4}{3\sqrt[3]{4x^2}(1+\sqrt[3]{2x})}$ ;

5)  $-\frac{x}{\sqrt{1-x^2}}$ ; 6)  $\frac{mx^{m-1}}{(1-x)^{m+1}}$ ; 7)  $-\frac{2x}{3\sqrt[3]{(1+x^2)^4}}$ ; 8)  $\frac{3-x}{2\sqrt{(1-x)^2}}$ . **5.69.** 1) Ko'rsatma:

$y' = (x^3 + x^2 + 6) = 3x^2 + 2x = 0$ , buning ildizlari  $x_0 = 0, -\frac{2}{3}$ . U holda:

$x < 0$	$x = 0$	$x > 0$
$y' < 0$	$y' = 0$	$y' > 0$

$x < -\frac{2}{3}$	$x = -\frac{2}{3}$	$x > -\frac{2}{3}$
$y' > 0$	$y' = 0$	$y' < 0$

$y_{\min} = 0^3 + 0^2 + 6 = 6$ ;  $y_{\max} = \left(-\frac{2}{3}\right)^3 + \left(-\frac{2}{3}\right)^2 + 6 = 6\frac{4}{27}$ ; 9)  $x_0 = -\frac{b}{2a}$ ,  $a > 0$  da

eng kichik qiymat  $\frac{4ac-b^2}{4a}$ ,  $a < 0$  da eng katta qiymat  $\frac{4ac-b^2}{4a}$ . **5.70.** 2) eng katta

qiymati  $f(3) = 1$ , eng kichik qiymati  $f(-3) = -971,4$ . **5.73.**  $x = \frac{P}{2}$ ,  $y = \frac{P}{2}$ ,

$S_{\max} = \frac{P^2}{8}$ . **5.74.** 2; 2;  $2\sqrt{2}$ . **5.75.**  $x = \frac{2}{3}$ . **5.76.**  $x = r$  da ( $r > 0$ ). **5.78.**

$f^2(x) = 14 + 2\sqrt{(x-2)(16-x)}$  funksiya  $x$  ning qanday qiymatida eng katta qiymatga ega bo'lishini aniqlaymiz.  $x-2$  va  $16-x$  ko'paytuvchilar musbat, ularning yig'indisi 14 ga teng, ya'ni doimiy son. Demak,  $f^2(x)$  funksiya,  $f(x)$  funksiya ham eng katta qiymatni  $x$  ning  $x-2 = 16-x$  tenglikni qanoatlantiradigan qiymatida qabul qiladi. Bu  $x=9$ , unda  $f^2(x) = 28$ . Izlanayotgan eng katta qiymat  $f(9) = \sqrt{28}$ . **5.80.** Ko'rsatma:  $x \leq 1, 1 < x \leq 2, 2 \leq x \leq 3, 3 \leq x < 4, x \geq 4$  hollarini qarang. Javob:  $2 \leq x \leq 3$  bo'lishi sharti bilan  $f = 4$ . **5.81.** Ko'rsatma: uchburchakning asosi va balandligi o'zgarmas ekanligidan foydalaning va

$AB = a$ ,  $CD = h$  deb qabul qiling. Eng katta qiymat  $KL$  chiziq o'rtta chiziq bo'lganda hosil bo'ladi. **5.85.** 1)  $\Delta f = f(2) - f(1) = 9$ ;  $\Delta x = 2 - 1 = 1$ ; (1) formula bo'yicha  $f'(c) = \frac{9}{1} = 9$ . Lekin  $f' = 3x^2 + 2$ , bundan  $x = c$  da  $3c^2 + 2 = 9$ ,  $c = \pm\sqrt{\frac{7}{3}}$ , nihoyat,  $c \in [1; 2]$  bo'lganidan  $c = \sqrt{\frac{7}{3}}$ ; 3) quyi tomon yo'nalgan; 4)  $(0; +\infty)$  da qavariqligi bilan yuqoriga,  $(-\infty; 0)$  da quyiga yo'nalgan. **5.88.** 1)  $(-\infty; +\infty)$  da o'sadi; 2)  $(-\infty; +\infty)$  da o'sadi; 3)  $(-\infty; 2)$  da o'sadi,  $(2; 3)$  da kamayadi,  $(3; +\infty)$  da o'sadi. **5.103.** 2)  $-1,66; 0,25; 2; 1$ .

### VI b o b

**6.7.** 2) Ko'rsatma:  $2x = t$ ;  $\frac{e^{2x}}{2} + C$ . **6.13.** 1)  $\frac{1}{4}\sin 2x - \frac{1}{2}x \cos 2x + C$ ; 2)  $x \sin x + \cos x + C$ ; 3)  $\frac{-(x+1)}{e^x} + C$ ; 4)  $\frac{3^x}{\ln^2 3}(x \ln 3 - 1) + C$ ; 5)  $x \ln x - x + C$ ; 6)  $\frac{x^2}{2} \ln x - \frac{x^4}{4} + C$ ; 7)  $\frac{e^x}{2}(\sin x + \cos x) + C$ ; 8)  $e^x(x^2 - 2x + 2) + C$ ; 9)  $x \ln^2 x - 2x \ln x + 2x + C$ . **6.16.** 7)  $8\frac{2}{3}$ ; 8)  $-3$ ; 9)  $\frac{2-\sqrt{3}}{4}$ ; 10)  $11,25$ . **6.18.** 2)  $\frac{\pi}{3}$ ; 4)  $\frac{\pi}{4}$ ; 5)  $17\frac{1}{3}$ . **6.19.** 2)  $1\frac{1}{3}$ ; 4)  $2\frac{2}{3}$ ; 6)  $\frac{8}{9}$ . **6.22.**  $A=3, B=0$ . **6.30.**  $64,8$ .

### VII b o b

**7.4.**  $s = \frac{gt^2}{2} + v_0 t + s_0$ , bu yerda  $v_0 = v(t_0)$ ,  $s(0) = s_0$ . Ko'rsatma.  $F = ma$ ,  $P = mg$  va  $F = P$  munosabatlardan foydalaning. **7.6.**  $y = e^{x^2}$ . Ko'rsatma.  $y' = 2xy$  va  $y(0) = 1$  dan foydalaning. **7.15.** 1)  $y = \frac{1}{3x}(x^3 - C)$ ; 2)  $y = x^2 + Cx^3$ ; 3)  $y = \sin x + C \cdot \operatorname{tg} \frac{x}{2}$ . **7.16.**  $y = \frac{x}{\cos x} + 1$ . **7.17.**  $y(0) = 1$  shartni qanoatlantiradigan yechim mavjud emas.

### VIII b o b

**8.3.**  $3 \cdot 4 = 12$ . **8.4.**  $8$ ; 6. **8.5.**  $24$ . **8.10.**  $A_7^3 \cdot A_3^3 = 7 \cdot 6 \cdot 5 \cdot 3 \cdot 2 \cdot 1 = 1260$ . **8.18.**  $C_{20}^4 = 4845$ . **8.19.**  $C_5^2 = 10$ . **8.20.**  $C_{10}^3 \cdot C_{12}^3 = 26400$ . **8.21.**  $C_{49}^5$ . **8.28.** 1)  $k = k_1 + k_2 + k_3 = 4$ ,  $k_i = 0, 1, 2, 3$  ( $k_1, k_2, k_3$ ) kortejlarni tuzamiz:  $(4, 0, 0)$ ,  $(0, 4, 0)$ ,  $(0, 0, 4)$ ,  $(3, 1, 0)$ ,  $(3, 0, 1)$ ,  $(1, 3, 0)$ ,  $(1, 0, 3)$ ,  $(0, 3, 1)$ ,  $(0, 1, 3)$ ,  $(2, 2, 0)$ ,  $(2, 0, 2)$ ,  $(0, 2, 2)$ ,  $(1, 1, 2)$ ,  $(1, 2, 1)$ ,  $(2, 1, 1)$ . Yoyilmada jami 15 ta had bor. Hadlardan ixtiyoriy birini, masalan,  $(2, 1, 1)$  kortejga mosini topamiz. Uning koeffitsiyenti:  $P(2, 1, 1) = \frac{(k!)}{(k_1! \cdot k_2! \cdot k_3!)} = \frac{(4!)}{(2! \cdot 1! \cdot 1!)} = 12$ . Izlanayotgan had  $12a^2bc$  ko'rinishda bo'ladi. **8.31.**  $\overline{C_5^8} = \frac{(12!)}{(8! \cdot 4!)} = \frac{(9 \cdot 10 \cdot 11 \cdot 12)}{(1 \cdot 2 \cdot 3 \cdot 4)} = 495$  va sh.o'. **8.32.** 3)  $C_9^4 \cdot 10!$ .

**8.37.**  $C_4^2 \cdot C_5^3 \cdot 5! = 7200$ . **8.38.**  $C_5^3 \cdot C_6^4 \cdot C_4^3$ . **8.39.**  $9 \cdot 9!$ . **8.40.**  $C_6^3 \cdot C_9^3 \cdot 6!$ . **8.46.**  $P_5 = 5! = 120$ . **8.47.**  $P(2, 2, 1, 1, 1) = (7!)/(2! \cdot 2! \cdot 1! \cdot 1! \cdot 1!) = 1260$ . **8.48.**  $9^4$ . **8.49.**  $C_{21}^4 \cdot C_{17}^4 \cdot C_{13}^4 \cdot C_9^5$ . **8.53.**  $84$ . **8.55.**  $A_{33}^4 = 982080$ .

## IX b o b

**9.8.**  $\{A_0, A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, A_9, A_{10}\}$ , bunda  $A_i$  – gerb  $i$  marta tushdi. **9.19.** 1)  $A \cup B = \emptyset$ ; 3)  $A \cap B = \emptyset$  yoki  $A = \emptyset$ ; 4)  $A \subset B$ . **9.20.** Yo‘q. **9.24.** 2)  $K$ ; 7)  $M$ . **9.31.**  $0,77$ . **9.39.**  $A = (A \cap B) \cup (A \cap \bar{B})$ , bunda  $A \cap B$  va  $A \cap \bar{B}$  bog‘liq emas.  $P(A) = P(A \cap B) + P(A \cap \bar{B})$  va shart bo‘yicha  $P(A \cap B) = P(A) \cdot P(B)$  bo‘lganidan  $P(A \cap \bar{B}) = P(A) - P(A \cap B) = P(A) - P(A) \cdot P(B) = P(A) \cdot (1 - P(B)) = P(A) \cdot P(B)$ . **9.41.** Ko‘rsatma:  $P(A \cap \overline{B \cup C}) + P(B \cap \overline{A \cup C}) + P(C \cap \overline{A \cup B})$  ni hisoblang; 4)  $P(A_1 \cap A_2 \cap A_3) = P(A_1) \cdot P(A_2) \cdot P(A_3) = 0,7 \cdot 0,6 \cdot 0,6 = 0,252$ . **9.43.**  $P(A \cap B \cap C) = P(A) \cdot P(B) \cdot P(C) = 0,9 \cdot 0,8 \cdot 0,7 = 0,504$ . **9.45.**  $A_1$  – «birinchi bo‘lakni ikkinchi bo‘lak bilan birlashtirish»ga qolgan  $2n - 1$  ta bo‘lakdan bittasi imkon beradi, demak,  $P(A_1) = 1/(2n - 1)$ ;  $A_k$  – « $k$ - bo‘lakning qolgan  $2n - (2k - 1)$  tasining bittasi bilan ulanish ehtimolligi  $P(A_k) = 1/(2n - (2k - 1))$ . O‘zaro bog‘liq hodisalar ehtimolliklarini ko‘paytirish formulasi bo‘yicha izlanayotgan ehtimollik:  $P = \frac{1}{2n-1} \cdot \frac{1}{2n-3} \cdot \dots \cdot \frac{1}{3} \cdot \frac{1}{1} = \frac{1}{99 \cdot 97 \cdot \dots \cdot 3 \cdot 1}$ . **9.49.**  $P = 0,4 \cdot 0,4 \cdot 0,4 \cdot 0,6 = 0,0384$ . **9.70.** Ko‘rsatma:  $n = 60$ ,  $x_{\max} = 7$ ,  $x_{\min} = 1$ ,  $\lambda = \frac{7-1}{60} = 0,1$ . **9.71.**  $\bar{\beta} \approx 65^\circ 36' 03''$ ,  $\sigma(\bar{\beta}) \approx 1''$ ,  $9$ . **9.83.** 2)  $(C_{20}^1 + C_{10}^1)/C_{20}^2 = 48/95$ . **9.85.**  $A$  – «uch otishda kamida biri nishonga tegdi» ehtimolligi  $P(A) = 1 - q^3 = 0,8$ , bundan  $q = \sqrt[3]{0,2} \approx 0,5848$ . **9.86.**  $P = 1 - 0,2 \cdot 0,3 \cdot 0,4 \cdot 0,5 = 0,88$ . **9.87.**  $n = 5$ ,  $m \geq 2$ ,  $p = 0,6$ ,  $q = 0,4$ ,  $P_5(m \geq 2) = 1 - P_5(m < 2) = 1 - \sum_{m=0}^{2-1} P_5(m) = 1 - P_5(0) - P_5(1) = 1 - C_5^0 p^0 q^5 - C_5^1 p q^4 = 0,912$ .

## X b o b

**10.1.**  $\begin{pmatrix} a_{11} & a_{12} & a_{13} & a_{14} & a_{15} \\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} \\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} \end{pmatrix}$ . **10.2.**  $A = (1 \ 1 \ 1 \ 1)$ ,  $B = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$ . **10.3.**  $C = \begin{pmatrix} 3 & 3 & 3 & 3 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{pmatrix}$ . **10.4.** 1)  $(3 \ 5 \ 5 \ 9)$ ; 2)  $(1 \ -3 \ 3 \ 6)$ ; 3)  $(44 \ 51 \ 58 \ 65)$ ; 4)  $(-4 \ -3 \ -23 \ -17)$ . **10.5.**  $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$ . **10.7.** 1)  $\begin{pmatrix} -2 & 2 & -1 \\ 2 & 5 & 9 \end{pmatrix}$ ;

$$2) \begin{pmatrix} -4 & 2 & 9 \\ -4 & -3 & 3 \end{pmatrix}; 3) \begin{pmatrix} -10 & 8 & 0 \\ 2 & 12 & 26 \end{pmatrix}; 4) \begin{pmatrix} -3 & 4 & -4 \\ 7 & 14 & 23 \end{pmatrix}. \mathbf{10.9. 1) \begin{pmatrix} \frac{5}{3} & 3 & \frac{13}{3} \\ -\frac{8}{3} & 0 & -\frac{2}{3} \\ -\frac{2}{3} & -\frac{1}{3} & \frac{17}{3} \end{pmatrix}.$$

$$\mathbf{10.28.}$$
 Mavjud emas.  $\mathbf{10.29. 4) \begin{pmatrix} 1 & -2 & 7 \\ 0 & 1 & -2 \\ 0 & 0 & 1 \end{pmatrix}; 5) \begin{pmatrix} 1 & -3 & 11 & -38 \\ 0 & 1 & -2 & 7 \\ 0 & 0 & 1 & -2 \\ 0 & 0 & 0 & 1 \end{pmatrix};$

$$6) \begin{pmatrix} \frac{1}{4} & \frac{1}{4} & \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} \\ \frac{1}{4} & -\frac{1}{4} & \frac{1}{4} & -\frac{1}{4} \\ \frac{1}{4} & -\frac{1}{4} & -\frac{1}{4} & \frac{1}{4} \end{pmatrix}. \mathbf{10.30. 1) \begin{pmatrix} 2 & -23 \\ 0 & 8 \end{pmatrix}.}$$
 Ko'rsatma: tenglamaning

har ikki qismini ham  $\begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}^{-1}$  matritsaga chapdan ko'paytiring; 4) ko'rsatma:

tenglamaning har ikki qismini ham  $\begin{pmatrix} 1 & 2 & -3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}^{-1}$  matritsaga o'ngdan ko'paytiring.

**10.32.** 1)  $x_1 = 2, x_2 = 1, x_3 = 3$ ; 2)  $x = y = z = 0$ ; 3)  $x_1 = 3, x_2 = 1, x_3 = 1$ ;  
 4)  $x=y=z=0$ . 5)  $x=3\frac{2}{7}, y=\frac{3}{7}, z=1\frac{5}{7}$ . 6)  $x_1=x_2=x_3=0$ . 7)  $x_1=3, x_2=-4, x_3=-1, x_4=1$ . 8)  $x_1=x_2=x_3=x_4=0$ . 9)  $x_1=x_2=x_3=x_4=x_5=0$ . 10)  $x_1=2, x_2=0, x_3=-2, x_4=-2, x_5=1$ . **10.41.** 1) (1; 12; 16); 2) (1; 2; 3; 0). **10.42.** 1)  $y = x_1 + 2x_2 + 3x_3$ . 2)  $0 \cdot x_1 + \frac{1}{3} \cdot x_2 + x_3$ . **10.43.** 1) Yo'q. 2) Ha. **10.44.** 1) Faqat bir xil usulda yoyish mumkin. 2) Faqat bir xil usulda yoyish mumkin. **10.49.** 1) (2; 1; 1). 3) (3; 0; 0). 5) (1; 2; 3).

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