Algebra imtihon savollari_1-kurs

Binar munosabatlar. Ekvivalentlik munosabati. Akslantirishlar.
Kompleks sonlar va ular ustida amallar.
O'rin almashtirishlar va o'rniga qo'yishlar.
Matritsalar va ular ustida amallar.
Determinant va uning xossalari.
Minorlar va algebraik to'ldiruvchilar. Laplas teoremasi.
Teskari matritsa va determinantning qo'shimcha xossalari
Chiziqli tenglamalar sistemalari va ularni yechish usullari.
Matritsaning rangi.
Bir jinsli tenglamalar sistemasi. Kroneker-Kapelli teoremasi.
Ko'phadlar uchun Yevklid algoritmi.
Bezu teoremasi va Gorner sxemasi. Algebraning asosiy teoremasi.
Ratsional kasrlar.
Uchinchi darajali algebraik tenglamalarni yechish.
Ildiz chegaralari. Shturm teoremasi.

1. Evklid algoritmidan foydalanib $f_1(x)u(x)+f_2(x)v(x)=d(x)$ tengligini qanoatlantiruvchi u(x) va v(x) ko'phadlarni toping. $f_1(x)=x^5+3x^4+x^3+x^2+3x+1, \quad f_2(x)=x^4+2x^3+x+2$

2. CHATSni Gauss usuli yordamida yeching.
$$\begin{aligned} x_1+\ x_2+\ \ x_3+\ \ x_4+\ \ x_5 &= 15,\\ x_1+2x_2+\ 3x_3+\ 4x_4+\ 5x_5 &= 35,\\ x_1+3x_2+\ 6x_3+10x_4+15x_5 &= 70,\\ x_1+4x_2+10x_3+20x_4+35x_5 &= 126,\\ x_1+5x_2+15x_3+35x_4+70x_5 &= 210. \end{aligned}$$

3. Ferrari usuli bilan yeching: $x^4-2x^3-2x^2+12x-24;$

4. Evklid algoritmidan foydalanib $f_1(x)u(x)+f_2(x)v(x)=d(x)$ tengligini qanoatlantiruvchi u(x) va v(x) ko'phadlarni toping. $f_1(x)=x^4-x^3-4x^2+4x+1 \quad f_2(x)=x^2-x-1$

5. Kardano formulasi yordamida yeching. $x^3+6x^2+30x+25=0$.

6. Tenglamani yeching. $(1-i)z^2+(1-2i)z+(-1-2i)=0$

7. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x-x_0$ daraja bo'yicha yoying.

$f(x)=(1+i)x^3+(1-i)x+2, \quad x_0=1+i$

8. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix} 5 & 2 & 1 & 3 & 2\\ 4 & 0 & 7 & 0 & 0\\ 2 & 3 & 7 & 5 & 3\\ 2 & 3 & 6 & 4 & 5\\ 3 & 0 & 4 & 0 & 0 \end{vmatrix}$.

9. Ferrari usuli bilan yeching: $x^4-2x^3+8x^2-12x+12;$

10. Chtsni Gauss usulida yeching.
$$\begin{aligned} x_1+\ x_2+\ 4x_3+\ 4x_4+\ 9x_5+\ \ 9 &= 0,\\ 2x_1+2x_2+17x_3+17x_4+82x_5+146 &= 0,\\ 2x_1\ \ \ \ \ +\ 3x_3-\ \ x_4+\ 4x_5+\ 10 &= 0,\\ x_2+\ 4x_3+12x_4+27x_5+\ 26 &= 0,\\ x_1+2x_2+\ 2x_3+10x_4\ \ \ \ \ -\ 37 &= 0. \end{aligned}$$

11. Kardano formulasi yordamida yeching. $x^3+9x^2+18x+28=0$.

12. Teskarisini toping. $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 5 \\ 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \end{pmatrix}$

13. Chtsni Gauss usulida yeching.
$$\begin{aligned} 6x_1 + 6x_2 + 5x_3 + 18x_4 + 20x_5 &= 14, \\ 10x_1 + 9x_2 + 7x_3 + 24x_4 + 30x_5 &= 18, \\ 12x_1 + 12x_2 + 13x_3 + 27x_4 + 35x_5 &= 32, \\ 8x_1 + 6x_2 + 6x_3 + 15x_4 + 20x_5 &= 16, \\ 4x_1 + 5x_2 + 4x_3 + 15x_4 + 15x_5 &= 11. \end{aligned}$$

14. Kardano formulasi yordamida yeching. $x^3 - 6x^2 + 57x - 196 = 0$.

15. Ferrari usuli bilan yeching: $x^4 - x^3 - x^2 + 2x - 2 = 0$

16. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x - x_0$ daraja bo'yicha yoying.

$f(x) = 5x^3 + x^2 + 7x - 4 \quad x_0 = 3$

17. Kardano formulasi yordamida yeching. $x^3 - 9x^2 + 21x - 5 = 0$

18. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix} 2 & 1 & 4 & 3 & 5 \\ 3 & 4 & 0 & 5 & 0 \\ 3 & 4 & 5 & 2 & 1 \\ 1 & 5 & 2 & 4 & 3 \\ 4 & 6 & 0 & 7 & 0 \end{vmatrix}$

19. Evklid algoritmidan foydalanib $f_1(x)u(x) + f_2(x)v(x) = d(x)$ tengligini qanoatlantiruvchi u(x) va v(x) ko'phadlarni toping. $f_1(x) = x^5 - 5x^4 - 2x^3 + 12x^2 - 2x + 12, \quad f_2(x) = x^3 - 5x^2 - 3x + 17$

20. Q maydonda berilgan kasrni elementar kasrlarga yoying. $\frac{f(x)}{g(x)} = \frac{x^2}{x^4 - 4}$

21. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix} 2 & 1 & 4 & 3 & 5 \\ 3 & 4 & 0 & 5 & 0 \\ 3 & 4 & 5 & 2 & 1 \\ 1 & 5 & 2 & 4 & 3 \\ 4 & 6 & 0 & 7 & 0 \end{vmatrix}$

22. Evklid algoritmidan foydalanib $f_1(x)u(x) + f_2(x)v(x) = d(x)$ tengligini qanoatlantiruvchi u(x) va v(x) ko'phadlarni toping.
$$\begin{aligned} f(x) &= 4x^4 - 2x^3 - 16x^2 + 5x + 9, \\ g(x) &= 2x^3 - x^2 - 5x + 4 \in Q[x]; \end{aligned}$$

23. Chtsni Kramer usulida yeching.
$$\begin{aligned} 2x - 5y + 3z + t &= 5, \\ 3x - 7y + 3z - t &= -1, \\ 5x - 9y + 6z + 4t &= 7, \\ 4x - 6y + 3z + t &= 8. \end{aligned}$$

24. Ferrari usuli bilan yeching: $x^4 + 2x^3 + x^2 - 1 = 0$

25. Teskari matritsani toping $\begin{pmatrix} 49 & 8 & 9 & -65 \\ 1 & 0 & -1 & 0 \\ -7 & -1 & 0 & 8 \\ -1 & 0 & 0 & 1 \end{pmatrix}$

26. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x - x_0$ daraja bo'yicha yoying.

$f(x) = x^4 + 2x^3 - 3x^2 - 4x + 1, \quad x_0 = -1.$

27.Ferrari usuli bilan yeching: $x^4 - x^3 - 3x^2 + 5x - 10 = 0$.

28. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix} 2 & 1 & 4 & 3 & 5 \\ 3 & 4 & 0 & 5 & 0 \\ 3 & 4 & 5 & 2 & 1 \\ 1 & 5 & 2 & 4 & 3 \\ 4 & 6 & 0 & 7 & 0 \end{vmatrix}$

29. Tengalamani yeching. $(3+i)z^2 + (-7+10i)z + (-5-5i) = 0$

30. Ferrari usuli bilan yeching. $x^4 - 2x^3 + 4x^2 + 2x - 5 = 0$

31. CHATSni Kramer usuli yordamida yeching.
$$\begin{aligned} x_1 + 3x_2 + 5x_3 + 7x_4 &= 12, \\ 3x_1 + 5x_2 + 7x_3 + x_4 &= 0, \\ 5x_1 + 7x_2 + x_3 + 3x_4 &= 4, \\ 7x_1 + x_2 + 3x_3 + 5x_4 &= 16. \end{aligned}$$

32. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x - x_0$ daraja bo'yicha yoying.

$f(x) = 2x^4 - 3x^3 + x^2 - 5x + 6, \quad x_0 = 1$

33. Ferrari usuli bilan yeching. $x^4 - 6x^3 + 10x^2 - 2x - 3 = 0$

34. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x - x_0$ daraja bo'yicha yoying.

$f(x) = x^5 - 5x^4 + 7x^3 - 2x^2 + 4x - 8, \quad x_0 = 2$

35. Hisoblang. $\begin{vmatrix} 3 & 6 & 5 & 6 & 4 \\ 5 & 9 & 7 & 8 & 6 \\ 6 & 12 & 13 & 9 & 7 \\ 4 & 6 & 6 & 5 & 4 \\ 2 & 5 & 4 & 5 & 3 \end{vmatrix}$

36. Ferrari usuli bilan yeching: $x^4 - 2x^3 + x^2 + 2x - 1 = 0$

37. CHATSni Kramer usuli yordamida yeching
$$\begin{aligned} 2x_1 - x_2 + 3x_3 + 2x_4 &= 4, \\ 3x_1 + 3x_2 + 3x_3 + 2x_4 &= 6, \\ 3x_1 - x_2 - x_3 + 2x_4 &= 6, \\ 3x_1 - x_2 + 3x_3 - x_4 &= 6. \end{aligned}$$

38. Tengalamani yeching. $2-2i\ z^2 + 2-i\ z + 5+i = 0$

39. Ferrari usuli bilan yeching: $x^4 - 2x^3 + 2x^2 + 4x - 8 = 0$

40. Teskari matritsani toping. $\begin{pmatrix} 7 & 8 & 6 & 9 \\ 5 & 7 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 2 & 1 & 1 & 2 \end{pmatrix}$

41. Kardano formulasi yordamida yeching. $x^3 + 6x^2 + 30x + 25 = 0$.

42. Tenglamalar sistemasini yeching. $\begin{cases} \left|\dfrac{z-12}{z-8i}\right| = \dfrac{5}{3} \\ \left|\dfrac{z-4}{z-8}\right| = 1 \end{cases}$

43. Tenglamalar sistemasini yeching. $\begin{cases} |z+1-i| = |z+i| \\ |3+2i-z| = |z+1| \end{cases}$

44. Kardano formulasi yordamida yeching. $x^3 + 9x^2 + 18x + 28 = 0$

45. $f(x)=x^3-7x^2-13x+4$ $A=\begin{pmatrix}1&-2&3\\2&-4&1\\3&-5&2\end{pmatrix}$ bo'lsa f(A)=?

46. Hisoblang. $\frac{\left(-1+i\sqrt{3}\right)^{15}}{(1-i)^{20}}+\frac{\left(-1-i\sqrt{3}\right)^{15}}{(1+i)^{20}}$.

47. Kardano formulasi yordamida yeching. $x^3-6x^2+57x-196=0$

48. Chtsni Gauss usulida yeching.
$$\begin{aligned}x_1+x_2+4x_3+4x_4+9x_5+9&=0,\\2x_1+2x_2+17x_3+17x_4+82x_5+146&=0,\\2x_1+3x_3-x_4+4x_5+10&=0,\\x_2+4x_3+12x_4+27x_5+26&=0,\\x_1+2x_2+2x_3+10x_4-37&=0.\end{aligned}$$

49. Teskari matritsani toping $\begin{pmatrix}5&2&-2&-3\\6&4&-3&5\\9&2&-3&4\\7&6&-4&7\end{pmatrix}$

50. Tenglamalar sistemasini yeching. $\begin{cases}|z+1|=|z+2|\\|3z+9|=|5z+10i|\end{cases}$

51. Ferrari usuli bilan yeching: $x^4-2x^3+4x^2-2x+3=0$

52. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix}2&1&4&3&5\\3&4&0&5&0\\3&4&5&2&1\\1&5&2&4&3\\4&6&0&7&0\end{vmatrix}$

53. Kardano formulasi yordamida yeching. $x^3-9x^2+21x-5=0$

54. Tenglamani yeching. $(1-2i)z^2+(-4-8i)z+(-15-6i)=0$

55. Tengalamalar sistemasini yeching. $\begin{cases}(1+i)z_1+(1-i)z_2=1+i,\\(1-i)z_1+(1+i)z_2=1+3i\end{cases}$

56. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x-x_0$ daraja bo'yicha yoying.

$f(x)=2x^4-3x^3+x^2-5x+6,\quad x_0=1$

57. Ferrari usuli bilan yeching: $x^4-2x^3-2x^2+12x-24;$

58. Evklid algoritmidan foydalanib $f_1(x)u(x)+f_2(x)v(x)=d(x)$ tengligini qanoatlantiruvchi u(x) va v(x) ko'phadlarni toping. $f_1(x)=x^4-x^3-4x^2+4x+1\quad f_2(x)=x^2-x-1$

59. Kardano formulasi yordamida yeching. $x^3+6x^2+30x+25=0$.

60. Teskari matritsani toping. $\begin{pmatrix}7&8&6&9\\5&7&4&5\\3&4&5&6\\2&1&1&2\end{pmatrix}$

61. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x-x_0$ daraja bo'yicha yoying.

$f(x)=(1+i)x^3+(1-i)x+2,\quad x_0=1+i$

62. Chtsni Kramer usulida yeching.
$$\begin{aligned}2x-5y+3z+t&=5,\\3x-7y+3z-t&=-1,\\5x-9y+6z+4t&=7,\\4x-6y+3z+t&=8.\end{aligned}$$

63. Ferrari usuli bilan yeching: $x^4-2x^3+8x^2-12x+12$;

64. Hisoblang. $\sqrt[4]{\dfrac{7-2i}{1+i\sqrt{2}}+\dfrac{4+14i}{\sqrt{2}+2i}-(8-2i)}$

65. Quyidagi matritsali tenglamalarni yeching. $\begin{pmatrix}1&2&-3\\3&2&-4\\2&-1&0\end{pmatrix}X=\begin{pmatrix}1&-3&0\\10&2&7\\10&7&8\end{pmatrix}$

66. Ferrari usuli bilan yeching: $x^4+2x^3+2x^2+x-7=0$

67. Hisoblang. $\sqrt[4]{\dfrac{-2+2\sqrt{3}i}{2+i\sqrt{5}}-5\dfrac{\sqrt{3}+i}{2\sqrt{5}+5i}}$

68. Quyidagi matritsani teskarisini toping. $\begin{pmatrix}5&2&-2&-3\\6&4&-3&5\\9&2&-3&4\\7&6&-4&7\end{pmatrix}$

69. Ferrari usuli bilan yeching. $x^4-2x^3+4x^2+2x-5=0$

70. $\sin 5x$ ni $\cos x$ va $\sin x$ orqali ifodalang

71. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix}5&2&1&3&2\\4&0&7&0&0\\2&3&7&5&3\\2&3&6&4&5\\3&0&4&0&0\end{vmatrix}$.

72. Ferrari usuli bilan yeching. $x^4-6x^3+10x^2-2x-3=0$

73. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x-x_0$ daraja bo'yicha yoying.

$f(x)=x^5-5x^4+7x^3-2x^2+4x-8,\quad x_0=2$

74. Laplas teoremasi bo'yicha hisoblang. $\begin{vmatrix}2&1&4&3&5\\3&4&0&5&0\\3&4&5&2&1\\1&5&2&4&3\\4&6&0&7&0\end{vmatrix}$

75. Hisoblang. $\dfrac{(-1+i\sqrt{3})^{15}}{(1-i)^{20}}+\dfrac{(-1-i\sqrt{3})^{15}}{(1+i)^{20}}$

76. Hisoblang. $\begin{vmatrix}3&6&5&6&4\\5&9&7&8&6\\6&12&13&9&7\\4&6&6&5&4\\2&5&4&5&3\end{vmatrix}$

77. Kardano formulasi yordamida yeching. $x^3+6x^2+30x+25=0$.

78. Tenglamani yeching. $6-i\ z^2+\ -4-11i\ z+\ 2+4i\ =0$

79. $\sin 7x+\cos 7x$ ni $\cos x$ va $\sin x$ orqali ifodalang

80. Ferrari usuli bilan yeching: $x^4+2x^3+x^2-1=0$

81. Teskari matritsani toping. $\begin{pmatrix} 2 & -1 & 3 & -4 \\ 3 & -2 & 4 & -3 \\ 5 & -3 & -2 & 1 \\ 3 & -3 & -1 & 2 \end{pmatrix}$

82. Evklid algoritmidan foydalanib $f_1(x)u(x)+f_2(x)v(x)=d(x)$ tengligini qanoatlantiruvchi u(x) va v(x) ko'phadlarni toping. $f_1(x)=x^4-x^3-4x^2+4x+1 \quad f_2(x)=x^2-x-1$

83. Teskari matritsani toping. $\begin{pmatrix} 7 & 8 & 6 & 9 \\ 5 & 7 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 2 & 1 & 1 & 2 \end{pmatrix}$

84. Ferrari usuli bilan yeching: $x^4+2x^3+2x^2+x-7=0$

85. Gorner sxemasidan foydalanib $f(x)$ ko'phadni $x-x_0$ daraja bo'yicha yoying.

$f(x)=2x^6+3x^4+x^2+4, \quad x_0=2$

86. CHATSni Kramer usuli yordamida yeching $\begin{aligned} 2x_1-x_2+3x_3+2x_4&=4,\\ 3x_1+3x_2+3x_3+2x_4&=6,\\ 3x_1-x_2-x_3+2x_4&=6,\\ 3x_1-x_2+3x_3-x_4&=6. \end{aligned}$

87. Ferrari usuli bilan yeching: $x^4-x^3-x^2+2x-2=0$

88. Tenglamani yeching. $(1-5i)z^2+(-26-6i)z+(-5+5i)=0$

89. Kardano formulasi yordamida yeching. $x^3-9x^2+21x-5=0$

90. Teskari matritsani toping. $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 1 & 2 \\ 1 & 1 & 1 & -1 \\ 1 & 0 & -2 & -6 \end{pmatrix}$