2024-2025 o'quv yili Matematika ta'lim yo'nalishi Algebra fanidan yakuniy nazorat uchun nazariy va amaliy topshiriqlar bazasi(1 kurs)

1. Ratsional kasr, normallashgan kasr, to‘g'ri va noto‘g'ri ratsional kasrlar, sodda kasr.
2. Uchinchi darajali algebraik tenglamalarni yechish**.** Kardano formulasi.
3. Bezu teoremasi. Gorner sxemasi.
4. Keltiriladigan va keltirilmaydigan ko‘phadlar.
5. Ko‘phadlarning umumiy bo‘luvchisi, ko‘phadlarning eng katta umumiy bo‘luvchisi.
6. To‘rtinchi darajali tenglamalarni yechishning L.Ferrari usuli.
7. Musbat ildizlarning yuqori chegarasini izlashning N'yuton usuli.
8. Shturm qatorlari va Shturm teoremasi.
9. Butun koeffitsientli ko'phadning ratsional ildizlari.
10. Rezultant. Ikki ko'phad rezultanti
11. Diskriminant.
12. Simmetrik ko'phadlar. Simmetrik ko'phadlar haqidagi asosiy teorema.
13. Ko'p o'zgaruvchili ko'phad haqida tushuncha.
14. Ko'p o'zgaruvchili ko'phadlarni leksikografik tartibda yozish
15. Chiziqli fazolar. Chiziqli fazoning o'lchami va bazisi.
16. Algebraning asosiy teoremasi. Viet formulasi.
17. Ortogonallashtirish jarayoni.
18. Ko‘phadlarni bo‘lish. Ko‘phadlar uchun Yevklid algoritmi
19. Ko‘phadni karrali ko‘paytuvchilarga ajratish.
20. Simmetrik ko'phadlar haqidagi asosiy teorema. Simmetrik ko‘phadlar yordamida algebraik tenglama yechish

21. Berilgan ko'phadlarning EKUB ini toping.

$$f = 3x^6 - x^5 - 9x^4 - 14x^3 - 11x^2 - 3x - 1$$
$$g = 3x^5 + 8x^4 + 9x^3 + 15x^2 + 10x + 9$$

22.4-darajali tenglamani FERRARI usulida hisoblang.

$$x^4 - 4x^3 + 5x^2 - 2x - 6 = 0$$

23. Gorner sxemasi yordamida ratsional kasrni soda kasr ko'rinishida ifodalang.

$$\frac{x^3 - x + 1}{(x-2)^5}$$

24.3-darajali tenglamani Kardano formulasi yordamida yeching

$$x^3 + 9x^2 + 18x + 28 = 0$$

25. Simmetrik ko'phadlarni asosiy simmetrik ko'phadlar yordamida ifodalang,

$f = x^6 + y^6$

26. Algebraik tenglamalar sistemasini elementar simmetrik ko'phadlar yordamida hisoblang.

$$x - y = 2$$
$$x^3 - y^3 = 8$$

27.Berilgan ko'phadlarning EKUB ini toping.

$$f = x^4 - 4x^3 + 1$$
$$g = x^3 - 3x^2 + 1$$

28.4-darajali tenglamani FERRARI usulida hisoblang.

$$x^4 + 2x^3 + 2x^2 + 10x + 25 = 0$$

29. Gorner sxemasi yordamida ratsional kasrni soda kasr ko'rinishida ifodalang.

$$\frac{x^4 - 2x^2 + 3}{(x+1)^5}$$

30.3-darajali tenglamani Kardano formulasi yordamida yeching

$$x^3 + 12x + 63 = 0$$

31. Simmetrik ko'phadlarni asosiy simmetrik ko'phadlar yordamida ifodalang,

$f = x^7 + y^7$

32. Algebraik tenglamalar sistemasini elementar simmetrik ko'phadlar yordamida hisoblang.

$$x^2 + y = 5$$
$$x^6 + y^3 = 65$$

33.Berilgan ko'phadlarning EKUB ini toping.

$$f = x^5 + x^4 - x^3 - 3x^2 - 3x - 1$$
$$g = x^4 - 2x^3 - x^2 - 2x + 1$$

34.4-darajali tenglamani FERRARI usulida hisoblang.

$$x^4 + 2x^3 + 3x^2 + 2x - 3 = 0$$

35.3-darajali tenglamani Kardano formulasi yordamida yeching

$$x^3 + 9x - 26 = 0$$

36. Simmetrik ko'phadlarni asosiy simmetrik ko'phadlar yordamida ifodalang,

$f = x^5 + y^5$

37. Irratsional tenglamani elementar simmetrik ko'phadlar yordamida hisoblang.

$$x+\sqrt{17-x^2}+x\sqrt{17-x^2}=9$$

38.Berilgan ko'phadlarning EKUB ini toping.

$$f=x^4+x^3-3x^2-4x-1$$
$$g=x^3+x^2-x-1$$

39.4-darajali tenglamani FERRARI usulida hisoblang.

$$x^4+x^3-10x^2-2x+4=0$$

40. λ ning qanday qiymatida berilgan ko'phadlar umumiy ildizga ega bo'ladi?

$x^3-\lambda x+2$ va $x^2+\lambda x+2$

41. Simmetrik ko'phadlarni asosiy simmetrik ko'phadlar yordamida ifodalang,

$$f=x_1^4+x_2^4+x_3^4-x_1^2x_2^2-x_1^2x_3^2-x_2^2x_3^2$$

42.Berilgan ko'phadlarning EKUB ini toping.

$$f=x^5+x^4-x^3-2x-1$$
$$g=3x^4+2x^3+x^2+2x-2$$

43.Shturm ko'phadlar sistemasini hosil qiling va ko'phad ildizlari oralig'ini toping.

$$f=x^3-3x-1$$

44. Shturm ko'phadlar sistemasini hosil qiling va ko'phad ildizlari oralig'ini toping.

$$f=x^3+x^2-2x-1$$

45. Shturm ko'phadlar sistemasini hosil qiling va ko'phad ildizlari oralig'ini toping.

$$f=x^3-7x+7$$

46. Shturm ko'phadlar sistemasini hosil qiling va ko'phad ildizlari oralig'ini toping.

$$f=x^4-12x^2-16x-4$$

47.Ko'phadning diskriminantini toping.

$$x^3-x^2-2x+1$$

48. Ko'phadning diskriminantini toping.

$$x^3+2x^2+4x+1$$

49. Gorner sxemasi yordamida ratsional kasrni soda kasr ko'rinishida ifodalang.

$$\frac{2x^2-5x+1}{(x-2)^5}$$

50. Gorner sxemasi yordamida ratsional kasrni soda kasr ko'rinishida ifodalang.

$$\frac{x^4+7x^3+4x^2-25x+1}{(x+5)^6}$$

51.Berilgan ko'phadlarni karrali ko'paytuvchilarga ajrating va ildizlarini toping.

$$f(x)=x^5-15x^3-10x^2+60x+72$$

52.Berilgan ko'phadlarni karrali ko'paytuvchilarga ajrating va ildizlarini toping.

$$f(x)=x^5-7x^3-2x^2+12x+8$$

53.Viyet formulalaridan foydalanib berilgan ildizlar yordamida ko'phadni hosil qiling.

$$x_1=1, x_2=2, x_3=3$$

54.Viyet formulalaridan foydalanib berilgan ildizlar yordamida ko'phadni hosil qiling.

$$x_1=0, x_2=1, x_3=1, x_4=-1$$

55. $f(x)=2x^3-x^2-7x+\lambda$ Berilgan ko'phadning ikkita ildizlari yig'indisi 1 ga teng. λ ning qiymatini toping.

56.Uchinchi darajali ko'phadning bosh koyeffitsiyenti $a_0=2$,ildizlari orasidagi munosabat quyidagicha bo'lsa 3 -darajali ko'phadni toping.

$$\frac{1}{x_1}+\frac{1}{x_2}+\frac{1}{x_3}=2\ ,\quad \frac{1}{x_1x_2}+\frac{1}{x_1x_3}+\frac{1}{x_2x_3}=4\ ,\quad \frac{1}{x_1x_2x_3}=8$$

57.3-darajali tenglamani Kardano formulasi yordamida hisoblang.

$$x^3-12x+16=0$$

58.Berilgan ko'phadni ratsional ildizlarini toping.

$$f(x)=x^4+x^3-11x^2-5x+30$$

59.Berilgan ko'phadni ratsional ildizlarini toping.

$$f(x)=x^3-11x^2+38x-40$$

60. Berilgan ko'phadni ratsional ildizlarini toping.

$$f(x)=x^5+6x^4+4x^3-23x^2-30x-8$$

61. Simmetrik ko'phadni asosiy elementar simmetrik ko'phadlar yordamida ifodalang.

$f(x_1, x_2, x_3) = x_1^3 + x_2^3 + x_3^3 + 5x_1x_2x_3$

62.Tenglamalar sistemasini asosiy simmetrik ko'phadlar yordamida hisoblang.

$$x^3 + y^3 = 35$$
$$x + y = 5$$

63. Tenglamalar sistemasini asosiy simmetrik ko'phadlar yordamida hisoblang.

$$\sqrt[3]{x} - y = 1$$
$$x - y^3 = 7$$

64. Irratsional tenglamani asosiy simmetrik ko'phadlar yordamida hisoblang.

$$\sqrt[4]{97 - x} + \sqrt[4]{x} = 5$$

65. Tenglamalar sistemasini asosiy simmetrik ko'phadlar yordamida hisoblang.

$$x + y = 5$$
$$x^2 - xy + y^2 = 7$$

66. Tenglamalar sistemasini asosiy simmetrik ko'phadlar yordamida hisoblang.

$$x + y + xy = 7$$
$$x^2 + xy + y^2 = 13$$

67. Tenglamalar sistemasini asosiy simmetrik ko'phadlar yordamida hisoblang.

$$x^2 + y = 5$$
$$x^6 + y^3 = 65$$

68. . Tenglamalar sistemasini asosiy simmetrik ko'phadlar yordamida hisoblang.

$$\sqrt[3]{x} + \sqrt[3]{y} = 3$$
$$xy = 8$$

69. Berilgan ko'phadlarning EKUB ini toping.

$$f_1(x) = 3x^3 - 2x^2 + x + 2$$
$$f_2(x) = x^2 - x + 1$$

70.Berilgan ko'phadlarning EKUB ini toping.

$$f_1(x) = x^4 - x^3 - 4x^2 + 4x + 1$$
$$f_2(x) = x^2 - x - 1$$

71.Berilgan ko'phadlarning EKUB ini toping.

$f_1(x) = x^4 - 4x^3 + 1$
$f_2(x) = x^3 - 3x^2 + 1$

72. Berilgan ko'phadlarning rezultantini hisoblang.

$f(x) = x^3 - 3x^2 + 2x + 1$
$g(x) = 2x^2 - x - 1$

73. Berilhan ko'phadlarning rezultantini hisoblang.

$f(x) = 2x^3 - 3x^2 + 2x + 1$
$g(x) = x^2 + x + 3$

74. Berilhan ko'phadlarning rezultantini hisoblang.

$f(x) = 2x^3 - 3x^2 - x + 2$
$g(x) = x^4 - 2x^2 - 3x + 4$

75.Tenglamalar sistemasini resultant yordamida hisoblang.

$y^2 - 7xy + 4x^2 + 13x - 2y - 3 = 0$
$y^2 - 14xy + 9x^2 + 28x - 4y - 5 = 0$

76.Tenglamalar sistemasini resultant yordamida hisoblang.

$y^2 + x^2 - y - 3x = 0$
$y^2 - 6xy - x^2 + 11y + 7x - 12 = 0$

77.Gorner sxemasi yordamida $f(x_0)$ ni hisoblang

$f(x) = x^4 - 3x^3 + 6x^2 - 10x + 16$
$x_0 = 4$

78.Gorner sxemasi yordamida $f(x_0)$ ni hisoblang

$f(x) = x^5 + (1+2i)x^4 - (1+3i)x^2 + 7$
$x_0 = -2 - i$

79.Gorner sxemasi yordamida f(x) ko'phadni $x - x_0$ ikkihad bo'yicha yoying.

$f(x) = x^4 + 2x^3 - 3x^2 - 4x + 1$
$x_0 = -1$

80. Gorner sxemasi yordamida f(x) ko'phadni $x - x_0$ ikkihad bo'yicha yoying.

$f(x) = x^5$
$x_0 = 1$

81. Gorner sxemasi yordamida f(x) ko'phadni $x - x_0$ ikkihad bo'yicha yoying.

$f(x) = x^4 - 8x^3 + 24x^2 - 50x + 90$
$x_0 = 2$

82. Vektorlarning (a) va (b) sistemalari ekvivalent ekanligini tekshiring:

a $_1$ = (1, -3, 4); **a** $_2$ = (-1, -2, -3) ; **a** $_3$ = (8, 1, -1); **a** $_4$ = (-3, -4, -1);

b$_1$ = (-1, 3, -4); **b**$_2$ = (0, -5, 1); **b**$_3$ = (5, -3, -2).

83. Vektorlarning quyidagi sistemalari chiziqli bog'liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (1, 2, 3, 4); **a** $_2$ = (-1, 1, -1, 1); **a** $_3$ = (3, 4, 1, 2).

84. Vektorlarning quyidagi sistemalari chiziqli bog'liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (2, -2, 3, 5); **a** $_2$ = (-1, 1, -3, 3) ; **a** $_3$ = (-4, 1, -3, 0); **a** $_4$ = (0, 4, -1, 2).

85. Vektorlarning (a) va (b) sistemalari ekvivalent ekanligini tekshiring:

a $_1$ =(1, 2, 3, 4, -3); **a** $_2$=(-1, -2, 3, 4, 1); **a** $_3$=(-5, 1, -7, 1, 2); **a** $_4$=(0, 4, 1, 2, 0);

b$_1$ = (-1, -2, -3, -4); **b**$_2$ = (-6, -9, 4, 3); **b**$_3$ = (-5, 5, 3, 2).

86. Quyidagi vektorlar sistemasini ortogonallang: $a_1 = (1,2,1,3), a_2 = (4,1,1,1), a_3 = (3,1,1,0)$

87. Vektorlarning quyidagi sistemalari chiziqli bog'liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (2, -2, 3, 5); **a** $_2$ = (-1, 1, -3, 3) ; **a** $_3$ = (-4, 1, -3, 0); **a** $_4$ = (0, 4, -1, 2).

88.Vektorlarning quyidagi sistemalari chiziqli bog'liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (2, -2, 3, 5); **a** $_2$ = (-1, 1, -3, 3) ; **a** $_3$ = (-4, 1, -3, 0); **a** $_4$ = (0, 4, -1, 2).

89. Vektorlarning (a) va (b) sistemalari ekvivalent ekanligini isbotlang:

a $_1$ = (1, 2, 3, 4); **a** $_2$ = (0, 0, -1, 4) ; **a** $_3$ = (-1, 6, -7, 1); **a** $_4$ = (8, 4, 5, 2);

b$_1$ = (-1, -2, -3, -4); **b**$_2$ = (0, 0, 1, -4); **b**$_3$ =(-1, 6, -7, 1).

90. Ko’phadni karrali ko`paytuvchilarga ajrating.

$$f(x) = x^5 - 10x^3 - 10x^2 + 60x + 72$$

91.Ko’phadni karrali ko`paytuvchilarga ajrating.

$$f(x) = x^5 - 7x^3 - 2x^2 + 12x + 8$$

92.Kardano formulasi yordamida uchinchi darajali tenglamani yeching.

$$x^3 + 9x^2 + 18x + 28 = 0$$

93. Kardano formulasi yordamida uchinchi darajali tenglamani yeching.

$$x^3 - 6x^2 + 57x - 196 = 0$$

94. Kardano formulasi yordamida uchinchi darajali tenglamani yeching.

$$x^3 - 9x^2 + 21x - 5 = 0$$

95.To`rtinchi darajali algebraik tenglamani Ferrari usulida yerching.

$$x^4 + 2x^3 + x^2 - 1 = 0$$

96.To`rtinchi darajali algebraik tenglamani Ferrari usulida yerching.

$$x^4 - x^3 - 3x^2 + 5x - 10 = 0$$

97.To`rtinchi darajali algebraik tenglamani Ferrari usulida yerching.

$$x^4 - 2x^3 + 4x^2 + 2x - 5 = 0$$

98.To`rtinchi darajali algebraik tenglamani Ferrari usulida yerching.

$$x^4 - 6x^3 + 10x^2 - 2x - 3 = 0$$

99.Tenglamalar sistemasini elementar simmetrik ko`phadlar yordamida yeching.
$$\begin{cases} x + y = 5 \\ x^2 - xy + y^2 = 7 \end{cases}$$

100.Tenglamalar sistemasini elementar simmetrik ko`phadlar yordamida yeching.
$$\begin{cases} x + y + xy = 7 \\ x^2 + xy + y^2 = 13 \end{cases}$$

101.Tenglamalar sistemasini elementar simmetrik ko`phadlar yordamida yeching.
$$\begin{cases} x^2 + xy + y^2 = 49 \\ x^4 + x^2y^2 + y^4 = 931 \end{cases}$$

102.Tenglamalar sistemasini elementar simmetrik ko`phadlar yordamida yeching.
$$\begin{cases} x - y = 2 \\ x^3 - y^3 = 8 \end{cases}$$

103.Tenglamani elementar simmetrik ko`phadlar yordamida yeching

$$x + \sqrt{17 - x^2} + x\sqrt{17 - x^2} = 9$$

104.Berilgan ko'phadni diskriminantni toping. $x^3 - x^2 - 2x + 1$

105. Berilgan ko'phadni diskriminantni toping. $x^3 + 2x^2 + 4x + 1$

106.Ushbu ko'phadlarning eng katta umumiy bo'luvchisini toping.

$$f(x) = x^5 + 4x^4 - 10x^2 - x + 6$$
$$\varphi(x) = 5x^4 + 16x^3 - 20x^2 - 1$$

107.Ushbu ko'phadlarning eng katta umumiy bo'luvchisini toping.

$$f(x) = x^5 + 3x^4 - x^3 - 7x^2 + 4$$
$$\varphi(x) = 5x^4 + 12x^3 - 3x^2 - 14x$$

108.Ushbu ko'phadlarning eng katta umumiy bo'luvchisini toping.

$$f(x) = x^5 + x^4 - x^3 - 2x - 1$$
$$\varphi(x) = 3x^4 + 2x^3 + x^2 - 2$$

109.Ushbu ko'phadlarning eng katta umumiy bo'luvchisini toping.

$$f(x) = x^3 + 5x^2 - x - 5$$
$$\varphi(x) = 3x^2 + 10x - 1$$

110.Ushbu ko'phadni karrali ko'paytuvchilarga ajrating.

$$f(x) = x^5 - 3x^4 + 4x^3 - 4x^2 + 3x - 1$$

111.Quyidagi uchinchi darajali tenglamalarni yeching.

$$x^3 - 6x + 9 = 0$$

112.Quyidagi uchinchi darajali tenglamalarni yeching.

$$x^3 + 12x + 63 = 0$$

113.Quyidagi uchinchi darajali tenglamalarni yeching.

$$x^3 + 3x^2 - 4 = 0$$

114.Quyidagi uchinchi darajali tenglamalarni yeching.

$$x^3 + 9x^2 + 18x + 28 = 0$$

115.Quyidagi uchinchi darajali tenglamalarni yeching.

$$x^3 + 12x^2 + 45x + 54 = 0$$

116.Quyidagi uchinchi darajali tenglamalarni yeching.

$$x^3 + 3x^2 + 3x - 36 = 0$$

117.To‘rtinchi darajali tenglamalarni Ferrari usuli bilan yeching.

$$x^4 + 4x + 3 = 0$$

118.To‘rtinchi darajali tenglamalarni Ferrari usuli bilan yeching.

$$x^4 - 4x + 3 = 0$$

119.To‘rtinchi darajali tenglamalarni Ferrari usuli bilan yeching.

$$x^4 + 2x^3 + x + 2 = 0$$

120.To‘rtinchi darajali tenglamalarni Ferrari usuli bilan yeching.

$$x^4 - 2x^3 - x + 2 = 0$$

121.Quyidagi tenglamalarning ratsional ildizlarini hisoblang.

$$x^4 + 6x^3 + 12x^2 + 11x + 6 = 0$$

122.Quyidagi tenglamalarning ratsional ildizlarini hisoblang.

$$x^4 - 3x^3 - \frac{1}{2}x^2 + \frac{5}{2}x - 3 = 0$$

123.Quyidagi tenglamalarning ratsional ildizlarini hisoblang.

$$x^5 + x^4 - 6x^3 - 14x^2 - 11x - 3 = 0$$

124.Quyidagi tenglamalar uchun musbat va manfiy ildizlari sonini aniqlang.

$$x^4 - 2x^3 - 2x^2 - 5x - 1 = 0$$

125.Quyidagi simmetrik ko‘phadlarni asosiy simmetrik funksiyalar orqali ifodalang.

$${x_1}^3 + {x_2}^3 + {x_3}^3 - 3x_1x_2x_3$$

126.Quyidagi simmetrik ko‘phadlarni asosiy simmetrik funksiyalar orqali ifodalang.

$$x_1{}^4 + x_2{}^4 + x_3{}^4 - 2x_1{}^2x_2{}^2 - 2x_1{}^2x_3{}^2 - 2x_2{}^2x_3{}^2$$

127.Quyidagi ko‘phadlarning rezultantini aniqlang.

$$f(x) = x^3 - 3x^2 + 2x + 1$$
$$\varphi(x) = 2x^2 - x - 1$$

128. Vektorlarning quyidagi sistemalari chiziqli bog’liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (1, 2, 3, 4); **a** $_2$ = (-1, 2, -3, 4) ; **a** $_3$ = (-1, 1, -1, 1); **a** $_4$ = (3, 4, 1, 2).

129.Quyidagi vektorlar sistemasini ortogonallang: $a_1 = (2,4,2,4), a_2 = (6,4,4,4), a_3 = (5,7,5,7)$

130.Quyidagi vektorlar sistemasini ortogonallang: $a_1 = (2,1,1,-1), a_2 = (1,1,3,0), a_3 = (5,2,-2,2)$

131.Quyidagi vektorlar sistemasini ortogonallang: $a_1 = (2,1,3,-1), a_2 = (7,4,3,-3), a_3 = (5,7,7,8)$

132. Vektorlarning quyidagi sistemalari chiziqli bog’liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (1, 2, 3, 4); **a** $_2$ = (-1, 1, -1, 1); **a** $_3$ = (3, 4, 1, 2).

133.Vektorlarning quyidagi sistemalari chiziqli bog’liq yoki erkliligini aniqlang hamda uning bazisi va rangini toping:

a $_1$ = (2, -2, 3, 5); **a** $_2$ = (-1, 1, -3, 3) ; **a** $_3$ = (-4, 1, -3, 0); **a** $_4$ = (0, 4, -1, 2).