ЗАДАНИЕ №2, 1-й курс 02.03.01

Даны две системы векторов a_1, a_2, a_3, a_4 и b_1, b_2, b_3 пространства $\mathbb{R}^4$, на которые натянуты линейные подпространства L_1 и L_2 соответственно.

1) Найти максимальную линейно независимую подсистему системы векторов a_1, a_2, a_3, a_4 и выразить все векторы системы линейно через векторы найденной подсистемы;

2) Показать, что b_1, b_2, b_3 - базис подпространства L_2 и найти координаты вектора c в этом базисе;

3) Найти базис пересечения подпространств L_2 и L_1;

4) Найти базис какого-нибудь подпространства L, для которого выполняется равенство $\mathbb{R}^4 = (L_1 \cap L_2) \oplus L$

1. $a_1 = \{0, -1, 0, 0\}, a_2 = \{1, 2, 0, -1\}, a_3 = \{-2, 2, -1, -1\}, a_4 = \{0, -1, -1, -1\},$
   $b_1 = \{2, 2, -1, 2\}, b_2 = \{2, 2, -1, -1\}, b_3 = \{0, -2, -2, -1\}$

2. $a_1 = \{2, 2, 1, 1\}, a_2 = \{-2, 0, -1, -2\}, a_3 = \{-1, 0, 0, -2\}, a_4 = \{2, -1, 0, -1\},$
   $b_1 = \{0, -2, -2, 2\}, b_2 = \{-1, -1, 2, 2\}, b_3 = \{1, 1, 0, 2\}$

3. $a_1 = \{-2, 0, 0, 2\}, a_2 = \{2, 1, 0, -2\}, a_3 = \{-2, 1, -2, -2\}, a_4 = \{0, 1, 1, 0\},$
   $b_1 = \{2, 1, 1, 0\}, b_2 = \{0, 0, 0, 0\}, b_3 = \{1, -2, 0, 0\}$

4. $a_1 = \{0, 1, 1, -1\}, a_2 = \{0, 0, -1, -2\}, a_3 = \{1, 0, 0, 2\}, a_4 = \{1, 1, 1, 1\},$
   $b_1 = \{1, -1, -1, -2\}, b_2 = \{2, 0, -1, -2\}, b_3 = \{2, 0, 2, 1\}$

5. $a_1 = \{2, -2, 1, -1\}, a_2 = \{-2, 1, 2, -2\}, a_3 = \{-1, -2, -2, 1\}, a_4 = \{0, 1, 1, 2\},$
   $b_1 = \{1, 1, -1, 1\}, b_2 = \{0, -2, 2, 2\}, b_3 = \{1, -1, -1, 1\}$

6. $a_1 = \{0, -2, 1, 1\}, a_2 = \{0, 0, -2, 1\}, a_3 = \{2, 1, -2, 1\}, a_4 = \{2, 1, -1, -1\},$
   $b_1 = \{1, 0, 2, 1\}, b_2 = \{1, 1, 2, 0\}, b_3 = \{1, -1, 0, -1\}$

7. $a_1 = \{1, -1, 1, -1\}, a_2 = \{2, -1, 2, -1\}, a_3 = \{2, -1, 2, 0\}, a_4 = \{-2, -1, -1, 0\},$
   $b_1 = \{1, 0, -2, 1\}, b_2 = \{1, 0, 2, -1\}, b_3 = \{2, -2, -1, 2\}$

8. $a_1 = \{2, 1, 1, -1\}, a_2 = \{-1, -1, 1, 2\}, a_3 = \{1, -2, -1, 2\}, a_4 = \{1, 0, -1, -1\},$
   $b_1 = \{1, -1, 2, 0\}, b_2 = \{2, 1, 1, -1\}, b_3 = \{-1, 1, -2, -2\}$

9. $a_1 = \{0, 1, 0, 1\}, a_2 = \{2, 1, 1, -1\}, a_3 = \{-2, 1, 2, -1\}, a_4 = \{0, 2, -1, -1\},$
   $b_1 = \{0, -1, 0, 2\}, b_2 = \{-2, 1, 1, 2\}, b_3 = \{0, 2, 0, -1\}$

10. $a_1 = \{-2, 1, 1, 2\}, a_2 = \{1, 1, -1, -2\}, a_3 = \{-1, -2, 1, -1\}, a_4 = \{2, 1, 1, 2\},$
    $b_1 = \{-1, 2, 1, 0\}, b_2 = \{-2, 0, 1, 2\}, b_3 = \{2, -1, -2, 0\}$

11. $a_1 = \{-1, 2, -1, -2\}, a_2 = \{0, 0, 1, 2\}, a_3 = \{2, 1, 0, 1\}, a_4 = \{1, 1, 0, -1\},$
    $b_1 = \{2, 2, 1, 2\}, b_2 = \{-1, 0, -1, 1\}, b_3 = \{2, -2, 2, -2\}$

12. $a_1 = \{2, 2, -1, 2\}, a_2 = \{-1, -2, 0, 2\}, a_3 = \{0, -1, -2, 1\}, a_4 = \{0, -2, 2, -2\},$
    $b_1 = \{-2, -1, 0, -1\}, b_2 = \{-1, -2, -1, -2\}, b_3 = \{1, 2, 1, 2\}$

13. $a_1 = \{0, 2, 1, -1\}, a_2 = \{0, 0, -1, 1\}, a_3 = \{-2, -1, 1, -2\}, a_4 = \{-1, -1, -1, -2\},$
    $b_1 = \{1, 1, 2, 2\}, b_2 = \{2, -1, 2, -1\}, b_3 = \{-1, 1, 1, 2\}$

14. $a_1 = \{-2, 0, 0, 1\}, a_2 = \{2, 2, -1, 2\}, a_3 = \{-1, 0, 1, -2\}, a_4 = \{-1, 2, 1, 2\}$,
$b_1 = \{-2, 0, 0, -2\}, b_2 = \{2, -2, -2, 2\}, b_3 = \{-1, 0, -1, 1\}$

15. $a_1 = \{0, -1, -1, 1\}, a_2 = \{2, 2, -1, 0\}, a_3 = \{2, 1, 2, -1\}, a_4 = \{1, -1, -2, 0\}$,
$b_1 = \{0, 2, -1, 0\}, b_2 = \{2, 1, -2, -2\}, b_3 = \{1, -2, 0, 0\}$

16. $a_1 = \{-1, 0, -1, -1\}, a_2 = \{2, 0, -2, -1\}, a_3 = \{0, 0, 2, -2\}, a_4 = \{2, -2, 0, 0\}$,
$b_1 = \{-1, -2, -1, 2\}, b_2 = \{2, -2, -1, -2\}, b_3 = \{2, 0, 2, -1\}$

17. $a_1 = \{0, 1, 1, -1\}, a_2 = \{0, -1, 2, 1\}, a_3 = \{1, 0, -2, 2\}, a_4 = \{0, 2, -2, 0\}$,
$b_1 = \{-1, -1, 2, -2\}, b_2 = \{-2, 2, 0, 2\}, b_3 = \{-1, 2, 1, 2\}$

18. $a_1 = \{-1, 1, 0, -2\}, a_2 = \{0, -1, -2, 1\}, a_3 = \{2, 2, -1, 0\}, a_4 = \{-1, 2, 0, -1\}$,
$b_1 = \{1, -1, -1, -2\}, b_2 = \{-1, -2, 2, -2\}, b_3 = \{-1, 2, 1, 2\}$

19. $a_1 = \{1, -2, -2, 0\}, a_2 = \{0, 2, 1, 0\}, a_3 = \{2, 0, -1, -2\}, a_4 = \{-1, 1, 0, 1\}$,
$b_1 = \{0, 0, 1, -2\}, b_2 = \{1, 2, -1, -2\}, b_3 = \{1, 2, -2, 1\}$

20. $a_1 = \{-2, 0, -1, -1\}, a_2 = \{-2, -2, 0, 0\}, a_3 = \{2, 0, -2, 1\}, a_4 = \{0, -1, -1, 1\}$,
$b_1 = \{-2, 0, -1, 2\}, b_2 = \{1, -2, 0, -1\}, b_3 = \{-2, -1, -1, 1\}$

21. $a_1 = \{-1, 0, 0, 0\}, a_2 = \{-2, 0, 0, 2\}, a_3 = \{2, 2, 0, 2\}, a_4 = \{-1, -2, 2, 2\}$,
$b_1 = \{0, -2, -1, 0\}, b_2 = \{-1, 0, -1, -1\}, b_3 = \{2, 2, -1, -2\}$

22. $a_1 = \{-1, -2, -1, 1\}, a_2 = \{-2, 2, -2, 2\}, a_3 = \{-1, 2, 0, 0\}, a_4 = \{-1, -2, 0, -1\}$,
$b_1 = \{-1, -1, -1, 2\}, b_2 = \{0, -1, 2, 1\}, b_3 = \{-1, 2, 1, 1\}$

23. $a_1 = \{0, -2, 2, 2\}, a_2 = \{2, 1, -1, 0\}, a_3 = \{2, 2, 2, 0\}, a_4 = \{1, -2, 2, 0\}$,
$b_1 = \{0, 0, -1, 0\}, b_2 = \{2, -1, -2, -1\}, b_3 = \{-1, -1, 0, 2\}$

24. $a_1 = \{-2, 0, -1, 1\}, a_2 = \{-1, -2, -1, 0\}, a_3 = \{1, -2, 1, -1\}, a_4 = \{2, -2, 1, -1\}$,
$b_1 = \{-2, -2, 0, 2\}, b_2 = \{-2, 2, -1, 1\}, b_3 = \{2, -1, -2, 0\}$

25. $a_1 = \{-1, -1, 0, 2\}, a_2 = \{-1, 2, 2, -1\}, a_3 = \{2, -1, 1, -1\}, a_4 = \{2, 0, 1, 1\}$,
$b_1 = \{-2, -2, -2, 2\}, b_2 = \{0, 0, 1, -1\}, b_3 = \{1, -1, -2, 1\}$

26. $a_1 = \{1, 1, 2, 1\}, a_2 = \{0, 1, 1, 1\}, a_3 = \{2, 1, 1, 1\}, a_4 = \{1, -1, 0, 0\}$,
$b_1 = \{1, -1, -1, 1\}, b_2 = \{-1, -1, -2, 0\}, b_3 = \{1, 1, 1, -1\}$

27. $a_1 = \{0, 1, -1, 1\}, a_2 = \{0, 2, 2, -1\}, a_3 = \{-1, 1, 2, 1\}, a_4 = \{-1, 2, 1, 0\}$,
$b_1 = \{1, 2, 2, 2\}, b_2 = \{-2, 2, 2, -1\}, b_3 = \{0, -2, 1, -2\}$

28. $a_1 = \{0, 1, 1, 2\}, a_2 = \{-1, 2, 1, 0\}, a_3 = \{-2, 1, 0, 2\}, a_4 = \{2, -2, 2, -2\}$,
$b_1 = \{2, -2, 2, -2\}, b_2 = \{1, 0, 1, -2\}, b_3 = \{-2, 2, 0, 1\}$

29. $a_1 = \{2, 2, 0, 2\}, a_2 = \{2, -1, 2, -1\}, a_3 = \{2, 0, 1, -2\}, a_4 = \{-1, 2, 0, -1\}$,
$b_1 = \{0, 1, 1, -2\}, b_2 = \{-2, 0, 2, -2\}, b_3 = \{-2, -2, 0, -2\}$

30. $a_1 = \{1, -2, 2, 1\}, a_2 = \{1, 2, -2, 1\}, a_3 = \{1, -2, -2, -1\}, a_4 = \{-1, -2, -2, -2\}$,
$b_1 = \{1, -2, -2, 0\}, b_2 = \{2, 2, -1, -2\}, b_3 = \{-2, -2, -2, 0\}$

31. $a_1 = \{1, -2, 2, -2\}, a_2 = \{-1, 1, -2, 0\}, a_3 = \{1, 0, 0, -2\}, a_4 = \{1, 2, 0, -1\}$,
$b_1 = \{-1, 1, -1, 0\}, b_2 = \{1, 0, 1, 0\}, b_3 = \{-2, 2, -1, 0\}$

32. $a_1 = \{2, -2, -1, 1\}, a_2 = \{-1, 2, -2, -2\}, a_3 = \{-2, -1, 0, -2\}, a_4 = \{-1, -2, -2, -1\},$
$b_1 = \{0, -2, 0, -2\}, b_2 = \{2, -1, 1, -2\}, b_3 = \{1, -2, 1, 1\}$

33. $a_1 = \{-2, -2, 2, -2\}, a_2 = \{0, 1, -2, 0\}, a_3 = \{-1, -1, 0, 0\}, a_4 = \{-2, -2, 1, 1\},$
$b_1 = \{2, 1, -1, -1\}, b_2 = \{1, 0, -1, -1\}, b_3 = \{0, 1, 1, 2\}$

34. $a_1 = \{-1, 0, 1, -1\}, a_2 = \{1, -2, 0, -2\}, a_3 = \{2, 2, 2, 1\}, a_4 = \{-2, -2, -1, -2\},$
$b_1 = \{1, 1, -1, -1\}, b_2 = \{-1, 1, 1, 1\}, b_3 = \{1, -2, 2, 2\}$

35. $a_1 = \{-1, 2, 1, -1\}, a_2 = \{-2, 2, -1, -2\}, a_3 = \{-1, -2, -2, -2\}, a_4 = \{1, -1, 2, 1\},$
$b_1 = \{-1, 1, -1, 2\}, b_2 = \{-1, 2, 1, -2\}, b_3 = \{1, 0, -2, 2\}$

36. $a_1 = \{1, 0, 2, 1\}, a_2 = \{2, -1, -1, -2\}, a_3 = \{-2, -2, 2, -2\}, a_4 = \{2, -2, 0, 1\},$
$b_1 = \{1, 1, -2, 0\}, b_2 = \{2, -2, -1, 1\}, b_3 = \{-2, -1, 2, 0\}$

37. $a_1 = \{1, -1, 0, -2\}, a_2 = \{2, 1, -2, -2\}, a_3 = \{0, -2, 0, -1\}, a_4 = \{-2, 0, 1, 1\},$
$b_1 = \{1, 0, -2, -2\}, b_2 = \{1, 2, 2, -1\}, b_3 = \{-2, 1, 0, 1\}$

38. $a_1 = \{2, 2, -2, -2\}, a_2 = \{2, 1, -2, 2\}, a_3 = \{0, 1, -2, 0\}, a_4 = \{-2, 0, 2, 1\},$
$b_1 = \{1, -2, 0, 1\}, b_2 = \{0, 1, 1, 2\}, b_3 = \{2, 0, -2, -1\}$

39. $a_1 = \{0, -1, 2, -2\}, a_2 = \{2, 1, 1, -1\}, a_3 = \{-2, -2, 2, -2\}, a_4 = \{0, 0, 1, 2\},$
$b_1 = \{-2, -1, -2, 1\}, b_2 = \{-2, 2, 0, 2\}, b_3 = \{-2, 2, -2, 1\}$

40. $a_1 = \{2, -1, -1, 2\}, a_2 = \{2, 1, 2, 0\}, a_3 = \{2, 0, -2, 1\}, a_4 = \{-2, -2, 0, -2\},$
$b_1 = \{1, 0, -2, -2\}, b_2 = \{0, 1, -2, -2\}, b_3 = \{0, -2, 0, 0\}$

41. $a_1 = \{-1, -2, -2, 2\}, a_2 = \{0, -2, 2, 2\}, a_3 = \{1, -1, 1, -2\}, a_4 = \{-1, 0, 1, -2\},$
$b_1 = \{0, 1, 0, -2\}, b_2 = \{-2, -2, -1, 0\}, b_3 = \{1, -1, 1, 1\}$

42. $a_1 = \{-1, -2, -1, 2\}, a_2 = \{1, 0, 0, -1\}, a_3 = \{1, 1, -1, -1\}, a_4 = \{-1, 1, -1, 2\},$
$b_1 = \{0, -2, -2, -2\}, b_2 = \{1, 1, 0, 1\}, b_3 = \{-2, 1, 1, 0\}$

43. $a_1 = \{-2, -2, 1, 1\}, a_2 = \{0, -2, 2, 0\}, a_3 = \{-2, 0, -2, 0\}, a_4 = \{-2, 1, 2, 2\},$
$b_1 = \{-1, 2, -2, 1\}, b_2 = \{2, 2, 2, 2\}, b_3 = \{2, 2, 0, 2\}$

44. $a_1 = \{0, 1, 1, 2\}, a_2 = \{0, -1, 2, -1\}, a_3 = \{-1, 1, 2, 1\}, a_4 = \{1, 1, 2, -1\},$
$b_1 = \{-2, -1, -2, 2\}, b_2 = \{0, -1, -2, 1\}, b_3 = \{2, -1, -2, 2\}$

45. $a_1 = \{0, 2, -2, -2\}, a_2 = \{0, 0, -1, 0\}, a_3 = \{0, 0, 2, 0\}, a_4 = \{-1, -1, 0, 2\},$
$b_1 = \{2, -2, 1, -2\}, b_2 = \{-2, 1, -2, 0\}, b_3 = \{1, 2, 0, -2\}$

46. $a_1 = \{-2, -1, -2, 2\}, a_2 = \{1, -2, 0, -2\}, a_3 = \{1, 1, -1, 2\}, a_4 = \{-1, -1, 1, 0\},$
$b_1 = \{1, -2, -2, 0\}, b_2 = \{0, 2, 2, -1\}, b_3 = \{-1, -1, -1, 2\}$

47. $a_1 = \{1, -1, 0, 1\}, a_2 = \{1, -1, -1, -1\}, a_3 = \{-2, 1, 0, 0\}, a_4 = \{-2, -1, 2, 2\},$
$b_1 = \{0, 0, -1, -2\}, b_2 = \{-1, -1, -1, -2\}, b_3 = \{-1, 2, 1, -2\}$

48. $a_1 = \{2, 0, -1, -2\}, a_2 = \{-2, 0, 1, 2\}, a_3 = \{-2, 0, 0, 0\}, a_4 = \{0, 2, -1, 0\},$
$b_1 = \{2, -2, 1, -2\}, b_2 = \{-2, -2, 0, 0\}, b_3 = \{0, 1, 2, 1\}$

49. $a_1 = \{2, 1, 1, -1\}, a_2 = \{2, -2, -1, -2\}, a_3 = \{1, 0, -2, 0\}, a_4 = \{-1, -2, 0, 0\},$
$b_1 = \{2, -2, -2, 1\}, b_2 = \{-2, 0, 1, 2\}, b_3 = \{-1, -2, -2, 2\}$

50. $a_1 = \{-2, -2, -1, -1\}, a_2 = \{-2, 2, 2, -1\}, a_3 = \{-1, 0, 2, 0\}, a_4 = \{-1, 1, 1, 0\},$
    $b_1 = \{0, -2, 0, 2\}, b_2 = \{0, 2, -1, -1\}, b_3 = \{2, 2, 2, 0\}$

51. $a_1 = \{0, 1, 2, 0\}, a_2 = \{0, 2, 0, 1\}, a_3 = \{0, 1, -2, 1\}, a_4 = \{2, -1, 1, -1\},$
    $b_1 = \{1, -1, -1, 0\}, b_2 = \{1, 2, -1, 1\}, b_3 = \{-1, 2, 2, -2\}$

52. $a_1 = \{-1, -2, -2, 0\}, a_2 = \{-1, 2, -2, -2\}, a_3 = \{1, 0, 2, 0\}, a_4 = \{-2, -2, 2, 1\},$
    $b_1 = \{-2, 1, -1, 2\}, b_2 = \{-1, 1, -1, 1\}, b_3 = \{1, -1, 2, -2\}$

53. $a_1 = \{-2, -1, -2, 0\}, a_2 = \{-1, -1, 0, -1\}, a_3 = \{-2, -1, 2, -2\}, a_4 = \{2, 0, -1, -2\},$
    $b_1 = \{-2, 2, -2, 1\}, b_2 = \{-1, 0, 1, 1\}, b_3 = \{-2, -1, 0, 2\}$

54. $a_1 = \{2, -1, -2, -1\}, a_2 = \{1, -2, 0, 1\}, a_3 = \{0, 2, 2, 1\}, a_4 = \{2, 0, 0, 2\},$
    $b_1 = \{-2, -2, 2, 0\}, b_2 = \{1, 0, -1, 1\}, b_3 = \{0, 1, 2, -1\}$

55. $a_1 = \{0, -2, 1, 2\}, a_2 = \{1, 0, 2, 1\}, a_3 = \{-2, 1, -1, 0\}, a_4 = \{2, -1, -2, 2\},$
    $b_1 = \{-2, -2, 1, 0\}, b_2 = \{-2, 2, -1, 0\}, b_3 = \{2, -2, 1, 1\}$

56. $a_1 = \{-2, 2, 2, -1\}, a_2 = \{0, 0, 0, -1\}, a_3 = \{2, 0, -2, -2\}, a_4 = \{-2, -1, -1, 0\},$
    $b_1 = \{-1, 2, -2, -1\}, b_2 = \{1, 2, -1, -1\}, b_3 = \{0, -1, -2, -2\}$

57. $a_1 = \{2, 1, 0, -1\}, a_2 = \{1, 1, -2, 0\}, a_3 = \{0, -2, 2, 0\}, a_4 = \{1, -2, 1, -1\},$
    $b_1 = \{2, -2, -1, 2\}, b_2 = \{2, -2, 0, -2\}, b_3 = \{0, 0, 0, -2\}$

58. $a_1 = \{1, 2, 1, -1\}, a_2 = \{1, -2, -1, -1\}, a_3 = \{2, -2, -1, -2\}, a_4 = \{0, -1, 1, 1\},$
    $b_1 = \{-2, 0, 2, -2\}, b_2 = \{-1, -1, 0, 0\}, b_3 = \{1, 2, -1, -2\}$

59. $a_1 = \{-1, -2, 2, 1\}, a_2 = \{-2, 1, 0, 0\}, a_3 = \{1, 1, -2, 2\}, a_4 = \{2, -1, -1, 2\},$
    $b_1 = \{1, 1, 2, 2\}, b_2 = \{1, -2, -1, 0\}, b_3 = \{-2, 0, 1, -2\}$

60. $a_1 = \{-2, -1, 1, 1\}, a_2 = \{1, 2, 2, -1\}, a_3 = \{0, -2, -1, 0\}, a_4 = \{0, 0, 2, 2\},$
    $b_1 = \{1, -1, 1, 2\}, b_2 = \{-1, 2, -1, 1\}, b_3 = \{-1, -2, -2, -1\}$

61. $a_1 = \{-1, 1, -2, 1\}, a_2 = \{2, 1, 2, 0\}, a_3 = \{1, 1, 2, 1\}, a_4 = \{-1, 1, -1, 2\},$
    $b_1 = \{-1, -1, -1, 2\}, b_2 = \{0, 2, 2, 0\}, b_3 = \{1, 0, -2, -1\}$

62. $a_1 = \{1, 0, 0, -2\}, a_2 = \{2, 0, 0, -1\}, a_3 = \{1, -2, -2, -2\}, a_4 = \{2, 2, 0, 0\},$
    $b_1 = \{1, 1, 2, -1\}, b_2 = \{-2, 1, 1, -1\}, b_3 = \{1, -2, -1, -2\}$

63. $a_1 = \{1, 0, 0, 0\}, a_2 = \{0, 2, 0, -1\}, a_3 = \{-1, -1, 0, 1\}, a_4 = \{2, 1, -1, 2\},$
    $b_1 = \{1, -2, 2, -2\}, b_2 = \{-1, 1, 2, -2\}, b_3 = \{1, -1, -2, 2\}$

64. $a_1 = \{-1, -1, 2, 2\}, a_2 = \{2, -1, 0, 1\}, a_3 = \{1, -2, -2, -2\}, a_4 = \{-1, -2, 2, 0\},$
    $b_1 = \{0, 2, -2, 2\}, b_2 = \{-2, -2, 2, -1\}, b_3 = \{2, 1, -2, 0\}$

65. $a_1 = \{-1, -2, 1, 2\}, a_2 = \{-2, 2, -2, -1\}, a_3 = \{-2, 1, 2, 1\}, a_4 = \{1, -1, -2, 1\},$
    $b_1 = \{2, 0, -1, 2\}, b_2 = \{1, -2, 0, 1\}, b_3 = \{2, 1, 0, -1\}$

66. $a_1 = \{-2, -2, 1, 0\}, a_2 = \{2, 2, 1, 2\}, a_3 = \{1, -1, -2, -2\}, a_4 = \{1, 2, 1, 0\},$
    $b_1 = \{-2, 2, 2, -1\}, b_2 = \{2, -2, -1, -2\}, b_3 = \{-1, 1, -1, 0\}$

67. $a_1 = \{1, -2, -2, 1\}, a_2 = \{-1, -1, 0, -1\}, a_3 = \{2, 0, 1, 1\}, a_4 = \{-2, -2, 2, 2\},$
    $b_1 = \{1, 0, 2, 0\}, b_2 = \{-2, 0, 2, 1\}, b_3 = \{2, 2, -2, 2\}$

68. $a_1 = \{2, -2, 2, 1\}, a_2 = \{-2, 2, 0, 1\}, a_3 = \{1, 0, 0, 1\}, a_4 = \{-1, -1, -1, -2\},$
    $b_1 = \{-2, 0, -2, 1\}, b_2 = \{-2, -1, -1, -1\}, b_3 = \{-1, 2, -1, -1\}$

69. $a_1 = \{0, 2, 0, 2\}, a_2 = \{1, -2, -1, 2\}, a_3 = \{1, 1, -2, -2\}, a_4 = \{-1, 2, 2, -1\},$
    $b_1 = \{1, 0, 2, 0\}, b_2 = \{-2, -1, 2, -2\}, b_3 = \{1, 0, 1, 1\}$

70. $a_1 = \{2, 2, 1, 2\}, a_2 = \{-1, 2, -2, 0\}, a_3 = \{-2, 2, 1, -2\}, a_4 = \{1, 0, -1, -2\},$
    $b_1 = \{2, 1, -1, 0\}, b_2 = \{2, -1, 2, -1\}, b_3 = \{-2, 1, 2, -1\}$

71. $a_1 = \{0, 1, 1, 1\}, a_2 = \{1, 2, 1, 2\}, a_3 = \{-1, 0, 2, 0\}, a_4 = \{0, 2, 2, -1\},$
    $b_1 = \{-2, 2, 2, -2\}, b_2 = \{-2, 0, 0, 1\}, b_3 = \{1, 0, 2, 2\}$

72. $a_1 = \{1, -2, 2, 1\}, a_2 = \{1, 1, 1, 2\}, a_3 = \{-1, 2, 2, 0\}, a_4 = \{-1, 2, 0, 1\},$
    $b_1 = \{0, 2, -2, -1\}, b_2 = \{1, 0, -1, 0\}, b_3 = \{0, 2, -2, 0\}$

73. $a_1 = \{0, -2, 0, 0\}, a_2 = \{0, 0, 0, -1\}, a_3 = \{2, 2, 1, -1\}, a_4 = \{-1, 2, 1, -2\},$
    $b_1 = \{-2, -2, 0, -1\}, b_2 = \{-1, 2, 1, -2\}, b_3 = \{0, 1, 1, 0\}$

74. $a_1 = \{2, 1, -1, -2\}, a_2 = \{-2, -1, 0, -1\}, a_3 = \{0, -1, 2, 2\}, a_4 = \{1, -1, 1, 2\},$
    $b_1 = \{-2, -1, 1, -1\}, b_2 = \{1, 2, 0, 1\}, b_3 = \{-2, 2, -2, 1\}$

75. $a_1 = \{0, -2, 1, 2\}, a_2 = \{2, -2, -1, -2\}, a_3 = \{-2, 0, 2, 0\}, a_4 = \{-2, 1, 0, 0\},$
    $b_1 = \{-1, -2, 0, 1\}, b_2 = \{2, -1, 2, 1\}, b_3 = \{-2, 0, -1, 1\}$

76. $a_1 = \{1, 1, 0, -1\}, a_2 = \{2, 0, 2, -2\}, a_3 = \{0, 2, 1, -1\}, a_4 = \{2, 1, 1, 0\},$
    $b_1 = \{1, 1, -2, 0\}, b_2 = \{-2, 2, 0, 2\}, b_3 = \{-1, -1, 2, 2\}$

77. $a_1 = \{-2, -1, -2, 2\}, a_2 = \{1, -1, 1, -2\}, a_3 = \{2, -1, 0, 0\}, a_4 = \{1, -2, -1, -2\},$
    $b_1 = \{2, 0, -1, 0\}, b_2 = \{2, 2, -2, -2\}, b_3 = \{1, 2, 2, -1\}$

78. $a_1 = \{2, -2, -1, 1\}, a_2 = \{2, 0, 1, -1\}, a_3 = \{-2, 0, 2, 2\}, a_4 = \{1, 1, 2, 1\},$
    $b_1 = \{2, 1, -2, -2\}, b_2 = \{-1, 0, -2, -1\}, b_3 = \{-2, 2, 2, -2\}$

79. $a_1 = \{-2, 1, -2, 1\}, a_2 = \{-1, -1, 0, -2\}, a_3 = \{-1, 2, -1, -2\}, a_4 = \{1, -1, 0, 0\},$
    $b_1 = \{2, 0, -1, 2\}, b_2 = \{-2, 0, 0, -1\}, b_3 = \{2, -2, 0, -1\}$

80. $a_1 = \{0, 0, 2, 1\}, a_2 = \{1, -2, -1, -2\}, a_3 = \{0, -1, 1, 2\}, a_4 = \{1, -1, 1, 1\},$
    $b_1 = \{2, 1, -2, 1\}, b_2 = \{-1, 0, -1, 2\}, b_3 = \{1, 0, 2, 0\}$

81. $a_1 = \{-1, -1, 0, -1\}, a_2 = \{-1, -1, -1, -2\}, a_3 = \{0, 1, 1, 1\}, a_4 = \{-1, 1, -1, 1\},$
    $b_1 = \{-1, 0, 0, 2\}, b_2 = \{-2, -1, 2, -2\}, b_3 = \{-2, -1, -1, 1\}$

82. $a_1 = \{1, 1, -1, -1\}, a_2 = \{0, 2, -1, -1\}, a_3 = \{-2, -1, 1, 2\}, a_4 = \{-2, -1, -1, -1\},$
    $b_1 = \{1, 1, 2, -1\}, b_2 = \{-2, -1, -1, 2\}, b_3 = \{2, 2, -1, 2\}$

83. $a_1 = \{1, -1, 0, 0\}, a_2 = \{2, 0, -1, -2\}, a_3 = \{1, 1, 2, 0\}, a_4 = \{1, 2, 1, 2\},$
    $b_1 = \{-2, -1, 2, 0\}, b_2 = \{-1, 0, 0, 0\}, b_3 = \{-2, 1, -2, -1\}$

84. $a_1 = \{0, 0, -2, 2\}, a_2 = \{-1, 0, 1, 2\}, a_3 = \{-1, -1, 0, -1\}, a_4 = \{2, 2, 0, -1\},$
    $b_1 = \{0, -1, 1, -1\}, b_2 = \{-1, -2, -2, -1\}, b_3 = \{2, 1, 0, -1\}$

85. $a_1 = \{-2, -2, -1, 0\}, a_2 = \{2, 0, 2, 2\}, a_3 = \{-2, 0, -2, 1\}, a_4 = \{-2, -2, -1, -1\},$
    $b_1 = \{1, 1, -1, 1\}, b_2 = \{-2, -2, -2, 1\}, b_3 = \{0, 1, -1, -2\}$

86. $a_1 = \{1, 1, 0, 0\}, a_2 = \{0, -2, -1, 0\}, a_3 = \{2, 2, -1, -1\}, a_4 = \{-2, 1, 2, 2\},$
$b_1 = \{2, 2, 0, 1\}, b_2 = \{-2, 0, -2, 0\}, b_3 = \{-2, 2, 0, 2\}$

87. $a_1 = \{0, -1, 2, -2\}, a_2 = \{2, 1, 1, 2\}, a_3 = \{-1, 1, 1, -2\}, a_4 = \{-1, 2, -1, 2\},$
$b_1 = \{-1, 1, -1, -2\}, b_2 = \{-2, 1, 0, -2\}, b_3 = \{2, 1, 1, -2\}$

88. $a_1 = \{-1, -1, 1, 2\}, a_2 = \{-2, -2, 1, 1\}, a_3 = \{0, -2, 2, 1\}, a_4 = \{-1, -2, -2, -2\},$
$b_1 = \{-1, -2, 2, 2\}, b_2 = \{-2, 0, 0, 1\}, b_3 = \{1, 0, 1, 2\}$

89. $a_1 = \{2, -1, 0, 2\}, a_2 = \{-2, -1, 2, -2\}, a_3 = \{1, 2, 1, -1\}, a_4 = \{-2, 1, 2, -2\},$
$b_1 = \{0, 1, -1, 1\}, b_2 = \{-1, -1, 1, 2\}, b_3 = \{-2, 0, 0, -1\}$

90. $a_1 = \{0, 1, 0, 2\}, a_2 = \{0, 0, 0, 0\}, a_3 = \{0, -1, 1, 1\}, a_4 = \{1, 0, 1, -2\},$
$b_1 = \{0, -2, 2, 0\}, b_2 = \{-2, -1, 2, 2\}, b_3 = \{2, 0, 1, 0\}$

91. $a_1 = \{0, 2, -2, -2\}, a_2 = \{-1, 0, 2, 2\}, a_3 = \{2, -1, 0, 0\}, a_4 = \{-1, 2, 1, 2\},$
$b_1 = \{-2, -2, -2, -1\}, b_2 = \{2, -1, 0, 0\}, b_3 = \{-1, 1, 1, -1\}$

92. $a_1 = \{2, -1, -2, 2\}, a_2 = \{-2, 2, 0, 0\}, a_3 = \{1, 1, -2, 2\}, a_4 = \{0, -2, 0, 1\},$
$b_1 = \{0, -2, 1, 1\}, b_2 = \{-1, 2, -2, 2\}, b_3 = \{0, -2, 1, 0\}$

93. $a_1 = \{-2, -2, -1, -1\}, a_2 = \{-2, 1, 0, 0\}, a_3 = \{-2, -2, 2, -1\}, a_4 = \{-2, -1, 0, -2\},$
$b_1 = \{-1, 2, 2, -1\}, b_2 = \{0, 0, -2, 2\}, b_3 = \{-1, -2, 2, 1\}$

94. $a_1 = \{-1, 1, 2, -1\}, a_2 = \{1, 1, -2, -1\}, a_3 = \{-2, -1, 1, -2\}, a_4 = \{0, 0, 1, -1\},$
$b_1 = \{2, -1, -1, 2\}, b_2 = \{-2, 1, 2, -2\}, b_3 = \{-1, 2, 2, -2\}$

95. $a_1 = \{2, -1, 1, 2\}, a_2 = \{1, 1, 0, 0\}, a_3 = \{0, -1, 2, 0\}, a_4 = \{1, -2, -1, 1\},$
$b_1 = \{-2, 0, -2, 2\}, b_2 = \{2, 0, 0, 1\}, b_3 = \{1, 2, 2, 0\}$

96. $a_1 = \{0, -1, 2, 2\}, a_2 = \{-1, 0, 1, -2\}, a_3 = \{2, 1, 0, 0\}, a_4 = \{0, -2, 1, -1\},$
$b_1 = \{-2, -2, 0, -1\}, b_2 = \{-2, 1, 2, -1\}, b_3 = \{2, 0, -1, -2\}$

97. $a_1 = \{-1, -2, 2, 0\}, a_2 = \{0, 1, 0, -1\}, a_3 = \{0, 0, 0, 0\}, a_4 = \{2, 2, -1, -2\},$
$b_1 = \{2, 1, 0, -1\}, b_2 = \{-2, 2, 1, 1\}, b_3 = \{0, -1, 2, 0\}$

98. $a_1 = \{-1, 2, -2, -1\}, a_2 = \{2, 1, -2, -1\}, a_3 = \{2, 0, 2, 2\}, a_4 = \{-1, -1, 1, 0\},$
$b_1 = \{-2, -2, 1, -1\}, b_2 = \{1, 0, 0, -2\}, b_3 = \{0, 1, -2, 0\}$

99. $a_1 = \{1, -2, -2, 2\}, a_2 = \{0, -1, 0, 1\}, a_3 = \{-2, -1, 0, -2\}, a_4 = \{2, -1, 0, 1\},$
$b_1 = \{-1, -2, -1, -1\}, b_2 = \{0, 0, -1, 1\}, b_3 = \{-2, -2, -1, 2\}$

100. $a_1 = \{0, -2, 1, -2\}, a_2 = \{-2, 0, 0, 0\}, a_3 = \{2, 1, -1, -1\}, a_4 = \{-1, 2, 1, 1\},$
$b_1 = \{-2, 2, -1, -1\}, b_2 = \{-1, -2, 0, -1\}, b_3 = \{-1, 2, -2, 1\}$