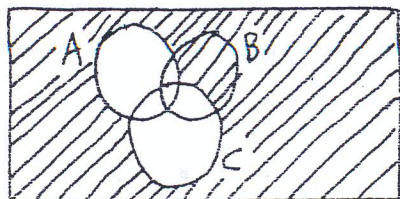
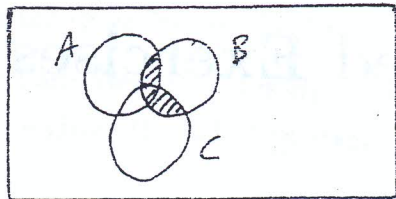


22.



24.



26. 32

27. 105

29. 51

30. 4

32. $\{(a, 1), (a, 2), (b, 1), (b, 2), (c, 1), (c, 2)\}$

33. $\{(1, 1), (1, 2), (2, 1), (2, 2)\}$

36. $\{(1, a, a), (2, a, a)\}$

37. $\{(1, 1, 1), (1, 2, 1), (2, 1, 1), (2, 2, 1), (1, 1, 2), (1, 2, 2), (2, 1, 2), (2, 2, 2)\}$

40. $\{1, 2\}$
 $\{1\}, \{2\}$

41. $\{a, b, c\}$
 $\{a, b\}, \{c\}$
 $\{a, c\}, \{b\}$
 $\{b, c\}, \{a\}$
 $\{a\}, \{b\}, \{c\}$

44. False

45. True

48. Equal

49. Equal

51. Not equal

53. $\emptyset, \{a\}, \{b\}, \{c\}, \{d\}, \{a, b\}, \{a, c\}, \{a, d\}, \{b, c\}, \{b, d\}, \{c, d\}, \{a, b, c\}, \{a, b, d\}, \{a, c, d\}, \{b, c, d\}, \{a, b, c, d\}$

54. $2^{10} = 1024; 2^{10} - 1 = 1023$

56. $X = Y$

58. True

59. True

61. False. Take $X = \{1, 2\}, Y = \{2, 3\}, U = \{1, 2, 3\}$.

62. False. Take $U = \{1, 2, 3, 4, 5\}, X = \{2, 3\}, Y = \{3, 4\}$.

64. True

65. False. Take $U = \{1, 2\}, X = \{1\}, Y = \{2\}$.

67. False. Take $X = \{1, 2\}, Y = \{1\}, Z = \{2\}$.

68. False. Take $X = \{1, 2\}, Y = \{1, 3\}, Z = \{1, 4\}$.

71. (proof by contradiction.) Suppose that the statement is false. Then there exists a set X such that $\emptyset \in X$ but $\emptyset \notin \emptyset$. But this is a contradiction since the empty set has no members. $\emptyset \notin X$.