계산시 참고사항

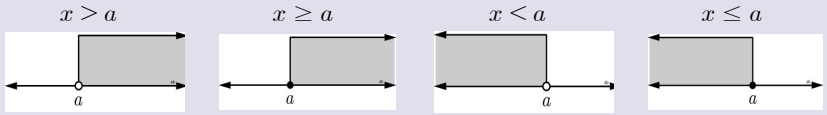
1. 일차부등식

(1) 일차부등식: 부등식의 성질을 이용하여 부등식을 정리하였을 때
$(일차식)>0$, $(일차식)<0$, $(일차식)\geq 0$, $(일차식)\leq 0$중 하나의 꼴로 변형되는 부등식

2. 일차부등식의 풀이

(1) 미지수 x를 포함한 항은 좌변으로, 상수항은 우변으로 이항한다.
(2) 양변을 정리하여 $ax>b$, $ax<b$, $ax\geq b$, $ax\leq b(a\neq 0)$의 꼴로 만든다.
(3) 양변을 x의 계수 a로 나눈다. 이때 $a<0$이면 부등호의 방향이 바뀐다.

3. 부등식의 해를 수직선에 나타내기



부등식의 풀이
◉ 부등식의 성질을 이용하여 주어진 부등식을 다음 중 하나의 꼴로 고쳐서 해를 구한다.
$x>$(수), $x\geq$(수) $x<$(수), $x\leq$(수)

해를 수직선에 나타냈을 때
◉ 수직선에서 ●에 대응하는 수는 부등식의 해에 포함되고, ○에 대응하는 수는 부등식의 해에 포함되지 않는다.

일차부등식

◪ 다음 중 일차부등식인 것에는 ○표를, 아닌 것에는 ×표를 하여라.

1. $x-3\leq 2x+5$ ( )
2. $x^2-3x<4$ ( )
3. $-x+3<2-x$ ( )
4. $x^2-4\geq x^2+2x$ ( )
5. $x+5>8$ ( )
6. $7+2>4$ ( )
7. $3x+1\leq 2$ ( )
8. $2x+3<2(x-1)$ ( )
9. $3x-8x>6x$ ( )
10. $2x+10=4$ ( )
11. $x+8<3x+4$ ( )
12. $x^2+x\leq x^2$ ( )
13. $-x+3<5-x$ ( )

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14. $5x-1>3x+7$ ( )

15. $3x^2+2x-5\le 0$ ( )

16. $2x\ge 2x+5$ ( )

17. $x(x-1)<2x^2$ ( )

18. $x^2+3x<x^2-9$ ( )

일차부등식의 풀이

◪ 다음 일차부등식을 풀어라.

19. $x+2>5$

20. $2x\ge -8$

21. $5-x\ge 2-4x$

22. $-8-2x>2x+4$

23. $4x-7>2x-6$

24. $2-3x<14+3x$

25. $x-1>2$

26. $x+3\le -1$

27. $2x<10$

28. $7x+3\ge 4x$

29. $-4x\le 20$

30. $2x+3>9$

31. $3x-2<10$

32. $\frac{x}{3}>4$

33. $-\frac{x}{5}\ge -3$

34. $-x+7<2$

35. $2x-1\ge 5x+2$

36. $2x+4<x-3$

37. $5x+1\le 3x+7$

38. $3x\ge x+5$

39. $-x-3>x+1$

40. $-2x+1<x-5$

41. $4x-3 \geq 6x+5$

42. $3x+8 > 5x$

43. $7x-5 \geq 5x+9$

44. $-5x+7 < x-5$

45. $x-9 < -1-3x$

46. $3-x > 4x-7$

47. $9x-4 \leq 6x+5$

48. $3x-8 \geq 6x+10$

49. $-6x-5 < x+2$

50. $-2x+3 \geq x-6$

51. $x+7 \geq 5x-9$

52. $-2x+8 \geq 3x-2$

53. $3x-6 < 8x+9$

54. $8x-3 < 4x+3$

55. $14-2x \leq 4+3x$

56. $3x+4 > 2x+3$

57. $6x-2 \leq x+8$

58. $5x+14 < 9x+2$

59. $x+7 \geq 5x-9$

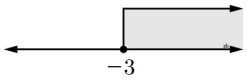
60. $2x-2 < 5x-8$

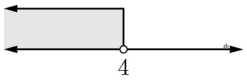
61. $-3x-2 > -x+6$

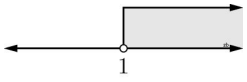
62. $-2x+8 \geq 3x-2$

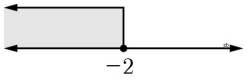
수직선에 나타내기

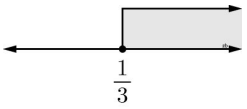
◪ **다음 수직선 위에 나타내어진 x의 값의 범위를 부등식으로 나타내어라.**

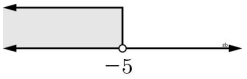
63. 

64. 

65. 

66. 

67. 

68. 

◪ 다음 부등식을 수직선 위에 나타내어라.

69. $x \geq 3$

70. $x < -1$

71. $x \leq 2$

72. $x > 5$

73. $x < 3$

74. $x \geq -1$

75. $x \leq -1$

76. $x > 6$

77. $x < \frac{3}{4}$

78. $x \geq -9$

79. $x \leq 3$

80. $x \leq 0$

81. $x \leq -2$

◪ 다음 일차부등식을 풀고, 해를 수직선 위에 나타내어라.

82. $x+2 > 3$

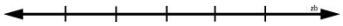
83. $3x \leq 12$

84. $2x-1 \leq 9$

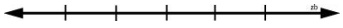
85. $-5x > 15$

86. $x+6 \geq -2x$

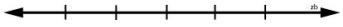
87. $-4x+1 \leq -x-14$



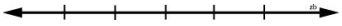
88. $x-4 > 3x-4$



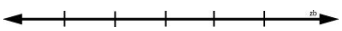
89. $x+2 > 3x-4$



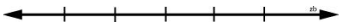
90. $x+1 \leq 4$



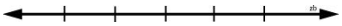
91. $-3x < -12$



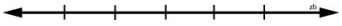
92. $-2x+3 \geq 7$



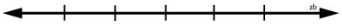
93. $x-2 > 2$



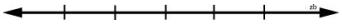
94. $x+3 \leq 5$



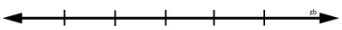
95. $x-1 > -3$



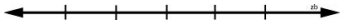
96. $2x < 8$



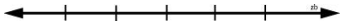
97. $\frac{1}{2}x > 1$



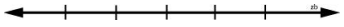
98. $-x-1 < 4$



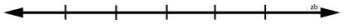
99. $-x+2 \geq 3$



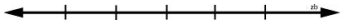
100. $-3x \geq 9$



101. $-\frac{x}{4} \leq -1$



102. $1-3x \geq 4$



정답 및 해설

1) ○

2) ×

3) ×

4) ○

5) ○

6) ×

7) ○

8) ×

9) ○

10) ×

11) ○

12) ○

13) ×

14) ○

15) ×

16) ×

17) ×

18) ○

19) $x>3$

20) $x\geq -4$

21) $x\geq -1$
⇨ $5-x\geq 2-4x \Rightarrow 3x\geq -3 \Rightarrow x\geq -1$

22) $x<-3$
⇨ $-8-2x>2x+4 \Rightarrow -4x>12 \Rightarrow x<-3$

23) $x>\frac{1}{2}$

⇨ $4x-7>2x-6 \Rightarrow 2x>1 \Rightarrow x>\frac{1}{2}$

24) $x>-2$
⇨ $2-3x<14+3x \Rightarrow -6x<12 \Rightarrow x>-2$

25) $x>3$

26) $x\leq -4$

27) $x<5$
⇨ $2x<10,\ 2\times\frac{1}{2}<10\times\frac{1}{2}$ $\therefore x<5$

28) $x\geq -1$

29) $x\geq -5$

30) $x>3$
⇨ $2x+3>9$의 양변에서 3을 빼면
$2x+3-3>9-3,\ 2x>6$
양변을 2로 나누면
$\frac{2x}{2}>\frac{6}{2}$ $\therefore x>3$

31) $x<4$
⇨ $3x-2<10$의 양변에 2를 더하면
$3x-2+2<10+2, 3x<12$
양변을 3으로 나누면
$\frac{3x}{3}<\frac{12}{3}$ $\therefore\ x<4$

32) $x>12$

33) $x\leq 15$
⇨ $-\frac{x}{5}\geq -3,\ -\frac{x}{5}\times(-5)\leq -3\times(-5)$ $\therefore x\leq 15$

34) $x>5$
⇨ $-x+7<2$의 양변에서 7을 빼면
$-x+7-7<2-7, -x<-5$
양변을 -1로 나누면
$\frac{-x}{-1}>\frac{-5}{-1}$ $\therefore x>5$

35) $x\leq -1$
⇨ $2x-1\geq 5x+2$
$2x-5x\geq 2+1$
$-3x\geq 3$ $\therefore\ x\leq -1$

36) $x<-7$

37) $x\leq 3$
⇨ $5x+1\leq 3x+7,\ 5x-3x\leq 7-1$
$2x\leq 6$ $\therefore\ x\leq 3$

38) $x\geq \frac{5}{2}$
⇨ $3x\geq x+5,\ 3x-x\geq 5$
$2x\geq 5$ $\therefore\ x\geq \frac{5}{2}$

39) $x<-2$
⇨ $-x-3>x+1,\ -x-x>1+3$
$-2x>4 \quad \therefore\ x<-2$

40) $x>2$
⇨ $-2x+1<x-5,\ -2x-x<-5-1$
$-3x<-6 \quad \therefore\ x>2$

41) $x\le -4$
⇨ $4x-3\ge 6x+5,\ 4x-6x\ge 5+3$
$-2x\ge 8 \quad \therefore\ x\le -4$

42) $x<4$

43) $x\ge 7$
⇨ $7x-5\ge 5x+9$
$7x-5x\ge 9+5$
$2x\ge 14 \quad \therefore x\ge 7$

44) $x>2$
⇨ $-5x+7<x-5$
$-5x-x<-5-7$
$-6x<-12 \quad \therefore x>2$

45) $x<2$
⇨ $x-9<-1-3x \Rightarrow x<2$

46) $x<2$
⇨ $3-x>4x-7 \Rightarrow x<2$

47) $x\le 3$
⇨ $9x-4\le 6x+5$
$9x-6x\le 5+4$
$3x\le 9 \quad \therefore x\le 3$

48) $x\le -6$
⇨ $3x-8\ge 6x+10 \Rightarrow -3x\ge 18 \Rightarrow x\le -6$

49) $x>-1$
⇨ $-6x-5<x+2$
$-6x-x<2+5$
$-7x<7 \quad \therefore x>-1$

50) $x\le 3$
⇨ $-2x+3\ge x-6$
$-2x-x\ge -6-3$
$-3x\ge -9 \quad \therefore x\le 3$

51) $x\le 4$
⇨ $x+7\ge 5x-9$
$x-5x\ge -9-7$
$-4x\ge -16 \quad \therefore x\le 4$

52) $x\le 2$
⇨ $-2x+8\ge 3x-2$
$-2x-3x\ge -2-8$
$-5x\ge -10 \quad \therefore x\le 2$

53) $x>-3$
⇨ $3x-6<8x+9$
$3x-8x<9+6$
$-5x<15 \quad \therefore x>-3$

54) $x<\frac{3}{2}$
⇨ $8x-3<4x+3$
$8x-4x<3+3$
$4x<6$
$\therefore x<\frac{3}{2}$

55) $x\ge 2$
⇨ $14-2x\le 4+3x$
$-2x-3x\le 4-14$
$-5x\le -10$
$\therefore x\ge 2$

56) $x>-1$

57) $x\le 2$

58) $x>3$
⇨ $5x+14<9x+2$
$5x-9x<2-14$
$-4x<-12 \quad \therefore x>3$

59) $x\le 4$
⇨ $x+7\ge 5x-9$
$x-5x\ge -9-7$
$-4x\ge -16 \quad \therefore x\le 4$

60) $x>2$
⇨ $2x-2<5x-8 \Rightarrow x>2$

61) $x<-4$
⇨ $-3x-2>-x+6$
$-3x+x>6+2$
$-2x>8 \quad \therefore x<-4$

62) $x\le 2$
⇨ $-2x+8\ge 3x-2$
$-2x-3x\ge -2-8$
$-5x\ge -10 \quad \therefore x\le 2$

63) $x\ge -3$

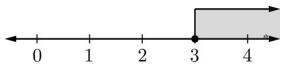
64) $x<4$

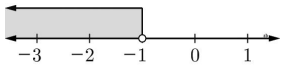
65) $x>1$

66) $x \le -2$

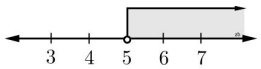
67) $x \ge \frac{1}{3}$

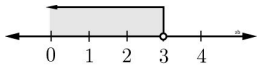
68) $x < -5$

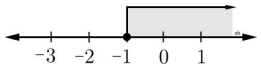
69) 

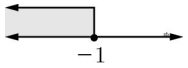
70) 

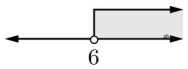
71) 

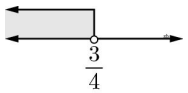
72) 

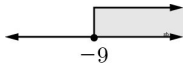
73) 

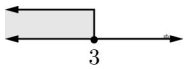
74) 

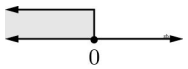
75) 

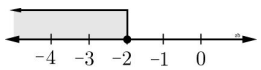
76) 

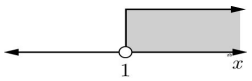
77) 

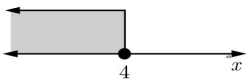
78) 

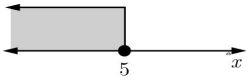
79) 

80) 

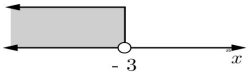
81) 

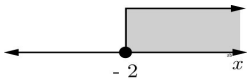
82) $x > 1$, 

83) $x \le 4$, 

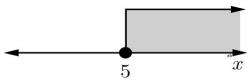
84) $x \le 5$, 

⇨ $2x \le 10 \quad \therefore x \le 5$

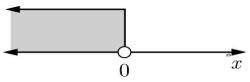
85) $x < -3$, 

86) $x \ge -2$, 

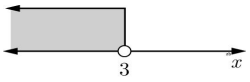
⇨ $3x \ge -6 \qquad \therefore x \ge -2$

87) $x \ge 5$, 

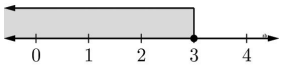
⇨ $-3x \le -15 \qquad \therefore x \ge 5$

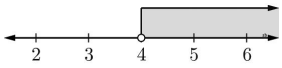
88) $x < 0$, 

⇨ $-2x > 0 \qquad \therefore x < 0$

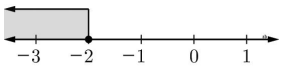
89) $x < 3$, 

⇨ $-2x > -6 \qquad \therefore x < 3$

90) $x \le 3$, 

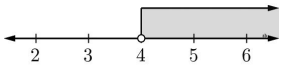
91) $x > 4$, 

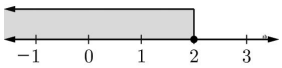
⇨ $\frac{-3x}{-3} > \frac{-12}{-3} \qquad \therefore x > 4$

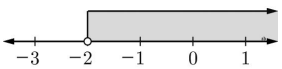
92) $x \le -2$, 

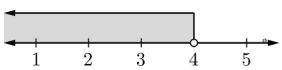
⇨ $-2x+3-3 \ge 7-3, \ -2x \ge 4$

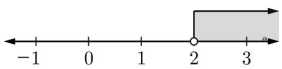
$\frac{-2x}{-2} \le \frac{4}{-2} \qquad \therefore x \le -2$

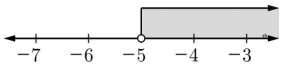
93) $x > 4$, 

94) $x \le 2$, 

95) $x > -2$, 

96) $x < 4$, 

97) $x > 2$, 

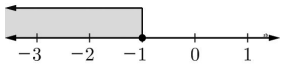
98) $x>-5$, 

⇨ $-x-1+1<4+1$

$-x<5$

$-x\times(-1)>5\times(-1)$

$\therefore x>-5$

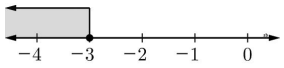
99) $x\le-1$, 

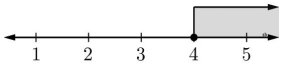
⇨ $-x+2-2\ge3-2$

$-x\ge1$

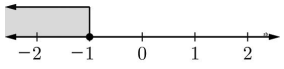
$-x\times(-1)\le1\times(-1)$

$\therefore x\le-1$

100) $x\le-3$, 

101) $x\ge4$, 

⇨ $-\frac{x}{4}\times(-4)\ge-1\times(-4)\quad\therefore x\ge4$

102) $x\le-1$, 

⇨ $1-3x-1\ge4-1$

$-3x\ge3$

$\frac{-3x}{-3}\le\frac{3}{-3}\qquad\therefore x\le-1$