Supplementary Exercise on Inequality

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Set 1: Simple linear inequality in one variable

1. $2(x-2) \geq x-3$
2. $3(y+7)-y < 2y+21$
3. $z-2 \leq z-1$
4. $3(y+7)-y \leq 2y+21$
5. $z-2 > z-1$
6. $\dfrac{z-2}{z} \leq \dfrac{z-1}{z}$

Set 2: Compound (linear) inequality in one variable

7. $x > 3$ and $x \leq 4$
8. $x > 3$ and $x \geq 4$
9. $x < 3$ and $x \geq 4$
10. $x \geq 3$ and $x \leq 3$
11. $x > 3$ and $x \leq 3$
12. $x > 0$ and $-1 \leq x$ and $-2 < x$
13. $2x-3 < 7 \leq x-5$
14. $x > 0$ and $-1 \leq x$ and $-2 > x$
15. $2x-3 \leq 6-x \leq x+4$ and $x > 2$
16. $2x-3 \leq 6-x \leq 5-2x$
17. $x < 3$ or $x \geq 4$
18. $x > 3$ or $x \leq 4$
19. $x < 3$ or $x > 3$
20. $x \geq 3$ or $x \leq 3$
21. $x > 3$ or $x \geq 4$ or $x < 5$
22. $x-7 < x+6$ or $2x \geq 19$
23. $x \geq 4$ or ($x > x$ and $x < 20$)
24. ($x \geq 4$ or $x > x$) and $x < 20$
25. $\begin{cases} 3 < x \text{ or } x \geq 5 \\ 2 \leq x < 4 \end{cases}$
26. $\begin{cases} 3 < x \\ \text{or} \\ 2 \leq x < 4 \end{cases}$

Set 3 : Quadratic inequality in one variable

27. $(x+1)(x-1) > 0$
28. $x^2 - 1 \leq 0$
29. $(x+1)(1-x) \geq 0$
30. $(x-2+\sqrt{3})(x-2-\sqrt{3}) > 0$
31. $x^2 - 4x + 1 \leq 0$
32. $-2x^2 + \sqrt{10}\,x - 1 > 0$
33. $(x+3)^2 \geq 0$
34. $-4(x+3)^2 < 0$
35. $-2x(x-1) > -2(x-1)$
36. $4x^2 - 2x + \dfrac{1}{4} \leq 0$
37. $x^2 + 1 > 0$
38. $5(x-3)^2 + 6 < 0$
39. $-20(x+4)^2 - 28 \geq 0$
40. $x^2 - 4x + 9 > 0$
41. $-30x^2 + 2x - 1 \geq 0$
42. $(x-1)(x^2+x+1) \leq 0$

Set 4 : Multiple inequality in one variable

43. $(x+1)\,x\,(x-1) > 0$
44. $(x+1)\,x\,(x-2)\,(x-3) < 0$
45. $(x+1)(2-x)(3-2x)(4-3x) \leq 0$
46. $\dfrac{(x+1)\cdot(x-1)}{(3-x)(4-x)} \leq 0$
47. $(x+1)^3\,x^4\,(x-1)^5 \leq 0$
48. $(x-2)^2\,(x+4)^4\,(x+6)^6 > 0$
49. $\dfrac{(x+1)^3\cdot(x-1)^5}{x^{61}} \geq 0$
50. $(x^2-6x+1)(-5x^2+x-2) < 0$
51. $\dfrac{x}{x+2} > 1$
52. $\dfrac{(x^3+1)\cdot(x-1)^2}{x^4-2x^2+1} > 0$
53. $(x+\dfrac{1}{x})^2 > 2$
54. $(x+\dfrac{1}{x})^2 \geq 6$

1.	$x \geq 1$	2.	no solution	3.	all real numbers	4.	all real numbers
5.	no solution	6.	$z > 0$	7.	$3 < x \leq 4$	8.	$x \geq 4$
9.	no solution	10.	$x = 3$	11.	no solution	12.	$x > 0$
13.	no solution	14.	no solution	15.	$2 < x \leq 3$	16.	$x \leq -1$
17.	$x < 3$ or $x \geq 4$	18.	all real numbers	19.	$x \neq 3$ (all real no. except 3)	20.	all real numbers
21.	all real numbers	22.	all real numbers	23.	$4 \leq x$	24.	$4 \leq x < 20$
25.	$3 < x < 4$	26.	$x \geq 2$	27.	$x < -1$ or $x > 1$	28.	$-1 \leq x \leq 1$
29.	$-1 \leq x \leq 1$	30.	$x<2-\sqrt{3}$ or $x>2+\sqrt{3}$	31.	$2-\sqrt{3} \leq x \leq 2+\sqrt{3}$	32.	$\frac{\sqrt{10}-\sqrt{2}}{4} < x < \frac{\sqrt{10}+\sqrt{2}}{4}$
33.	all real numbers	34.	$x \neq -3$ (all real no. except -3)	35.	no solution	36.	$x = \frac{1}{4}$
37.	all real numbers	38.	no solution	39.	no solution	40.	all real numbers
41.	no solution	42.	$x \leq 1$	43.	$-1 < x < 0$ or $x > 1$	44.	$-1 < x < 0$ or $2 < x < 3$
45.	$x \leq -1$ or $\frac{4}{3} \leq x \leq \frac{3}{2}$ or $x \geq 2$	46.	$x \leq -1$ or $1 \leq x < 3$ or $3 < x < 4$	47.	$-1 \leq x \leq 1$	48.	all real numbers except 2,–4,–6
49.	$-1 \leq x < 0$ or $1 \leq x$	50.	$x < 3 - 2\sqrt{2}$ or $x > 3 + 2\sqrt{2}$	51.	$x < -2$	52.	$-1<x<1$ or $1 < x$ (or $-1 < x$ and $x \neq 1$)
53.	$x \neq 0$ (all real no. except 0)	54.	$x \leq \frac{-\sqrt{2}-\sqrt{6}}{2}$ or $\frac{\sqrt{2}-\sqrt{6}}{2} \leq x < 0$ or $0 < x \leq \frac{\sqrt{6}-\sqrt{2}}{2}$ or $x \leq \frac{\sqrt{6}+\sqrt{2}}{2}$				