MATHEMATICS MCQ BOOKLET

Grade 10 · Chapter 4 · Linear and Quadratic Inequalities

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Independent MCQs on linear and quadratic inequalities in one variable, graphing in the plane, systems of inequalities, and absolute value. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a short explanation of why it is correct.

A. Important / Main Topics

1. The trichotomy property for real numbers a and b states that exactly one of these holds:

(A) $a < b$, $a = b$, or $a > b$
(B) $a + b = 0$ always
(C) $ab = 1$ always
(D) a and b are both irrational

Correct Answer: A

Explanation: The trichotomy property for real numbers a and b states that exactly one of these holds $a < b$, $a = b$, or $a > b$.

2. If $a > b$, then adding the same real c to both sides gives:

(A) $a + c < b + c$
(B) $a + c > b + c$
(C) $a + c = b - c$
(D) $ac > bc$ always

Correct Answer: B

Explanation: If $a > b$, then adding the same real c to both sides gives $a + c > b + c$.

3. If $a < b$ and $c > 0$, then ac compared with bc is:

(A) $ac > bc$
(B) $ac = bc$
(C) $ac < bc$
(D) the sign cannot be determined

Correct Answer: C

Explanation: If $a < b$ and $c > 0$, then ac compared with bc is $ac < bc$.

4. If $a < b$ and $c < 0$, then ac compared with bc is:

(A) $ac < bc$
(B) $ac = bc$
(C) $ac = a + c$
(D) $ac > bc$

Correct Answer: D

Explanation: If $a < b$ and $c < 0$, then ac compared with bc is $ac > bc$.

5. Solve $9x + 6 < 8x - 2$:

(A) $x < -8$
(B) $x > -8$
(C) $x < 8$
(D) $x > 8$

Correct Answer: A

Explanation: Subtract 8x and 6 from both sides to get $x < -8$.

6. Solve $6x - 7 \geq 2x + 17$:

(A) $x \leq 6$
(B) $x \geq 6$

(C) x > 6 only
(D) x < 6

Correct Answer: B

Explanation: 4x ≥ 24, so x ≥ 6, so the correct choice is x ≥ 6.

7. Solve 16.2x − 6 ≥ 15x − 9:

(A) x ≤ −2.5
(B) x ≥ 2.5
(C) x ≥ −2.5
(D) x ≤ 2.5

Correct Answer: C

Explanation: 1.2x ≥ −3, so x ≥ −2.5, so the correct choice is x ≥ −2.5.

8. Solve 17 − 3x ≥ 56:

(A) x ≥ −13
(B) x ≥ 13
(C) x ≤ 13
(D) x ≤ −13

Correct Answer: D

Explanation: Solve 17 − 3x ≥ 56 x ≤ −13.

9. Solve −4(2x − 3) < 28:

(A) x > −5
(B) x > 5 after distributing −8x − 12
(C) x < −5
(D) x < 5

Correct Answer: A

Explanation: −8x + 12 < 28 gives −8x < 16, so x > −2; the common error forgets that −4(−3) = +12.

10. On a number line, x < 3 uses:

(A) a filled circle at 3 and a ray to the right
(B) an open circle at 3 and a ray to the left
(C) a filled circle at 3 and a ray to the left
(D) open circles at −3 and 3

Correct Answer: B

Explanation: Strict inequality excludes 3, so the endpoint is open and the ray points left.

11. On a number line, x ≥ −2 uses:

(A) an open circle at −2
(B) a filled circle at −2 with a ray to the left
(C) a filled circle at −2 with a ray to the right
(D) no endpoint mark

Correct Answer: C

Explanation: On a number line, x ≥ −2 uses a filled circle at −2 with a ray to the right.

12. Solve 5x − 12 ≤ 3x − 4:

(A) x ≥ 4
(B) x ≤ −4
(C) x ≥ −4
(D) x ≤ 4

Correct Answer: D

Explanation: 2x ≤ 8, so x ≤ 4, so the correct choice is x ≤ 4.

13. Solve 1 − 8x ≤ −4(2x − 1):

(A) all real x
(B) x ≤ 0 only

(C) x ≥ 0 only
(D) no solution

Correct Answer: A

Explanation: Both sides simplify to 1 − 8x ≤ −8x + 4, which reduces to 1 ≤ 4, true for every x.

14. Solve (−2/3)x − 2 < (1/3)x + 8:

(A) x < −10
(B) x > −10
(C) x > 10
(D) x < 10

Correct Answer: B

Explanation: Solve (−2/3)x − 2 < (1/3)x + 8 x > −10.

15. Solve 8 − (4/5)x > −14 + 2x:

(A) x > 55/7
(B) x < 5
(C) x < 55/7
(D) x > 5

Correct Answer: C

Explanation: Multiply by 5: 40 − 4x > −70 + 10x → 22 > 2.8x, so x < 55/7.

16. Four more than three times x is less than 40 translates to:

(A) 3(x + 4) < 40
(B) 4x + 3 < 40
(C) 3x − 4 < 40
(D) 3x + 4 < 40

Correct Answer: D

Explanation: The phrase means 3x + 4 < 40, whose solution is x < 12.

17. Twice the sum of x and 8 is less than or equal to −2 translates to:

(A) 2(x + 8) ≤ −2
(B) 2x + 8 ≤ −2
(C) $(2x + 8)^2 \leq -2$
(D) 2x + 16 ≤ −2 only if x = 8

Correct Answer: A

Explanation: 2(x + 8) ≤ −2 simplifies to x + 8 ≤ −1, so x ≤ −9.

18. A bag weighs 26.5 lb and the limit is 60 lb. The added weight w satisfies:

(A) 26.5 + w ≥ 60
(B) 26.5 + w ≤ 60, so w ≤ 33.5
(C) w ≤ 26.5
(D) w ≥ 60

Correct Answer: B

Explanation: Total weight must not exceed 60, so w ≤ 33.5 pounds may be added.

19. For a rectangle with height 9 ft and width (x + 2) ft, area > 81 gives:

(A) 9x > 81, so x > 9
(B) x + 2 > 81
(C) 9(x + 2) > 81, so x > 7
(D) x > 81

Correct Answer: C

Explanation: 9(x + 2) > 81 → x + 2 > 9 → x > 7, so the correct choice is 9(x + 2) > 81, so x > 7.

20. For a triangle with base (x + 1) cm and height 8 cm, area ≤ 44 gives:

(A) 8(x + 1) ≤ 44, so x ≤ 4.5
(B) x + 1 ≤ 44

(C) $x \le 44$
(D) $4(x + 1) \le 44$, so $x \le 10$

Correct Answer: D

Explanation: For a triangle with base $(x + 1)$ cm and height 8 cm, area ≤ 44 gives $4(x + 1) \le 44$, so $x \le 10$.

21. Solve $(x + 1)(x - 3) > 0$:

(A) $x < -1$ or $x > 3$
(B) $-1 < x < 3$
(C) $x < -1$ or $0 < x < 3$
(D) $x > -1$ and $x < 3$

Correct Answer: A

Explanation: The product is positive when both factors share sign: $x < -1$ or $x > 3$.

22. Solve $(x - 9)(x + 1) < 0$:

(A) $x < -1$ or $x > 9$
(B) $-1 < x < 9$
(C) $x < 1$ or $x > 9$
(D) $-9 < x < 1$

Correct Answer: B

Explanation: Solve $(x - 9)(x + 1) < 0$ $-1 < x < 9$.

23. Solve $x^2 - x - 90 > 0$:

(A) $-9 < x < 10$
(B) $x < 10$ only
(C) $x < -9$ or $x > 10$
(D) $x > -9$ only

Correct Answer: C

Explanation: $x^2 - x - 90 = (x - 10)(x + 9)$; the parabola opens upward, so it is positive outside the roots.

24. Solve $x^2 + 4x - 21 < 0$:

(A) $x < -7$ or $x > 3$
(B) $-3 < x < 7$
(C) $x < 3$ only
(D) $-7 < x < 3$

Correct Answer: D

Explanation: Solve $x^2 + 4x - 21 < 0$ $-7 < x < 3$.

25. Solve $x^2 + 8x + 16 \ge 0$:

(A) all real x
(B) $x \ge -4$ only
(C) $x \le -4$ only
(D) no solution

Correct Answer: A

Explanation: $x^2 + 8x + 16 = (x + 4)^2 \ge 0$ for every real x.

26. Solve $9x^2 - 6x + 1 \le 0$:

(A) $x \le 1/3$
(B) $x = 1/3$ only
(C) $x \ge 1/3$
(D) all real x

Correct Answer: B

Explanation: $9x^2 - 6x + 1 = (3x - 1)^2 \le 0$ forces $3x - 1 = 0$, so $x = 1/3$.

27. For $(x - 6)(x + 2) > 0$ the solution set is:

(A) $\{x \mid -2 < x < 6\}$
(B) $\{x \mid x \le -2$ or $x \ge 6\}$

(C) {x | x < −2 or x > 6}
(D) {x | x > −2}

Correct Answer: C

Explanation: Test intervals show the product is positive before −2 and after 6.

28. For $x^2 + 6x - 27 \leq 0$ the solution set is:

(A) {x | x ≤ −9 or x ≥ 3}
(B) {x | −3 ≤ x ≤ 9}
(C) {x | x < 3}
(D) {x | −9 ≤ x ≤ 3}

Correct Answer: D

Explanation: (x + 9)(x − 3) ≤ 0 on the closed interval from −9 to 3.

29. The solution of x < 3 for x □ N (natural numbers) is:

(A) {1, 2}
(B) {0, 1, 2}
(C) {1, 2, 3}
(D) {1}

Correct Answer: A

Explanation: Natural numbers here start at 1, so only 1 and 2 are less than 3.

30. Solve x/(−2) < 3 − x:

(A) x > 6
(B) x < 6
(C) x < 2
(D) x > 2

Correct Answer: B

Explanation: Solve x/(−2) < 3 − x x < 6.

31. Solve −5x ≥ −80:

(A) x ≥ 16
(B) x < 16
(C) x ≤ 16
(D) x > 16

Correct Answer: C

Explanation: Solve −5x ≥ −80 x ≤ 16.

32. Which ordered pair satisfies 4x − y ≥ 3?

(A) (0, 0)
(B) (0, −2)
(C) (−1, 2)
(D) (1, 1)

Correct Answer: D

Explanation: (1, 1) — this correctly answers the question.

33. Which ordered pair satisfies x − 3y ≤ 6?

(A) (0, 0)
(B) (6, −1)
(C) (10, 3)
(D) (6, −1) only if reversed

Correct Answer: A

Explanation: (0, 0) gives 0 ≤ 6; (6, −1) gives 9 ≤ 6, which is false.

34. Which ordered pair is NOT a solution of x − 3y ≤ 6?

(A) (0, 0)
(B) (6, −1)

(C) (10, 3)
(D) (−1, 2)

Correct Answer: B

Explanation: 6 − 3(−1) = 9, which is not ≤ 6, so the correct choice is (6, −1).

35. For graphing a linear inequality, the usual test point is:

(A) (1, 1) always
(B) (−1, −1) always
(C) (0, 0)
(D) the y-intercept only

Correct Answer: C

Explanation: If (0, 0) is not on the boundary line, it is the standard convenient test point.

36. For y > 5x − 4 the boundary line is drawn:

(A) solid because > includes equality
(B) as a vertical line
(C) only in quadrant IV
(D) dashed because > excludes equality

Correct Answer: D

Explanation: Strict inequality uses a dashed boundary line.

37. For x + 2y ≤ 0 the boundary line is drawn:

(A) solid
(B) dashed
(C) horizontal only
(D) vertical only

Correct Answer: A

Explanation: ≤ includes points on the line, so the boundary is solid.

38. For y ≥ −2 the boundary is:

(A) a vertical dashed line
(B) a horizontal solid line at y = −2
(C) a dashed line through the origin
(D) the x-axis

Correct Answer: B

Explanation: y = −2 is horizontal; ≥ requires a solid line.

39. Testing (0, 0) in y > 5x − 4 gives:

(A) 0 > −4, false
(B) 0 = −4
(C) 0 > −4, true, so shade the half-plane containing (0, 0)
(D) undefined

Correct Answer: C

Explanation: Since 0 > −4 is true, shade the region that contains the origin.

40. Testing (1, 0) in x + 2y ≤ 0 gives:

(A) 1 ≤ 0, true
(B) 0 ≤ 0 only
(C) undefined
(D) 1 ≤ 0, false, so shade the opposite half-plane

Correct Answer: D

Explanation: 1 + 0 = 1 is not ≤ 0, so shade away from (1, 0).

41. A linear inequality in two variables has solutions that are:

(A) ordered pairs (x, y)
(B) single numbers only

(C) always integers
(D) always positive reals

Correct Answer: A

Explanation: Each solution is an ordered pair making the inequality true.

42. The feasible region for a system of inequalities is:

(A) the union of only one inequality
(B) the intersection of all individual solution regions
(C) always empty
(D) only boundary lines

Correct Answer: B

Explanation: Points must satisfy every inequality simultaneously.

43. Which ordered pair satisfies both $2x - y \leq 5$ and $x + 2y > 2$?

(A) (1, −1)
(B) (2, 0)
(C) (3, 2)
(D) (4, 1)

Correct Answer: C

Explanation: (3, 2) — this correctly answers the question.

44. Point (7, −2) satisfies:

(A) $2x + y < 10$
(B) $x - y < -4$
(C) $-x - y > -3$
(D) $x + 10y < 1$

Correct Answer: D

Explanation: Point (7, −2) satisfies $x + 10y < 1$.

45. The absolute value |x| measures:

(A) the distance of x from 0 on the number line
(B) the square of x only
(C) x divided by 0
(D) the reciprocal of x

Correct Answer: A

Explanation: Absolute value counts units from the origin, always giving a non-negative result.

46. For $x \geq 0$, |x| equals:

(A) −x
(B) x
(C) 1/x
(D) x^2

Correct Answer: B

Explanation: For $x \geq 0$, $|x|$ equals x.

47. For $x < 0$, |x| equals:

(A) x
(B) 0
(C) −x
(D) 1/x

Correct Answer: C

Explanation: The absolute value of a negative number is its opposite.

48. |7| equals:

(A) −7
(B) 0

(C) ±7 as one value
(D) 7

Correct Answer: D

Explanation: Seven units from zero gives 7, so the correct choice is 7.

49. |−11| equals:

(A) 11
(B) −11
(C) 0
(D) −1/11

Correct Answer: A

Explanation: The distance from −11 to 0 is 11, so the correct choice is 11.

50. The absolute value of any real number is:

(A) always negative
(B) always positive or zero
(C) always irrational
(D) undefined at 0

Correct Answer: B

Explanation: $|x| \geq 0$ for every real x, so the correct choice is always positive or zero.

51. Solve $8|x - 3| = 88$:

(A) x = 11 or x = −5
(B) x = 3 only
(C) x = 14 or x = −8
(D) no solution

Correct Answer: C

Explanation: $|x - 3| = 11$ gives $x - 3 = \pm 11$, so x = 14 or −8.

52. Solve $|2x + 9| = 30$:

(A) x = 30 or x = −30
(B) x = 9/2 only
(C) no solution
(D) x = 21/2 or x = −39/2

Correct Answer: D

Explanation: Solve $|2x + 9| = 30$ x = 21/2 or x = −39/2.

53. The equation $|x - 3| = -26$ has:

(A) no real solution
(B) x = 29
(C) x = −23
(D) infinitely many solutions

Correct Answer: A

Explanation: The equation $|x - 3| = -26$ has no real solution.

54. Solve $|9x - 1| \leq 10$:

(A) $x \leq -1$ or $x \geq 11/9$
(B) $-1 \leq x \leq 11/9$
(C) $-10 \leq x \leq 10$
(D) x = 1 only

Correct Answer: B

Explanation: Solve $|9x - 1| \leq 10$ $-1 \leq x \leq 11/9$.

55. Solve $|2x - 7| < 1$:

(A) x < 3 or x > 4
(B) −3 < x < 4

(C) 3 < x < 4
(D) x = 7/2 only

Correct Answer: C

Explanation: Solve |2x − 7| < 1 3 < x < 4.

56. Solve 5|½x + 3| > 5:

(A) x < −4 or x > −8
(B) −8 < x < −4
(C) all real x
(D) x > −4 or x < −8

Correct Answer: D

Explanation: Solve 5|½x + 3| > 5 x > −4 or x < −8.

57. If |x − 638| ≤ 100, then x satisfies:

(A) 538 ≤ x ≤ 738
(B) 638 ≤ x ≤ 738
(C) 538 ≤ x ≤ 638
(D) x ≤ 538 or x ≥ 738

Correct Answer: A

Explanation: If |x − 638| ≤ 100, then x satisfies 538 ≤ x ≤ 738.

58. An essay of 500 words with deviation at most 30 satisfies:

(A) 500 ≤ words ≤ 530
(B) 470 ≤ words ≤ 530
(C) 470 ≤ words ≤ 500
(D) words = 500 only

Correct Answer: B

Explanation: |words − 500| ≤ 30 gives the interval from 470 to 530.

59. The equation |3x − 6| + 7 = 4 has:

(A) x = 1 only
(B) x = −1 only
(C) no solution because |3x − 6| = −3
(D) two solutions

Correct Answer: C

Explanation: Rearranging gives |3x − 6| = −3, impossible for absolute value.

60. Graphing y > 2x uses:

(A) a solid line and shading below
(B) only the origin
(C) a vertical line
(D) a dashed line y = 2x and shading above it

Correct Answer: D

Explanation: Strict > means dashed boundary; test (0,0): 0 > 0 is false, so shade where y > 2x.

61. Graphing y ≤ −5 uses:

(A) a horizontal solid line at y = −5 with shading below
(B) a dashed horizontal line above
(C) a vertical line at x = −5
(D) shading only at the origin

Correct Answer: A

Explanation: ≤ includes the line y = −5, shown solid, with the region below.

62. Graphing x ≤ 6 uses:

(A) a horizontal line at y = 6
(B) a vertical solid line at x = 6 with shading to the left

(C) a dashed vertical line to the right
(D) only points with y ≤ 6

Correct Answer: B

Explanation: x ≤ 6 is a vertical boundary at x = 6 with the left half-plane.

63. For the system 3x + 4y ≥ 12 and 5x + 6y ≤ 30, the solution is:

(A) only the line 3x + 4y = 12
(B) all points with x ≥ 0 only
(C) the overlap of two half-planes
(D) the empty set always

Correct Answer: C

Explanation: Both inequalities must hold, so take their inter.

64. For 8x + 5y ≤ 40 with x ≥ 0, the region lies:

(A) only on the y-axis
(B) entirely above the line
(C) only where y < 0
(D) in the first quadrant below the line 8x + 5y = 40

Correct Answer: D

Explanation: x ≥ 0 restricts to the right half-plane; 8x + 5y ≤ 40 adds the region on or below that line.

65. Solve (2/3)x − 4 ≥ 1:

(A) both A and C describe the same answer
(B) x ≥ 15/2
(C) x ≤ 15/2
(D) x ≥ 7.5

Correct Answer: A

Explanation: (2/3)x ≥ 5 → x ≥ 15/2 = 7.5, so the correct choice is both A and C describe the same answer.

66. Solve 1 − 3x ≤ −14 + 2x:

(A) x ≤ 3
(B) x ≥ 3
(C) x ≥ −3
(D) x ≤ −3

Correct Answer: B

Explanation: 1 + 14 ≤ 5x → 15 ≤ 5x → x ≥ 3, so the correct choice is x ≥ 3.

67. Solve 7(x − 1) > −8 + 7x:

(A) no solution
(B) x > 1 only
(C) all real x
(D) x < 1 only

Correct Answer: C

Explanation: 7x − 7 > 7x − 8 reduces to −7 > −8, which is true for every real x.

68. Solve −3(2x − 1) ≥ 1 − 8x:

(A) x ≤ −1
(B) x ≥ 1
(C) all real x
(D) x ≥ −1

Correct Answer: D

Explanation: −6x + 3 ≥ 1 − 8x → 2x ≥ −2 → x ≥ −1, so the correct choice is x ≥ −1.

69. If 2 < 5, then 1/2 compared with 1/5 is:

(A) 1/2 > 1/5
(B) 1/2 < 1/5

(C) 1/2 = 1/5
(D) undefined

Correct Answer: A

Explanation: If 2 < 5, then 1/2 compared with 1/5 is 1/2 > 1/5.

70. A hollow circle on a number-line graph means:

(A) the endpoint is included
(B) the endpoint is not included
(C) x = 0
(D) no solution exists

Correct Answer: B

Explanation: Open circle marks strict inequality at that boundary value.

71. A filled circle on a number-line graph means:

(A) the endpoint is excluded
(B) x is irrational
(C) the endpoint is included
(D) the solution is empty

Correct Answer: C

Explanation: Closed circle shows ≤ or ≥ at that value.

72. For ax + by < c the boundary line ax + by = c is drawn:

(A) solid
(B) as a number line only
(C) with arrows on both ends only
(D) dashed

Correct Answer: D

Explanation: < excludes boundary points, so the line is dashed.

73. For ax + by ≥ c the boundary line is:

(A) solid
(B) dashed
(C) vertical always
(D) absent

Correct Answer: A

Explanation: ≥ includes points on the line, shown with a solid boundary.

74. The solution of $2x^2 + 3x + 1 \leq 0$ is:

(A) $x \leq -1$ or $x \geq -1/2$
(B) $-1 \leq x \leq -1/2$
(C) all real x
(D) no real solution

Correct Answer: B

Explanation: The solution of $2x^2 + 3x + 1 \leq 0$ is $-1 \leq x \leq -1/2$.

75. Checking −2, −1, 0, 1, 2 in $2x^2 + 3x + 1 \leq 0$ shows solutions are:

(A) all five values
(B) none of them
(C) −1 and −1/2 only; integers −1 works, others fail
(D) only 0 and 1

Correct Answer: C

Explanation: Only x = −1 gives 0 ≤ 0 among the listed integers; −1/2 is not listed.

76. If a < b and both are negative, then 1/a compared with 1/b (for a, b ≠ 0) follows:

(A) 1/a < 1/b
(B) 1/a = 1/b

(C) reciprocals cannot be compared
(D) reciprocal reversal: 1/a > 1/b

Correct Answer: D

Explanation: If a < b and both are negative, then 1/a compared with 1/b (for a, b ≠ 0) follows reciprocal reversal: 1/a > 1/b.

77. The inequality 26.5 + w ≤ 60 models:

(A) maximum added weight before exceeding a limit
(B) minimum weight only
(C) equality of two bags
(D) quadratic weight

Correct Answer: A

Explanation: Total weight must stay at or below 60 pounds.

78. When graphing (x − 3)(x + 9) ≤ 0, included endpoints are:

(A) x = −3 and x = 9
(B) x = −9 and x = 3
(C) no endpoints
(D) x = 0 only

Correct Answer: B

Explanation: When graphing (x − 3)(x + 9) ≤ 0, included endpoints are x = −9 and x = 3.

79. Shading above a horizontal line y = k corresponds to:

(A) x > k
(B) y < k always
(C) y > k or y ≥ k depending on the symbol
(D) x < k always

Correct Answer: C

Explanation: Shading above a horizontal line y = k corresponds to y > k or y ≥ k depending on the symbol.

80. For y < 3x the test point (0, 0) gives:

(A) 0 < 0, true
(B) undefined
(C) always true
(D) 0 < 0, false, so shade the region not containing (0, 0)

Correct Answer: D

Explanation: Since 0 < 0 fails, shade the side away from the origin for this strict inequality.

B. Less Important / Secondary Topics

81. Thomas Harriot introduced the symbols < and > around:

(A) 1630
(B) 628 AD
(C) 1202
(D) 1525

Correct Answer: A

Explanation: Harriot's inequality notation dates from about 1630.

82. René Descartes popularised using letters for unknowns in:

(A) 628 AD
(B) 1637
(C) 820 AD
(D) 1202

Correct Answer: B

Explanation: René Descartes popularised using letters for unknowns in 1637.

83. Al-Khwarizmi's book on algebra was written in:

(A) 1637
(B) 628 AD
(C) 820 AD
(D) 1202

Correct Answer: C

Explanation: Al-Khwarizmi's book on algebra was written in 820 AD.

84. A linear inequality in one variable has solutions that are:

(A) ordered pairs in the plane
(B) matrices only
(C) complex numbers only
(D) intervals on the number line

Correct Answer: D

Explanation: A linear inequality in one variable has solutions that are intervals on the number line.

85. A quadratic inequality is often solved by:

(A) finding zeros and testing intervals
(B) adding 1 to both sides only
(C) squaring both sides always
(D) ignoring the sign chart

Correct Answer: A

Explanation: Critical points from factoring split the line into test intervals.

86. The word trichotomy means:

(A) two equal parts
(B) exactly three possibilities
(C) no solution
(D) four quadrants

Correct Answer: B

Explanation: The word trichotomy means exactly three possibilities.

87. STEAM connections in inequalities include:

(A) only ancient history
(B) only geometry proofs
(C) budget limits and measurement tolerances
(D) Roman numerals

Correct Answer: C

Explanation: Real constraints such as weight limits appear in applied problems.

88. When a test point lies on the boundary line, one should:

(A) shade both half-planes
(B) declare no solution
(C) use only x = 1
(D) choose a different test point

Correct Answer: D

Explanation: Points on the boundary are excluded for strict inequalities and need another test.

89. Absolute deviation at most d from m means:

(A) $|x - m| \le d$
(B) $|x| = d$ only
(C) $x - m > d$
(D) $x + m \le d$

Correct Answer: A

Explanation: Absolute value bounds the distance from the mean.

90. A basketball inflated to 8 psi with small tolerance uses:

(A) only quadratic formula
(B) absolute value to bound acceptable pressure
(C) only complex numbers
(D) no inequality

Correct Answer: B

Explanation: A basketball inflated to 8 psi with small tolerance uses absolute value to bound acceptable pressure.

91. Feasible region shading for y > mx + c lies:

(A) below the solid line always
(B) only at the origin
(C) above the dashed line y = mx + c
(D) on the y-axis only

Correct Answer: C

Explanation: Greater y means points above the boundary for a sloped line.

92. For y < mx + c the boundary is:

(A) solid
(B) vertical
(C) absent
(D) dashed

Correct Answer: D

Explanation: Strict < excludes the boundary, so the line is dashed.

93. The intersection of inequality solution sets gives:

(A) points satisfying every condition
(B) only one inequality
(C) the union always
(D) no region

Correct Answer: A

Explanation: The intersection of inequality solution sets gives points satisfying every condition.

94. An open interval on the number line uses:

(A) brackets on both ends always
(B) parentheses in interval notation
(C) only braces
(D) only absolute value

Correct Answer: B

Explanation: An open interval on the number line uses parentheses in interval notation.

95. A closed interval [a, b] includes:

(A) neither endpoint
(B) only a
(C) both endpoints a and b
(D) only b

Correct Answer: C

Explanation: A closed interval [a, b] includes both endpoints a and b.

96. If multiplying an inequality by zero, the result is:

(A) x = 0 always
(B) x > 0
(C) undefined always
(D) 0 = 0, giving no information about x

Correct Answer: D

Explanation: If multiplying an inequality by zero, the result is 0 = 0, giving no information about x.

97. The graph of |x| on the number line from −6 to 6 shows:

(A) distance 6 from 0 at both 6 and −6
(B) distance 0 at 6
(C) only positive labels
(D) no symmetry

Correct Answer: A

Explanation: Both 6 and −6 are six units from the origin.

98. Piecewise definition of |x| uses:

(A) x for all x
(B) x for x ≥ 0 and −x for x < 0
(C) −x for all x
(D) 1/x for x ≠ 0

Correct Answer: B

Explanation: That split matches distance from zero, so the correct choice is x for x ≥ 0 and −x for x < 0.

99. A stopping-distance model $d(x) = 0.05x^2 + 0.2x \le 35$ involves:

(A) only linear equations
(B) absolute value only
(C) a quadratic inequality in speed x
(D) no inequality

Correct Answer: C

Explanation: Speed must keep the quadratic expression at most 35.

100. A garden with perimeter at most 68 ft and area at least 240 ft² leads to:

(A) only one linear equation
(B) no variables
(C) only absolute value
(D) a system of inequalities in length and width

Correct Answer: D

Explanation: Perimeter and area constraints combine as inequalities.

101. Graphing y ≥ −5 shades:

(A) the half-plane on and above y = −5
(B) only the line y = −5
(C) below y = −5
(D) the vertical line x = −5

Correct Answer: A

Explanation: Graphing y ≥ −5 shades the half-plane on and above y = −5.

102. Graphing y < 3x uses:

(A) a solid horizontal line
(B) a dashed line through the origin with slope 3
(C) a circle
(D) only quadrant II

Correct Answer: B

Explanation: y = 3x is the dashed boundary for strict inequality.

103. For x ≤ 6 on the coordinate plane the region is:

(A) above y = 6
(B) below the x-axis only
(C) to the left of the vertical line x = 6
(D) only at x = 0

Correct Answer: C

Explanation: For x ≤ 6 on the coordinate plane the region is to the left of the vertical line x = 6.

104. The system $y - x \geq 1$ and $y - 4 \leq 4$ simplifies to:

(A) $y \leq x + 1$ only
(B) $x \geq 8$
(C) no variables
(D) $y \geq x + 1$ and $y \leq 8$

Correct Answer: D

Explanation: The system $y - x \geq 1$ and $y - 4 \leq 4$ simplifies to $y \geq x + 1$ and $y \leq 8$.

105. Writing inequalities for a shaded rectangle uses:

(A) bounds on x and y separately
(B) only one variable
(C) absolute value only
(D) no inequalities

Correct Answer: A

Explanation: Writing inequalities for a shaded rectangle uses bounds on x and y separately.

106. A triangle feasible region from three vertices requires:

(A) exactly one equation
(B) three or more linear inequalities
(C) no graph
(D) only quadratic terms

Correct Answer: B

Explanation: A triangle feasible region from three vertices requires three or more linear inequalities.

107. Harriot's work on inequalities belongs to:

(A) Babylonian base 60
(B) Mayan base 20
(C) 17th-century algebra
(D) Roman numerals

Correct Answer: C

Explanation: His notation is part of early modern symbolic algebra.

108. When checking a rational inequality solution, one must also:

(A) ignore denominators
(B) square every term
(C) use only integers
(D) verify domain restrictions if fractions appear

Correct Answer: D

Explanation: Excluded values can affect whether a candidate satisfies the original statement.