MATHEMATICS MCQ BOOKLET

Grade 9 · Chapter 7 · Coordinate Geometry

FBISE / National Book Foundation Model Textbook companion

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Independent MCQs on the Cartesian plane, distance, collinearity, and the midpoint formula. 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. On a number line, the distance between points with coordinates a and b is:

(A) |b − a|
(B) b − a without absolute value
(C) a + b
(D) ab

Correct Answer: A

Explanation: Absolute value makes the distance non-negative, so the order of subtraction does not matter.

2. Distance on a number line is never:

(A) zero when the points coincide
(B) negative
(C) equal to |a − b|
(D) symmetric in the two points

Correct Answer: B

Explanation: Length is defined with absolute value, so d(A, B) ≥ 0 always.

3. For points A and B on a line, d(A, B) compared with d(B, A) is:

(A) always larger
(B) always smaller
(C) equal
(D) undefined

Correct Answer: C

Explanation: Distance is symmetric: |b − a| = |a − b|.

4. The distance between −5 and 3 on a number line is:

(A) 2
(B) −8
(C) 15
(D) 8

Correct Answer: D

Explanation: The distance between −5 and 3 on a number line is 8.

5. If A is at −8 and B is at −2, then AB equals:

(A) 6
(B) 10
(C) −6
(D) 16

Correct Answer: A

Explanation: If A is at −8 and B is at −2, then AB equals 6.

6. An ordered pair (x, y) names a point in the:

(A) number line only
(B) Cartesian plane
(C) complex plane only
(D) set of integers only

Correct Answer: B

Explanation: The first number is the x-coordinate (abscissa) and the second is the y-coordinate (ordinate).

7. The point (0, 0) is called the:

(A) x-intercept only
(B) quadrant II
(C) origin
(D) unit length

Correct Answer: C

Explanation: The axes meet at the origin, which is the reference for all coordinates.

8. A point with x = 0 and y ≠ 0 lies on the:

(A) x-axis
(B) line y = x
(C) origin only
(D) y-axis

Correct Answer: D

Explanation: A point with x = 0 and y ≠ 0 lies on the y-axis.

9. A point with y = 0 and x ≠ 0 lies on the:

(A) x-axis
(B) y-axis
(C) line x = y
(D) origin only

Correct Answer: A

Explanation: The x-axis consists of points whose ordinate is 0.

10. The point (−3, 5) lies in quadrant:

(A) I
(B) II
(C) III
(D) IV

Correct Answer: B

Explanation: The point (−3, 5) lies in quadrant II.

11. The point (4, −2) lies in quadrant:

(A) I
(B) II
(C) IV
(D) III

Correct Answer: C

Explanation: The point (4, −2) lies in quadrant IV.

12. The point (−1, −6) lies in quadrant:

(A) I
(B) II
(C) IV
(D) III

Correct Answer: D

Explanation: Both coordinates are negative in quadrant III.

13. In general (x, y) equals (y, x) if and only if:

(A) x = y
(B) xy = 1
(C) x = −y
(D) x + y = 0

Correct Answer: A

Explanation: Order matters in an ordered pair, so the pairs coincide only when the two numbers are the same.

14. The distance between P1(x1, y1) and P2(x2, y2) is:

(A) $|x2 - x1| + |y2 - y1|$
(B) $\sqrt{[(x2 - x1)^2 + (y2 - y1)^2]}$
(C) $(x2 - x1) + (y2 - y1)$
(D) $|x2y2 - x1y1|$

Correct Answer: B

Explanation: The formula is Pythagoras on the horizontal and vertical legs of the right triangle they determine.

15. In the distance formula, swapping the two points:

(A) changes the sign of the distance
(B) doubles the distance
(C) leaves the distance unchanged
(D) makes the distance undefined

Correct Answer: C

Explanation: Squaring means $(x2 - x1)^2 = (x1 - x2)^2$, so order of the points does not matter.

16. The distance formula comes from applying Pythagoras in a triangle whose legs are:

(A) the two radii of a circle
(B) the intercepts only
(C) the midpoints only
(D) $|x2 - x1|$ and $|y2 - y1|$

Correct Answer: D

Explanation: Drop a horizontal and a vertical segment to form a right triangle with those legs.

17. Distance between (0, 0) and (6, 8) is:

(A) 10
(B) 14
(C) 48
(D) 7

Correct Answer: A

Explanation: Distance between (0, 0) and (6, 8) is 10.

18. Distance between (−2, 3) and (4, −5) is:

(A) 8
(B) 10
(C) 14
(D) 6

Correct Answer: B

Explanation: $\Delta x = 6$ and $\Delta y = -8$, so $\sqrt{(36 + 64)} = 10$.

19. Distance between (1, −1) and (1, 8) is:

(A) 7
(B) $\sqrt{65}$
(C) 9
(D) 0

Correct Answer: C

Explanation: The x-coordinates match, so the distance is $|8 - (-1)| = 9$.

20. Distance between (−4, 2) and (5, 2) is:

(A) 7
(B) $\sqrt{85}$
(C) 3
(D) 9

Correct Answer: D

Explanation: The y-coordinates match, so the distance is $|5 - (-4)| = 9$.

21. Distance between (0, −5) and (−12, 0) is:

(A) 13
(B) 7
(C) 17
(D) 60

Correct Answer: A

Explanation: Distance between (0, −5) and (−12, 0) is 13.

22. Distance between (2, 7) and (5, 11) is:

(A) 6
(B) 5
(C) 7
(D) 25

Correct Answer: B

Explanation: Distance between (2, 7) and (5, 11) is 5.

23. If A(−1, 2) and B(3, 5), then AB^2 equals:

(A) 7
(B) 5
(C) 25
(D) 16

Correct Answer: C

Explanation: $\Delta x = 4$ and $\Delta y = 3$, so $AB^2 = 16 + 9 = 25$ and $AB = 5$.

24. Points that lie on one straight line are called:

(A) concurrent
(B) conjugate
(C) cyclic
(D) collinear

Correct Answer: D

Explanation: Collinear means they share a single line; otherwise they are non-collinear.

25. Three points A, B, C with B between A and C are collinear when:

(A) AC = AB + BC
(B) AB = BC only
(C) AB · BC = AC
(D) $AB^2 + BC^2 = AC^2$ always

Correct Answer: A

Explanation: On a line the longest segment is the sum of the other two.

26. Vertices of a triangle must be:

(A) collinear
(B) non-collinear
(C) on the x-axis
(D) equidistant from the origin

Correct Answer: B

Explanation: Vertices of a triangle must be non-collinear.

27. A(1, 1), B(3, 5) and C(5, 9) are collinear because:

(A) AB = AC
(B) AB · BC = 1
(C) AC = AB + BC
(D) they form a right angle at B

Correct Answer: C

Explanation: AB = $\sqrt{[(2)^2+(4)^2]} = \sqrt{20} = 2\sqrt{5}$, BC = $2\sqrt{5}$, AC = $4\sqrt{5}$, so AC = AB + BC.

28. P(0, 0), Q(2, 1) and R(3, 4) are non-collinear because:

(A) PQ + QR equals PR
(B) all slopes are equal
(C) they lie on y = x
(D) PQ + QR is not equal to PR

Correct Answer: D

Explanation: PQ = $\sqrt{5}$, QR = $\sqrt{10}$, PR = 5, and $\sqrt{5} + \sqrt{10} \neq 5$, so they form a triangle.

29. A(0, 0), B(3, 0) and C(0, 4) form a right triangle because:

(A) $AB^2 + AC^2 = BC^2$
(B) AB = AC
(C) AB + AC = BC
(D) all sides are equal

Correct Answer: A

Explanation: AB = 3, AC = 4, BC = 5, and 9 + 16 = 25, so the right angle is at A.

30. The triangle with vertices (0, 0), (6, 0) and (0, 8) has hypotenuse:

(A) 6
(B) 10
(C) 8
(D) 14

Correct Answer: B

Explanation: It is a 6-8-10 right triangle, a scaled 3-4-5 triangle.

31. Vertices (0, 0), (4, 0) and (2, $2\sqrt{3}$) form an:

(A) isosceles right triangle
(B) obtuse scalene triangle
(C) equilateral triangle
(D) rectangle

Correct Answer: C

Explanation: Each side is 4, because the height of an equilateral triangle of side 4 is $2\sqrt{3}$.

32. Vertices (0, 0), (6, 0) and (3, 4) form an isosceles triangle because:

(A) all three sides equal 6
(B) it has a right angle at (3, 4)
(C) the base angles are 90°
(D) two sides equal $\sqrt{(9 + 16)} = 5$

Correct Answer: D

Explanation: The two equal sides from (3, 4) to the base ends are each 5, while the base is 6.

33. A scalene triangle has:

(A) three sides of different lengths
(B) all sides equal
(C) two sides equal
(D) a right angle always

Correct Answer: A

Explanation: Scalene means no two sides are equal.

34. Perimeter of triangle (0, 0), (3, 0), (0, 4) is:

(A) 7
(B) 12
(C) 5
(D) 24

Correct Answer: B

Explanation: Perimeter of triangle (0, 0), (3, 0), (0, 4) is 12.

35. If AB = 5, BC = 12 and AC = 13, triangle ABC is:

(A) equilateral
(B) impossible
(C) right-angled
(D) isosceles only

Correct Answer: C

Explanation: $5^2 + 12^2 = 25 + 144 = 169 = 13^2$, so Pythagoras holds.

36. A rectangle on the plane has opposite sides equal and:

(A) diagonals of different lengths
(B) all sides equal always
(C) no right angles
(D) equal diagonals that bisect each other

Correct Answer: D

Explanation: Distance between opposite corners is the same, and the shared midpoint is the centre.

37. Vertices (0, 0), (5, 0), (5, 3), (0, 3) form a rectangle because:

(A) adjacent sides 5 and 3 are perpendicular and opposite sides match
(B) all sides equal 5
(C) diagonals are unequal
(D) one angle is 60°

Correct Answer: A

Explanation: Horizontal and vertical sides meet at right angles, and opposite sides are equal.

38. Diagonals of that rectangle (0, 0), (5, 0), (5, 3), (0, 3) each have length:

(A) 4
(B) $\sqrt{34}$
(C) 8
(D) 15

Correct Answer: B

Explanation: $\sqrt{(5^2 + 3^2)} = \sqrt{34}$ for both AC and BD.

39. A square has equal sides and equal diagonals; (0, 0), (2, 0), (2, 2), (0, 2) has diagonal:

(A) 2
(B) 4
(C) $2\sqrt{2}$
(D) $\sqrt{2}$

Correct Answer: C

Explanation: A square has equal sides and equal diagonals; (0, 0), (2, 0), (2, 2), (0, 2) has diagonal $2\sqrt{2}$.

40. Diagonals of a parallelogram:

(A) are always equal
(B) are always perpendicular
(C) never meet
(D) bisect each other

Correct Answer: D

Explanation: Each diagonal's midpoint is the same point, which is the centre of the parallelogram.

41. For A(0, 0), B(4, 0), C(5, 2), D(1, 2), midpoint of AC is:

(A) (2.5, 1)
(B) (4, 2)
(C) (5, 0)
(D) (1, 2)

Correct Answer: A

Explanation: ((0 + 5)/2, (0 + 2)/2) = (2.5, 1), which is also the midpoint of BD.

42. The mid-point of A(x1, y1) and B(x2, y2) is:

(A) (x1 − x2, y1 − y2)
(B) ((x1 + x2)/2, (y1 + y2)/2)
(C) (x1x2, y1y2)
(D) (|x1 − x2|, |y1 − y2|)

Correct Answer: B

Explanation: Each coordinate of the midpoint is the average of the corresponding end coordinates.

43. Midpoint of (2, 8) and (6, 2) is:

(A) (8, 10)
(B) (4, 6)
(C) (4, 5)
(D) (2, 3)

Correct Answer: C

Explanation: Midpoint of (2, 8) and (6, 2) is (4, 5).

44. Midpoint of (−4, 7) and (2, −1) is:

(A) (−1, 4)
(B) (3, 3)
(C) (−2, 8)
(D) (−1, 3)

Correct Answer: D

Explanation: Midpoint of (−4, 7) and (2, −1) is (−1, 3).

45. Midpoint of (0, −6) and (10, 4) is:

(A) (5, −1)
(B) (10, −2)
(C) (5, 5)
(D) (0, 4)

Correct Answer: A

Explanation: Midpoint of (0, −6) and (10, 4) is (5, −1).

46. If (3, 1) is the midpoint of (a, 5) and (7, b), then a equals:

(A) 10
(B) −1
(C) 4
(D) 3

Correct Answer: B

Explanation: If (3, 1) is the midpoint of (a, 5) and (7, b), then a equals −1.

47. If (3, 1) is the midpoint of (a, 5) and (7, b), then b equals:

(A) 6
(B) 4
(C) −3
(D) 1

Correct Answer: C

Explanation: If (3, 1) is the midpoint of (a, 5) and (7, b), then b equals −3.

48. The centre of a circle with diameter ends (1, 2) and (7, 8) is:

(A) (8, 10)
(B) (6, 6)
(C) (1, 8)
(D) (4, 5)

Correct Answer: D

Explanation: The centre is the midpoint of the diameter: ((1 + 7)/2, (2 + 8)/2) = (4, 5).

49. Radius of the circle with diameter ends (1, 2) and (7, 8) is:

(A) $3\sqrt{2}$
(B) 6
(C) $\sqrt{72}$
(D) 10

Correct Answer: A

Explanation: Half of $\sqrt{[(6)^2 + (6)^2]}$ = half of $6\sqrt{2}$, which is $3\sqrt{2}$.

50. If M is the midpoint of LN, the ratio LN : MN is:

(A) 1 : 1
(B) 2 : 1
(C) 1 : 2
(D) 3 : 1

Correct Answer: B

Explanation: M halves LN, so the whole segment is twice MN.

51. The segment joining midpoints of two sides of a triangle is:

(A) equal to the third side
(B) twice the third side
(C) half the third side and parallel to it
(D) perpendicular to the third side always

Correct Answer: C

Explanation: That is the mid-segment (midpoint) theorem in the plane.

52. In □XYZ with X(0, 0), Y(8, 0), Z(4, 6), midpoint L of XY is:

(A) (8, 6)
(B) (2, 3)
(C) (4, 6)
(D) (4, 0)

Correct Answer: D

Explanation: In □XYZ with X(0, 0), Y(8, 0), Z(4, 6), midpoint L of XY is (4, 0).

53. In that same triangle, midpoint M of XZ is:

(A) (2, 3)
(B) (4, 6)
(C) (8, 0)
(D) (4, 0)

Correct Answer: A

Explanation: In that same triangle, midpoint M of XZ is (2, 3).

54. Then LM compared with YZ is:

(A) LM = YZ
(B) LM = YZ / 2
(C) LM = 2 YZ
(D) LM = YZ / 4

Correct Answer: B

Explanation: Then LM compared with YZ is LM = YZ / 2.

55. A lamp post equally far from two houses A and B should stand on the:

(A) x-axis always
(B) circle through A only
(C) perpendicular bisector of AB
(D) origin

Correct Answer: C

Explanation: Every point equidistant from A and B lies on the perpendicular bisector of the segment joining them.

56. If P(x, y) is equidistant from (2, 0) and (8, 0), then x equals:

(A) 2
(B) 8
(C) 10
(D) 5

Correct Answer: D

Explanation: The perpendicular bisector of those points on the x-axis is the line x = 5.

57. A point 4 units from both axes in quadrant I is:

(A) (4, 4)
(B) (−4, 4)
(C) (4, −4)
(D) (−4, −4)

Correct Answer: A

Explanation: Equal positive distances from both axes give (4, 4).

58. A point 3 units from both axes in quadrant III is:

(A) (3, 3)
(B) (−3, −3)
(C) (3, −3)
(D) (−3, 3)

Correct Answer: B

Explanation: Both coordinates must be negative in quadrant III.

59. Distance from (3, 5) to the x-axis is:

(A) 3
(B) √34
(C) 5
(D) 8

Correct Answer: C

Explanation: Vertical distance to y = 0 is |5| = 5.

60. Distance from (3, 5) to the y-axis is:

(A) 5
(B) √34
(C) 0
(D) 3

Correct Answer: D

Explanation: Horizontal distance to x = 0 is |3| = 3, which is smaller than the distance to the x-axis.

61. Distance from (3, 5) to the origin is:

(A) √34
(B) 8
(C) 4
(D) 15

Correct Answer: A

Explanation: Distance from (3, 5) to the origin is √34.

62. If P is equally far from (0, 0) and (6, 0), then P lies on:

(A) x = 0
(B) x = 3
(C) y = 3
(D) x + y = 6

Correct Answer: B

Explanation: The perpendicular bisector of the segment from (0, 0) to (6, 0) is the vertical line x = 3.

63. Length of a vertical segment from (2, −3) to (2, 9) is:

(A) 6
(B) 11
(C) 12
(D) √13

Correct Answer: C

Explanation: Length of a vertical segment from (2, −3) to (2, 9) is 12.

64. If A(c, 0) and B(0, 0) are 7 units apart, then c is:

(A) 0 only
(B) 49
(C) √7
(D) 7 or −7

Correct Answer: D

Explanation: If A(c, 0) and B(0, 0) are 7 units apart, then c is 7 or −7.

65. For A(k, 6) and O(0, 0) with AO = 10, a possible value of k is:

(A) 8
(B) 4
(C) 6
(D) 10

Correct Answer: A

Explanation: For A(k, 6) and O(0, 0) with AO = 10, a possible value of k is 8.

66. The abscissa of a point on the y-axis is:

(A) 1
(B) 0
(C) equal to its ordinate
(D) undefined

Correct Answer: B

Explanation: Every y-axis point is written (0, y).

67. The ordinate of a point on the x-axis is:

(A) x
(B) 1
(C) 0
(D) undefined

Correct Answer: C

Explanation: Every x-axis point is written (x, 0).

68. If (2, 5) = ((a + 1)/2, b − 1), then a equals:

(A) 2
(B) 5
(C) 4
(D) 3

Correct Answer: D

Explanation: If (2, 5) = ((a + 1)/2, b − 1), then a equals 3.

69. If (2, 5) = ((a + 1)/2, b − 1), then b equals:

(A) 6
(B) 5
(C) 4
(D) 1

Correct Answer: A

Explanation: If (2, 5) = ((a + 1)/2, b − 1), then b equals 6.

70. Unit length on a coordinate axis is the distance between:

(A) the origin and (2, 0)
(B) consecutive integers on that axis
(C) (1, 1) and (2, 2) only
(D) any two points

Correct Answer: B

Explanation: Consecutive integer marks are one unit apart by definition of the scale.

71. Collinear points (0, 2), (2, 6) and (3, 8) satisfy:

(A) AB = AC
(B) $AB^2 + BC^2 = AC^2$
(C) the largest distance equals the sum of the other two
(D) they form an equilateral triangle

Correct Answer: C

Explanation: Collinear points (0, 2), (2, 6) and (3, 8) satisfy the largest distance equals the sum of the other two.

72. To prove four points form a rhombus you can show:

(A) only one pair of sides equal
(B) only the diagonals equal
(C) they are collinear
(D) all four sides equal (by distance)

Correct Answer: D

Explanation: A rhombus is a quadrilateral with four equal sides; distance checks that.

73. To prove a parallelogram you can show:

(A) both pairs of opposite sides equal, or diagonals sharing a midpoint
(B) one right angle only
(C) all angles 90°
(D) one pair of sides equal

Correct Answer: A

Explanation: Equal opposite sides, or diagonals that bisect each other, characterise a parallelogram.

74. If A(2, 1), B(6, 1), C(6, 4), D(2, 4), then ABCD is a:

(A) rhombus that is not a rectangle
(B) rectangle
(C) kite with no right angle
(D) scalene triangle

Correct Answer: B

Explanation: Sides 4 and 3 are perpendicular, opposite sides match, so it is a rectangle.

75. The same rectangle ABCD has perimeter:

(A) 12
(B) 24
(C) 14
(D) 7

Correct Answer: C

Explanation: The same rectangle ABCD has perimeter 14.

76. If C is the midpoint of A(−2, 3) and B(8, 7), then C is:

(A) (6, 10)
(B) (5, 4)
(C) (3, 10)
(D) (3, 5)

Correct Answer: D

Explanation: If C is the midpoint of A(−2, 3) and B(8, 7), then C is (3, 5).

77. Two starts (0, 6) and (6, 0) are each 6 from the origin. A point C in quadrant I at equal distance from both starts lies on:

(A) y = x
(B) x = 0
(C) y = 6
(D) x + y = 0

Correct Answer: A

Explanation: The perpendicular bisector of (0, 6) and (6, 0) is y = x, so equal distance means C is on y = x.

78. On y = x, a point at distance 6 from (6, 0) in quadrant I is:

(A) (3, 3)
(B) (6, 6)
(C) (0, 0)
(D) (9, 9)

Correct Answer: B

Explanation: Let C = (t, t). Then (t − 6)² + t² = 36 □ 2t² − 12t = 0 □ t(t − 6) = 0. The first-quadrant solution is t = 6, so C(6, 6).

79. If end-points of a diameter are (0, −2) and (8, 4), the centre is:

(A) (8, 2)
(B) (4, 6)
(C) (4, 1)
(D) (0, 4)

Correct Answer: C

Explanation: If end-points of a diameter are (0, −2) and (8, 4), the centre is (4, 1).

80. Hassan at (4, 0) and Ali at (0, 4) are equally far from C(2, 2) because:

(A) C is the origin
(B) C lies on the x-axis
(C) the distance is 8
(D) C is the midpoint of the segment joining the starts, so HC = AC

Correct Answer: D

Explanation: Midpoint of (4, 0) and (0, 4) is (2, 2), so both distances equal √(4 + 4) = 2√2.

B. Less Important / Secondary Topics

81. Coordinate geometry is often linked historically with René Descartes, who is said to have described a fly's path using:

(A) coordinates on a plane
(B) only Roman numerals
(C) only tally marks
(D) sexagesimal hours alone

Correct Answer: A

Explanation: The Cartesian plane lets a point's position be recorded as an ordered pair.

82. The Cartesian plane is named after:

(A) Euclid only
(B) Descartes
(C) Pythagoras only
(D) Al-Khwarizmi only

Correct Answer: B

Explanation: Descartes' coordinate method is the historical source of the name.

83. Line segment AB is commonly denoted:

(A) only AB without a bar
(B) only d(A, B) as the segment itself
(C) overline AB
(D) angle AB

Correct Answer: C

Explanation: The bar marks the geometric segment; AB or d(A, B) is used for its length.

84. Length of segment AB may be written as AB, d(A, B), or:

(A) only □AB
(B) only the origin
(C) the slope of AB always
(D) m overline AB or |AB|

Correct Answer: D

Explanation: Length of segment AB may be written as AB, d(A, B), or m overline AB or |AB|.

85. (x, y) ≠ (y, x) in general because:

(A) order in an ordered pair matters
(B) addition is not commutative
(C) distance is negative
(D) the origin is undefined

Correct Answer: A

Explanation: Abscissa and ordinate play different roles, so swapping them usually moves the point.

86. On a number line the midpoint of coordinates a and b is:

(A) (a/2, b/2)
(B) (a + b)/2
(C) a − b
(D) ab/2

Correct Answer: B

Explanation: In one dimension the midpoint is simply the average of the two numbers.

87. The number line is also called a real line because:

(A) it shows only integers
(B) it cannot show negatives
(C) every real number corresponds to a point on it
(D) distance on it is always 1

Correct Answer: C

Explanation: Each real number is the coordinate of exactly one point of the line.

88. A coordinate of a point on a number line is:

(A) always positive
(B) always an integer
(C) the distance from 1
(D) the real number attached to that point

Correct Answer: D

Explanation: The origin is 0; positives lie one way and negatives the other.

89. If three points are collinear, they:

(A) do not form a triangle
(B) must form a right triangle
(C) must be on the y-axis
(D) have equal x-coordinates always

Correct Answer: A

Explanation: If three points are collinear, they do not form a triangle.

90. Non-collinear points in a plane can be vertices of a:

(A) single line only
(B) triangle or a non-degenerate polygon
(C) point
(D) ray only

Correct Answer: B

Explanation: Non-collinear points in a plane can be vertices of a triangle or a non-degenerate polygon.

91. The distance formula still works if one point is the origin (0, 0); then OP equals:

(A) x + y
(B) xy
(C) $\sqrt{(x^2 + y^2)}$
(D) |x − y|

Correct Answer: C

Explanation: That is the polar radius of P(x, y).

92. For a horizontal segment, the distance formula reduces to:

(A) |y2 − y1|
(B) $\sqrt{(x^2 + y^2)}$ with both changing
(C) 0 always
(D) |x2 − x1|

Correct Answer: D

Explanation: For a horizontal segment, the distance formula reduces to |x2 − x1|.

93. For a vertical segment, the distance formula reduces to:

(A) |y2 − y1|
(B) |x2 − x1|
(C) x2y2
(D) the midpoint

Correct Answer: A

Explanation: For a vertical segment, the distance formula reduces to |y2 − y1|.

94. All perpendicular bisectors of a given segment pass through:

(A) the origin always
(B) the midpoint of that segment
(C) both axes always
(D) quadrant I only

Correct Answer: B

Explanation: All perpendicular bisectors of a given segment pass through the midpoint of that segment.

95. If four vertices of a kite have diagonals AC and BD that cross at right angles at M, then M is:

(A) always the origin
(B) outside the kite
(C) the intersection (and often midpoint of one diagonal)
(D) a vertex

Correct Answer: C

Explanation: Kite diagonals are perpendicular; one of them is bisected at the crossing.

96. A useful check that (3, 4) is 5 from the origin is:

(A) 3 + 4 = 5
(B) 3 × 4 = 5
(C) 5 − 4 = 3 only as coincidence
(D) $3^2 + 4^2 = 5^2$

Correct Answer: D

Explanation: The 3-4-5 relation is Pythagoras, which is the distance formula at the origin.

97. Plotting Islamabad on a map uses geographic coordinates, which are analogous to:

(A) an ordered pair locating a point on a plane
(B) only integers on a line
(C) a single real number
(D) a slope

Correct Answer: A

Explanation: Latitude and longitude play the same locating role as (x, y).

98. If A, B, C are collinear with B between A and C, then d(A, C) − d(B, C) equals:

(A) d(B, C)
(B) d(A, B)
(C) d(A, C)
(D) 0 always

Correct Answer: B

Explanation: If A, B, C are collinear with B between A and C, then d(A, C) − d(B, C) equals d(A, B).

99. Minimum number of sides of a polygon in the plane is:

(A) 2
(B) 4
(C) 3
(D) 1

Correct Answer: C

Explanation: Minimum number of sides of a polygon in the plane is 3.

100. If x < 0 and y > 0, the point (−x, y) lies in quadrant:

(A) II
(B) III
(C) IV
(D) I

Correct Answer: D

Explanation: −x is positive when x is negative, and y is already positive, so the point is in quadrant I.

101. The point (−4, −(−6)) simplifies to (−4, 6), which is in quadrant:

(A) II
(B) III
(C) I
(D) IV

Correct Answer: A

Explanation: Negative x and positive y is quadrant II.

102. Two ordered pairs (4, 5) and ((t + 2)/2, 5) are equal when t equals:

(A) 4
(B) 6
(C) 8
(D) 2

Correct Answer: B

Explanation: Two ordered pairs (4, 5) and ((t + 2)/2, 5) are equal when t equals 6.

103. Midpoint of (c, −d) and (−d, c) is:

(A) (c − d, c − d)
(B) (c + d, −d + c)
(C) ((c − d)/2, (c − d)/2)
(D) (0, 0) always

Correct Answer: C

Explanation: Midpoint of (c, −d) and (−d, c) is ((c − d)/2, (c − d)/2).

104. If P(1, 4) is midpoint of A(x, 6) and B(−5, y), then (x, y) is:

(A) (−3, 8)
(B) (1, 4)
(C) (−5, 6)
(D) (7, 2)

Correct Answer: D

Explanation: If P(1, 4) is midpoint of A(x, 6) and B(−5, y), then (x, y) is (7, 2).

105. A 5-12-13 right triangle can sit with the right angle at (0, 0) using vertices:

(A) (5, 0), (0, 0), (0, 12)
(B) (5, 12), (0, 0), (13, 0)
(C) (5, 12) only two points
(D) (1, 1), (2, 2), (3, 3)

Correct Answer: A

Explanation: Those two legs are perpendicular axes segments of lengths 5 and 12.

106. Joining the midpoints of all four sides of any quadrilateral produces a:

(A) circle
(B) parallelogram (Varignon)
(C) always a square
(D) always a rhombus only if the original is a kite

Correct Answer: B

Explanation: The Varignon figure of a quadrilateral is always a parallelogram.

107. If A(3, 4), B(−1, 7) and C(x, y) are collinear with B the midpoint of AC, then C is:

(A) (7, 1)
(B) (1, 5.5)
(C) (−5, 10)
(D) (3, 7)

Correct Answer: C

Explanation: If A(3, 4), B(−1, 7) and C(x, y) are collinear with B the midpoint of AC, then C is (−5, 10).

108. Equidistance from two homes to place a lamp is a real-life reading of:

(A) the midpoint or perpendicular bisector in coordinate geometry
(B) factorization
(C) bearing without coordinates
(D) only logarithms

Correct Answer: D

Explanation: Equidistance from two homes to place a lamp is a real-life reading of only logarithms.