Chapter 1:Real Numbers

MCQs:

1. Which of the following is a real number?
a) √-4
b) 5/2
c) 0/1
d) Both (b) and (c)
Answer: d) Both (b) and (c)

2. The set of real numbers includes:
a) Rational numbers
b) Irrational numbers
c) Integers
d) All of the above
Answer: d) All of the above

3. Which of the following numbers is irrational?
a) √16
b) 3.1416
c) 22/7
d) π
Answer: d) π

4. The sum of two rational numbers is always:
a) Rational
b) Irrational
c) Whole number
d) None of these
Answer: a) Rational

5. The product of a rational and an irrational number is:
a) Always rational
b) Always irrational
c) Always an integer
d) None of these
Answer: b) Always irrational

6. The square root of a non-perfect square is:
a) Rational
b) Irrational
c) Integer
d) Whole number
Answer: b) Irrational

7. What is the decimal expansion of an irrational number?
a) Terminating
b) Non-terminating and repeating
c) Non-terminating and non-repeating
d) None of these
Answer: c) Non-terminating and non-repeating

8. The reciprocal of a rational number is always:
a) Rational
b) Irrational
c) Whole number
d) Undefined
Answer: a) Rational

9. The product of two irrational numbers is:
a) Always irrational
b) Always rational
c) Sometimes rational, sometimes irrational
d) None of these
Answer: c) Sometimes rational, sometimes irrational

10. The sum of a rational and an irrational number is:
a) Always rational
b) Always irrational
c) Always an integer
d) None of these
Answer: b) Always irrational

11. √100 is equal to:
a) 10
b) -10
c) ±10
d) None of these

Answer: c) ±10

12. The value of √2 × √8 is:
a) 4
b) 2
c) 8
d) 6
Answer: a) 4

13. The value of √49 + √25 is:
a) 14
b) 12
c) 9
d) 10
Answer: d) 10

14. If $x^2 = 121$, then x is:
a) 11
b) -11
c) ±11
d) 22
Answer: c) ±11

15. The value of 5^0 is:
a) 0
b) 5
c) 1
d) None of these
Answer: c) 1

16. Which of the following is NOT a rational number?
a) 0.5
b) 7/3
c) √2
d) -4
Answer: c) √2

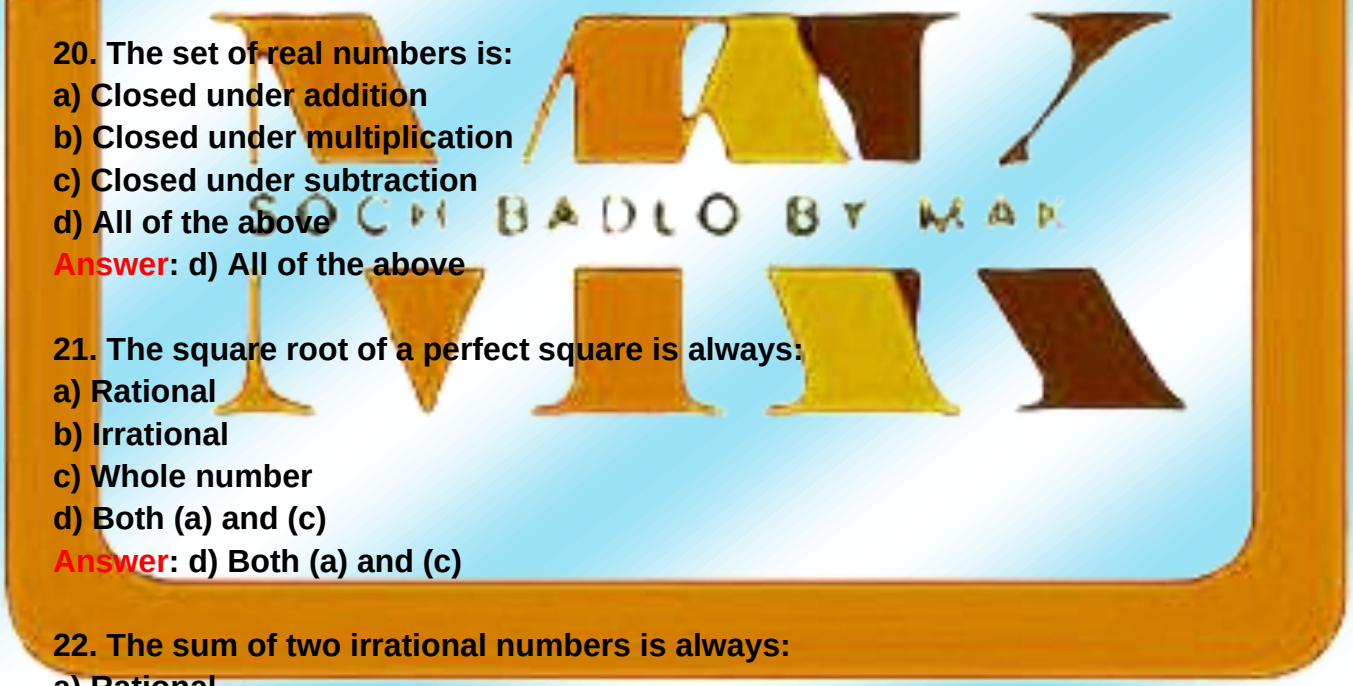
17. The number 0.333... (repeating) is:
a) Rational
b) Irrational

c) Integer
d) None of these
Answer: a) Rational

18. The number √81 is:
a) Rational
b) Irrational
c) Integer
d) Both (a) and (c)
Answer: d) Both (a) and (c)

19. Which of the following is an example of a terminating decimal?
a) 3.14
b) 2/5
c) 1.414213…
d) π
Answer: b) ⅖

20. The set of real numbers is:
a) Closed under addition
b) Closed under multiplication
c) Closed under subtraction
d) All of the above
Answer: d) All of the above



21. The square root of a perfect square is always:
a) Rational
b) Irrational
c) Whole number
d) Both (a) and (c)
Answer: d) Both (a) and (c)

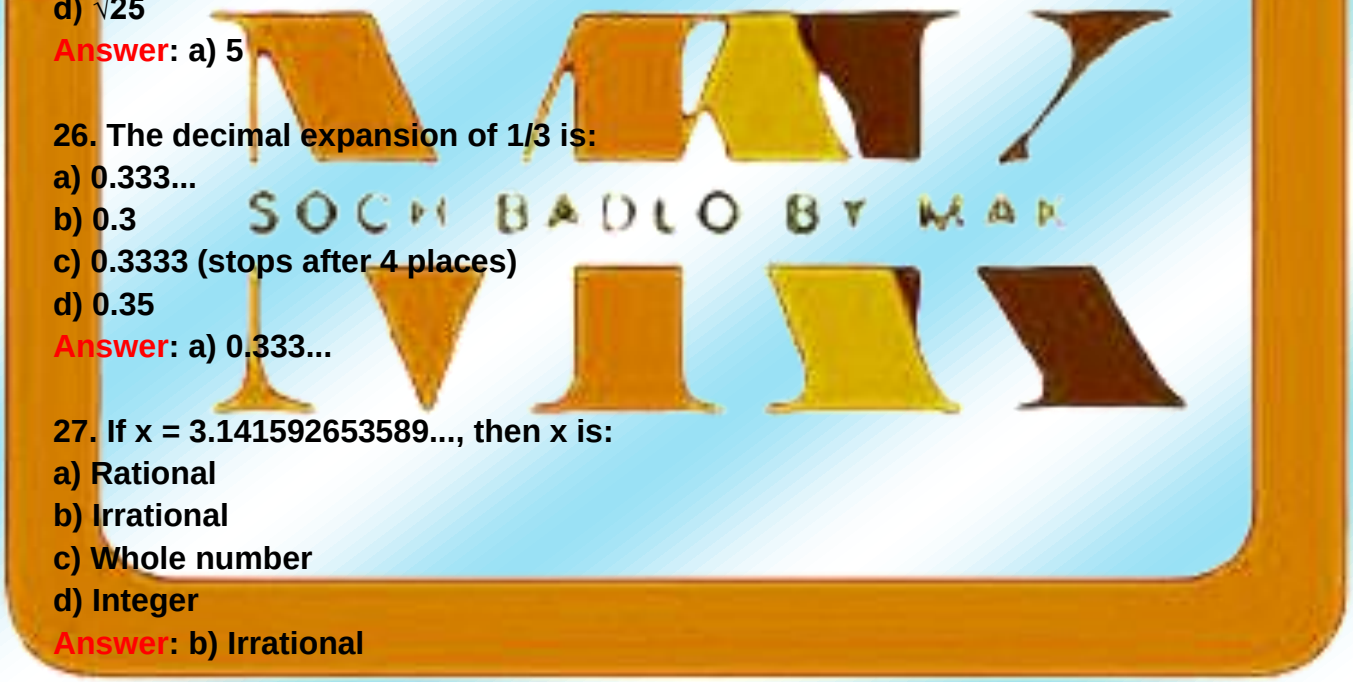
22. The sum of two irrational numbers is always:
a) Rational
b) Irrational
c) Sometimes rational, sometimes irrational
d) None of these
Answer: c) Sometimes rational, sometimes irrational

23. The reciprocal of an irrational number is:

a) Always rational
b) Always irrational
c) Sometimes rational, sometimes irrational
d) None of these
Answer: c) Sometimes rational, sometimes irrational

24. Which of the following is always irrational?
a) $\sqrt{4}$
b) $\pi \times 0$
c) $\sqrt{2} + \sqrt{3}$
d) 0.25
Answer: c) $\sqrt{2} + \sqrt{3}$

25. The product of $\sqrt{5}$ and $\sqrt{5}$ is:
a) 5
b) 10
c) 25
d) $\sqrt{25}$
Answer: a) 5



26. The decimal expansion of 1/3 is:
a) 0.333...
b) 0.3
c) 0.3333 (stops after 4 places)
d) 0.35
Answer: a) 0.333...

27. If x = 3.141592653589..., then x is:
a) Rational
b) Irrational
c) Whole number
d) Integer
Answer: b) Irrational

28. The sum of $\sqrt{2}$ and 2 is:
a) Rational
b) Irrational
c) Integer
d) None of these
Answer: b) Irrational

29. The product of any nonzero rational number with an irrational number is:
a) Always rational
b) Always irrational
c) Sometimes rational, sometimes irrational
d) Zero
Answer: b) Always irrational

30. What is the value of √36?
a) 6
b) -6
c) ±6
d) None of these
Answer: c) ±6

31. What is the value of 2√25?
a) 5
b) 10
c) 25
d) 50
Answer: b) 10

32. The square root of 0 is:
a) 0
b) Undefined
c) 1
d) Not a real number
Answer: a) 0

33. The cube root of 27 is:
a) 3
b) -3
c) ±3
d) 9
Answer: a) 3

34. If a number is squared, its result is always:
a) Positive
b) Negative
c) Zero

d) None of these
Answer: a) Positive

35. The value of $(-1)^2$ is:
a) 1
b) -1
c) 0
d) None of these
Answer: a) 1

36. The cube root of -8 is:
a) -2
b) 2
c) ±2
d) 4
Answer: a) -2

37. The decimal expansion of $\sqrt{3}$ is:
a) Terminating
b) Repeating
c) Non-terminating, non-repeating
d) None of these
Answer: c) Non-terminating, non-repeating

38. The sum of -2 and $\sqrt{4}$ is:
a) 0
b) 2
c) -4
d) 4
Answer: a) 0

39. If $x^2 = 49$, then x is:
a) ±7
b) 7
c) -7
d) 14
Answer: a) ±7

40. The product of two negative real numbers is:
a) Positive

b) Negative
c) Zero
d) Undefined
Answer: a) Positive

41. The sum of $2\sqrt{3}$ and $-\sqrt{3}$ is:
a) $3\sqrt{3}$
b) $-\sqrt{3}$
c) $\sqrt{3}$
d) 0
Answer: c) $\sqrt{3}$

42. The smallest real number is:
a) 0
b) -1
c) $-\infty$
d) No smallest real number exists
Answer: d) No smallest real number exists

43. The decimal expansion of 5/2 is:
a) 2.5
b) 0.5
c) 5.2
d) 2.25
Answer: a) 2.5

44. If x = 4 and y = -2, then x/y is:
a) 2
b) -2
c) 0
d) -4
Answer: b) -2

45. Which of the following is an example of a rational number?
a) 0.666...
b) $\sqrt{5}$
c) π
d) e
Answer: a) 0.666...

46. If x is a nonzero real number, then x^0 is always:
a) 0
b) 1
c) x
d) Undefined
Answer: b) 1

47. The sum of 3 and -3 is:
a) 0
b) -6
c) 6
d) 3
Answer: a) 0

48. Which of the following is NOT a real number?
a) -5
b) 0
c) √-9
d) 4.5
Answer: c) √-9

49. The cube root of 125 is:
a) 5
b) -5
c) 25
d) 0
Answer: a) 5

50. The value of $(-5)^2$ is:
a) 25
b) -25
c) 5
d) -5
Answer: a) 25

51. Which number is not a perfect square?
a) 49
b) 64
c) 81
d) 50

Answer: d) 50

52. If $x > 0$, then $\sqrt{x^2}$ is:
a) x
b) -x
c) ±x
d) 0
Answer: a) x

53. The value of $\sqrt{16} + \sqrt{9}$ is:
a) 5
b) 7
c) 10
d) 25
Answer: c) 10

54. The sum of $\sqrt{2}$ and $\sqrt{2}$ is:
a) $2\sqrt{2}$
b) 4
c) 1
d) $\sqrt{4}$
Answer: a) $2\sqrt{2}$

55. The cube of -3 is:
a) 9
b) -27
c) 27
d) -9
Answer: b) -27

56. If $x = 1$ and $y = -1$, then $x + y$ is:
a) 0
b) -1
c) 1
d) -2
Answer: a) 0

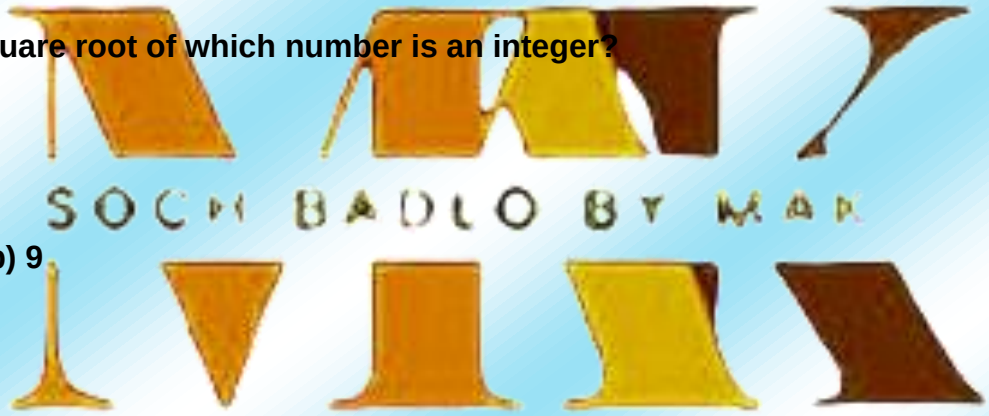
57. The product of any real number with 0 is always:
a) 0
b) The number itself

c) Undefined
d) None of these
Answer: a) 0

58. If $x = 2$, then x^4 is:
a) 8
b) 16
c) 32
d) 4
Answer: b) 16

59. The square of 0.5 is:
a) 0.25
b) 0.5
c) 1
d) 2
Answer: a) 0.25

60.The square root of which number is an integer?
a) 7
b) 9
c) 10
d) 12
Answer: b) 9



Chapter 2: Logarithms

MCQs:

1. What is the value of $\log_a 1$?
a) 0
b) 1
c) a
d) Undefined
Answer: a) 0

2. If $\log_a x = y$, then x = ?
a) a × y
b) a^y
c) y^a
d) a / y
Answer: b) a^y

3. What is $\log_a 0$?
a) 0
b) Undefined
c) 1
d) -1
Answer: b) Undefined

4. Which of the following is a logarithmic function?
a) y = 2^x
b) $y = \log_2 x$
c) $y = x^2$
d) y = x^3
Answer: b) $y = \log_2 x$

5. If $\log_3 81 = x$, then x = ?
a) 2
b) 3
c) 4
d) 5
Answer: c) 4

6. $\log_a (m \times n)$ = ?
a) $\log_a m + \log_a n$

b) $\log_a m - \log_a n$
c) $\log_a m \times \log_a n$
d) $\log_a m / \log_a n$
Answer: a) $\log_a m + \log_a n$

7. $\log_a (m / n) = ?$
a) $\log_a m + \log_a n$
b) $\log_a m - \log_a n$
c) $\log_a m \times \log_a n$
d) $\log_a n - \log_a m$
Answer: b) $\log_a m - \log_a n$

8. $\log_a (m^n) = ?$
a) $n \log_a m$
b) $\log_a m^n$
c) $\log_a n^m$
d) $\log_a m / n$
Answer: a) $n \log_a m$

9. $\log_a a = ?$
a) 1
b) 0
c) a
d) Undefined
Answer: a) 1

10. $\log_a (1/m) = ?$
a) $\log_a m$
b) $-\log_a m$
c) $1 / \log_a m$
d) $m \log_a a$
Answer: b) $-\log_a m$

11. If $\log_5 x = 3$, then $x = ?$
a) 5
b) 25
c) 125
d) 625
Answer: c) 125

12. If $\log_2 (x + 3) = 4$, then x = ?
a) 9
b) 10
c) 11
d) 13
Answer: c) 11

13. If $\log_{10} (5x - 2) = 2$, then x = ?
a) 10
b) 20
c) 100
d) 50
Answer: a) 10

14. If $\log_7 (x - 1) = 2$, then x = ?
a) 48
b) 49
c) 50
d) 51
Answer: b) 49

15. Solve: $\log_8 x = 3/2$
a) 16
b) 32
c) 64
d) 128
Answer: b) 32

16. The graph of $y = \log_a x$ always passes through which point?
a) (0,1)
b) (1,0)
c) (0,0)
d) (1,1)
Answer: b) (1,0)

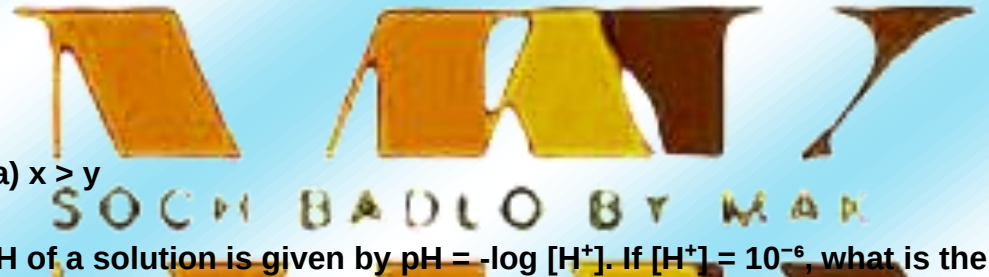
17. The logarithmic function $y = \log_2 x$ is the inverse of which function?
a) y = 2^x
b) $y = x^2$
c) y = e^x
d) y = 10^x

Answer: a) y = 2^x

18. What happens to the graph of $y = \log_a (x - 2)$?
a) Shifts 2 units left
b) Shifts 2 units right
c) Shifts 2 units up
d) Shifts 2 units down
Answer: b) Shifts 2 units right

19. If $\log_a x > \log_a y$ and $a > 1$, then:
a) $x > y$
b) $x < y$
c) $x = y$
d) $x \leq y$
Answer: a) $x > y$

20. If $\log_a x < \log_a y$ and $0 < a < 1$, then:
a) $x > y$
b) $x < y$
c) $x = y$
d) $x \leq y$
Answer: a) $x > y$



21. The pH of a solution is given by $pH = -\log [H^+]$. If $[H^+] = 10^{-6}$, what is the pH?
a) 4
b) 5
c) 6
d) 7
Answer: c) 6

22. The intensity of an earthquake is given by $R = \log_{10} (E / E_0)$. If $E = 10{,}000E_0$, then R = ?
a) 2
b) 3
c) 4
d) 5
Answer: c) 4

23. The population of a bacteria culture grows exponentially. If the population at time t is given by $P = 1000 \times 2^t$, what is $\log_2 P$?

a) $\log_2 1000 + t$
b) $\log_2 1000 - t$
c) $\log_2 1000 \times t$
d) $\log_2 (1000 + t)$
Answer: a) $\log_2 1000 + t$

24. If $\log_3 5 = x$, then $\log_3 25 = ?$
a) x^2
b) 2x
c) 5x
d) x/2
Answer: b) 2x

25. Change of base formula states that $\log_a b = ?$
a) log_b a
b) $\log_{10} b / \log_{10} a$
c) $\log_a b$ / log_b a
d) log_b a / $\log_{10} a$
Answer: b) $\log_{10} b / \log_{10} a$

26. If $\log_3 x = 4$, then $\log_9 x = ?$
a) 2
b) 3
c) 4
d) 8
Answer: a) 2

27. What is $\log_{10} 100000$?
a) 3
b) 4
c) 5
d) 6
Answer: c) 5

28. If $\log_2 a = x$ and $\log_2 b = y$, then $\log_2 (a \times b) = ?$
a) x + y
b) x - y
c) x × y
d) x / y
Answer: a) x + y

29. If $\log_a 2 = 0.301$ and $\log_a 3 = 0.477$, then $\log_a 6$ = ?
a) 0.778
b) 0.901
c) 1.002
d) 1.208
Answer: a) 0.778

30. If $\log_a x = 5$ and $\log_a y = 2$, then $\log_a (x/y)$ = ?
a) 2.5
b) 3
c) 5
d) 7
Answer: b) 3

31. Which transformation occurs when $y = \log_a (x - 3)$?
a) Shift left 3 units
b) Shift right 3 units
c) Shift up 3 units
d) Shift down 3 units
Answer: b) Shift right 3 units

32. The domain of $y = \log_a x$ is:
a) $x > 0$
b) $x < 0$
c) $x \neq 0$
d) $x \in \mathbb{R}$
Answer: a) $x > 0$

33. The range of a logarithmic function $y = \log_a x$ is:
a) $y > 0$
b) $y < 0$
c) $y \in \mathbb{R}$
d) $y \neq 0$
Answer: c) $y \in \mathbb{R}$

34. The logarithmic function $y = \log_a x$ is always:
a) Increasing
b) Decreasing
c) Constant

d) Undefined for x > 0
Answer: a) Increasing

35. The inverse of $y = \log_3 x$ is:
a) $y = x^3$
b) y = 3^x
c) $y = x^2$
d) y = 1/x
Answer: b) y = 3^x

36. If $\log_5 (x + 3) = \log_5 7$, then x = ?
a) 2
b) 3
c) 4
d) 5
Answer: a) 2

37. Solve for x: $\log_4 (x - 1) = 2$
a) 8
b) 16
c) 10
d) 9
Answer: b) 16

38. If $\log_{10} x > \log_{10} 5$, then:
a) x > 5
b) x < 5
c) x = 5
d) x ≤ 5
Answer: a) x > 5

39. If $\log_8 x < \log_8 10$, then:
a) x < 10
b) x > 10
c) x = 10
d) x ≥ 10
Answer: a) x < 10

40. If $\log_3 (x + 4) = \log_3 (2x - 1)$, then x = ?
a) 2

b) 3
c) 4
d) 5
Answer: b) 3

41. What is $\log_2 16$ in binary system?
a) 2
b) 3
c) 4
d) 5
Answer: c) 4

42. In which number system are logarithms commonly used for sound intensity calculations?
a) Binary
b) Decimal
c) Octal
d) Hexadecimal
Answer: b) Decimal

43. The Richter scale measures earthquake intensity using:
a) Linear functions
b) Logarithmic functions
c) Quadratic functions
d) Exponential functions
Answer: b) Logarithmic functions

44. The pH scale is based on:
a) Linear functions
b) Logarithmic functions
c) Quadratic functions
d) Rational functions
Answer: b) Logarithmic functions

45. If a sound has an intensity of 10^6 times the threshold, its decibel level is:
a) 30 dB
b) 40 dB
c) 50 dB
d) 60 dB
Answer: d) 60 dB

46. Logarithms are used in computing for:
a) Encryption algorithms
b) Storing data in RAM
c) Increasing processing speed
d) Power supply management
Answer: a) Encryption algorithms

47. Logarithmic functions help in:
a) Measuring sound intensity
b) Population growth modeling
c) Earthquake magnitude calculation
d) All of the above
Answer: d) All of the above

48. The equation $\log_3 9 = 2$ can be rewritten as:
a) 3^2 = 9
b) 9^3 = 2
c) 2^3 = 9
d) 9^2 = 3
Answer: a) 3^2 = 9

49. If $\log_a b = c$, then $a = ?$
a) c^b
b) b^c
c) b^(1/c)
d) b^(1/a)
Answer: c) b^(1/c)

50. $\log_4 2$ is equal to:
a) 0.5
b) 1
c) 2
d) 3
Answer: a) 0.5

Chapter 3: Sets and Relations

MCQs:

1. A set is a:
a) Collection of well-defined objects
b) Group of numbers only
c) List of elements in order
d) Random collection of things
Answer: a) Collection of well-defined objects

2. Which of the following is a well-defined set?
a) The set of all good students
b) The set of all even prime numbers
c) The set of all beautiful paintings
d) The set of all interesting books
Answer: b) The set of all even prime numbers

3. The symbol ∅ represents:
a) Universal set
b) Power set
c) Empty set
d) Infinite set
Answer: c) Empty set

4. The number of elements in a finite set is called its:
a) Order
b) Cardinality
c) Power
d) Subset
Answer: b) Cardinality

5. The set of natural numbers is denoted by:
a) ℕ
b) ℤ
c) ℚ
d) ℝ
Answer: a) ℕ

6. A set with only one element is called:
a) Singleton set

b) Null set
c) Finite set
d) Infinite set
Answer: a) Singleton set

7. A set containing all possible elements under consideration is called:
a) Power set
b) Universal set
c) Empty set
d) Finite set
Answer: b) Universal set

8. The set of whole numbers is denoted by:
a) $\mathbb{N}$
b) $\mathbb{Z}$
c) $\mathbb{R}$
d) $\mathbb{N}_0$
Answer: d) $\mathbb{N}_0$

9. If A = {a, b, c} and B = {a, b, c, d, e}, then A is:
a) Proper subset of B
b) Superset of B
c) Universal set
d) Null set
Answer: a) Proper subset of B

10. A set with infinitely many elements is called:
a) Finite set
b) Infinite set
c) Singleton set
d) Null set
Answer: b) Infinite set

11. A ∪ B represents:
a) Elements in A and B
b) Elements common in A and B
c) Elements in either A or B or both
d) Elements in A but not in B
Answer: c) Elements in either A or B or both

12. A ∩ B represents:
a) Elements in A only
b) Elements in B only
c) Elements in both A and B
d) Elements in A or B but not both
Answer: c) Elements in both A and B

13. The complement of a set A is denoted by:
a) A'
b) A ∪ B
c) A ∩ B
d) A – B
Answer: a) A'

14. If A = {1, 2, 3} and B = {3, 4, 5}, then A ∩ B is:
a) {1, 2, 3, 4, 5}
b) {3}
c) {1, 2}
d) {4, 5}
Answer: b) {3}

15. If A and B are disjoint sets, then:
a) A ∩ B = ∅
b) A ∪ B = ∅
c) A ∩ B = A
d) A ∩ B = B
Answer: a) A ∩ B = ∅

16. Venn diagrams represent:
a) Numbers only
b) Graphs only
c) Relations between sets
d) Probability values
Answer: c) Relations between sets

17. The region outside all sets in a Venn diagram represents:
a) Universal set
b) Empty set
c) Finite set
d) Singleton set

Answer: b) Empty set

18. If two sets have no elements in common, they are called:
a) Equivalent sets
b) Equal sets
c) Disjoint sets
d) Infinite sets
Answer: c) Disjoint sets

19. The shaded region in A ∪ B ∪ C in a Venn diagram represents:
a) A ∩ B ∩ C
b) A ∪ B ∪ C
c) A only
d) B only
Answer: b) A ∪ B ∪ C

20. A Venn diagram with three overlapping circles represents:
a) Two sets
b) Three sets
c) A singleton set
d) A null set
Answer: b) Three sets

21. A relation is a:
a) Connection between two sets
b) Subset of Cartesian product
c) Function
d) Random collection of numbers
Answer: b) Subset of Cartesian product

22. The Cartesian product of A = {1, 2} and B = {a, b} is:
a) {(1, a), (1, b), (2, a), (2, b)}
b) {(a, b), (1, 2)}
c) {1, 2, a, b}
d) {(1, 2, a, b)}
Answer: a) {(1, a), (1, b), (2, a), (2, b)}

23. If A = {x | x is an even number}, then A is:
a) Infinite set
b) Finite set

c) Singleton set
d) Null set
Answer: a) Infinite set

24. If f(x) = x², then f is a:
a) One-one function
b) Many-one function
c) Onto function
d) Bijection
Answer: b) Many-one function

25. A relation R is a function if:
a) Every element of domain has one unique image
b) Elements of domain have multiple images
c) Elements of range have multiple pre-images
d) The set is finite
Answer: a) Every element of domain has one unique image

26. The set of all students in a class is an example of:
a) Finite set
b) Infinite set
c) Singleton set
d) Empty set
Answer: a) Finite set

27. The relation "is the mother of" is:
a) One-one
b) Many-one
c) Reflexive
d) Symmetric
Answer: b) Many-one

28. The relation "is parallel to" between two lines is:
a) Reflexive
b) Symmetric
c) Transitive
d) All of the above
Answer: d) All of the above

29. The power set of {1,2} is:

a) {∅, {1}, {2}, {1,2}}
b) {{1,2}}
c) {1,2}
d) {{1}, {2}}
Answer: a) {∅, {1}, {2}, {1,2}}

30. If A and B are equal sets, then:
a) A ⊆ B and B ⊆ A
b) A ∪ B = ∅
c) A ∩ B = ∅
d) A - B = B
Answer: a) A ⊆ B and B ⊆ A

31. If A = {2, 4, 6, 8} and B = {4, 8, 12}, then A – B is:
a) {2, 6}
b) {4, 8}
c) {12}
d) {2, 6, 12}
Answer: a) {2, 6}

32. If A and B are two sets such that A ⊆ B, then A ∩ B is:
a) A
b) B
c) A ∪ B
d) ∅
Answer: a) A

33. If A ∪ B = A ∩ B, then:
a) A = B
b) A ⊆ B
c) A ∩ B = ∅
d) A = ∅
Answer: a) A = B

34. If A = {1, 2, 3} and B = {a, b}, then the number of elements in A × B is:
a) 3
b) 6
c) 2
d) 5
Answer: b) 6

35. If n(A) = 5 and n(B) = 3, then n(A × B) = ?
a) 5
b) 8
c) 15
d) 20
Answer: c) 15

36. Which of the following is an idempotent law?
a) A ∪ A = A
b) A ∩ A = A
c) Both a and b
d) A ∩ B = ∅
Answer: c) Both a and b

37. The associative property of union states:
a) A ∪ (B ∪ C) = (A ∪ B) ∪ C
b) A ∪ (B ∩ C) = (A ∪ B) ∩ C
c) A ∪ B = A
d) A ∩ (B ∪ C) = (A ∩ B) ∪ C
Answer: a) A ∪ (B ∪ C) = (A ∪ B) ∪ C

38. Which of the following is the distributive property of sets?
a) A ∩ (B ∪ C) = (A ∩ B) ∪ (A ∩ C)
b) A ∩ (B ∩ C) = (A ∩ B) ∪ C
c) A ∪ (B ∪ C) = A ∩ (B ∩ C)
d) A ∪ (B ∩ C) = (A ∪ B) ∩ (A ∪ C)
Answer: a) A ∩ (B ∪ C) = (A ∩ B) ∪ (A ∩ C)

39. In a class of 50 students, 30 like Mathematics, 20 like Science, and 10 like both. The number of students who like only Mathematics is:
a) 10
b) 20
c) 30
d) 40
Answer: b) 20

40. If in a group of 100 people, 60 like coffee, 40 like tea, and 20 like both, how many like only coffee?
a) 20

b) 40
c) 60
d) 80
Answer: b) 40

41. The shaded region in a Venn diagram of A - B represents:
a) Only A
b) Only B
c) A but not B
d) B but not A
Answer: c) A but not B

42. If the universal set has 100 elements and A has 60 elements, then A' (complement of A) has:
a) 40 elements
b) 60 elements
c) 100 elements
d) 0 elements
Answer: a) 40 elements

43. A relation R on a set A is called reflexive if:
a) (a, a) ∈ R for all a ∈ A
b) (a, b) ∈ R implies (b, a) ∈ R
c) (a, b) ∈ R and (b, c) ∈ R imply (a, c) ∈ R
d) (a, b) ∉ R for all a, b
Answer: a) (a, a) ∈ R for all a ∈ A

44. A relation is symmetric if:
a) (a, b) ∈ R implies (b, a) ∈ R
b) (a, b) ∈ R and (b, c) ∈ R imply (a, c) ∈ R
c) (a, a) ∈ R for all a ∈ A
d) (a, b) ∉ R for all a, b
Answer: a) (a, b) ∈ R implies (b, a) ∈ R

45. A transitive relation satisfies:
a) If (a, b) ∈ R and (b, c) ∈ R, then (a, c) ∈ R
b) If (a, b) ∈ R, then (b, a) ∈ R
c) (a, a) ∈ R for all a ∈ A
d) (a, b) ∉ R for all a, b
Answer: a) If (a, b) ∈ R and (b, c) ∈ R, then (a, c) ∈ R

46. A relation that is reflexive, symmetric, and transitive is called:
a) An equivalence relation
b) A one-to-one relation
c) A function
d) A universal relation
Answer: a) An equivalence relation

47. If P(A) represents the power set of A, then n(P(A)) for A = {1, 2, 3} is:
a) 6
b) 8
c) 9
d) 16
Answer: b) 8

48. The number of subsets of a set with n elements is given by:
a) 2^n
b) n^2
c) 2n
d) n!
Answer: a) 2^n

49. If A and B are sets such that $A \subseteq B$, then $A \cup B$ is:
a) A
b) B
c) $A \cap B$
d) ∅
Answer: b) B

50. If A and B are finite sets with |A| = 3 and |B| = 4, then the number of relations from A to B is:
a) 64
b) 128
c) 12
d) 81
Answer: a) 64

Chapter 4: Factorization and Algebraic Manipulation

MCQs:

1. Which of the following is a factor of $x^2 - 16$?
a) x - 4
b) x + 4
c) (x - 4)(x + 4)
d) $x^2 + 4$
Answer: c) (x - 4)(x + 4)

2. The expression $x^2 + 10x + 25$ can be factored as:
a) (x + 5)(x + 5)
b) (x - 5)(x - 5)
c) (x + 10)(x + 5)
d) (x + 25)(x + 1)
Answer: a) (x + 5)(x + 5)

3. The factors of $x^2 - 8x + 12$ are:
a) (x - 6)(x - 2)
b) (x - 4)(x - 3)
c) (x - 6)(x - 4)
d) (x - 3)(x - 2)
Answer: d) (x - 3)(x - 2)

4. The factored form of $a^2 - b^2$ is:
a) (a + b)(a - b)
b) (a - b)(a - b)
c) (a + b)(a + b)
d) $a^2 + 2ab + b^2$
Answer: a) (a + b)(a - b)

5. The expression $9x^2 - 25y^2$ is factored as:
a) (3x - 5y)(3x + 5y)
b) (3x + 5y)(3x + 5y)
c) (9x - 25y)(9x + 25y)
d) (x - y)(x + y)
Answer: a) (3x - 5y)(3x + 5y)

6. The common factor of $5x^3 + 10x^2 - 15x$ is:
a) 5x
b) x

c) $5x^2$
d) $10x$
Answer: a) $5x$

7. The greatest common factor (GCF) of $6x^2y$, $9xy^2$, and $12xy$ is:
a) $3xy$
b) $6xy$
c) xy
d) $2xy$
Answer: b) $6xy$

8. The common factor of $6a^3b + 9a^2b^2 - 3ab$ is:
a) $3ab$
b) $6a^2b$
c) $9ab$
d) ab
Answer: a) $3ab$

9. The common factor of $14x^2 - 21x$ is:
a) $7x$
b) $5x$
c) $14x$
d) $21x$
Answer: a) $7x$

10. The highest common factor (HCF) of $20x^2y$, $30xy^2$, $50x^2y$ is:
a) $10xy$
b) $20xy$
c) $30x^2y$
d) $50x^2y$
Answer: a) $10xy$

11. The expansion of $(a + b)^2$ is:
a) $a^2 + 2ab + b^2$
b) $a^2 - 2ab + b^2$
c) $a^2 + b^2$
d) $a^2 - b^2$
Answer: a) $a^2 + 2ab + b^2$

12. The identity for $(a - b)^2$ is:

a) $a^2 - 2ab + b^2$
b) $a^2 + 2ab + b^2$
c) $a^2 - b^2$
d) $a^2 + b^2 - 2ab$
Answer: a) $a^2 - 2ab + b^2$

13. The identity for $(x + y)(x - y)$ is:
a) $x^2 - y^2$
b) $x^2 + y^2$
c) $x^2 + 2xy + y^2$
d) $x^2 - 2xy + y^2$
Answer: a) $x^2 - y^2$

14. The value of $(7 + 3)^2$ using an identity is:
a) 100
b) 49
c) 81
d) 25
Answer: a) 100

15. The value of $(8 - 5)^2$ using an identity is:
a) 9
b) 36
c) 18
d) 12
Answer: a) 9

16. The factors of $x^2 - 11x + 30$ are:
a) $(x - 6)(x - 5)$
b) $(x - 10)(x - 3)$
c) $(x - 7)(x - 4)$
d) $(x - 9)(x - 2)$
Answer: a) $(x - 6)(x - 5)$

17. The factors of $x^2 + 3x - 28$ are:
a) $(x - 7)(x + 4)$
b) $(x + 7)(x - 4)$
c) $(x - 6)(x - 3)$
d) $(x + 6)(x + 3)$
Answer: b) $(x + 7)(x - 4)$

18. The factors of $3x^2 + 10x + 7$ are:
a) $(3x + 7)(x + 1)$
b) $(3x + 1)(x + 7)$
c) $(x + 3)(3x + 7)$
d) $(3x - 1)(x + 7)$
Answer: a) $(3x + 7)(x + 1)$

19. The remainder when $x^2 - 4x + 3$ is divided by $x - 1$ is:
a) 1
b) 0
c) -1
d) 2
Answer: b) 0

20. If $a + b = 12$ and $ab = 27$, then $a^2 + b^2$ is:
a) 90
b) 144
c) 72
d) 54
Answer: c) 72

21. The factors of $x^2 - 15x + 56$ are:
a) $(x - 8)(x - 7)$
b) $(x - 9)(x - 6)$
c) $(x - 10)(x - 5)$
d) $(x - 12)(x - 4)$
Answer: a) $(x - 8)(x - 7)$

22. The factored form of $x^2 + 14x + 49$ is:
a) $(x + 7)(x + 7)$
b) $(x + 14)(x + 1)$
c) $(x + 9)(x + 5)$
d) $(x + 12)(x + 2)$
Answer: a) $(x + 7)(x + 7)$

23. Which of the following expressions is a perfect square?
a) $x^2 - 4x + 4$
b) $x^2 + 7x + 10$
c) $x^2 - 5x + 6$

d) $x^2 + 3x + 2$
Answer: a) $x^2 - 4x + 4$

24. The factors of $x^2 - 18x + 81$ are:
a) $(x - 9)(x - 9)$
b) $(x - 6)(x - 3)$
c) $(x - 12)(x - 6)$
d) $(x - 8)(x - 4)$
Answer: a) $(x - 9)(x - 9)$

25. The factors of $2x^2 + 5x - 3$ are:
a) $(2x - 1)(x + 3)$
b) $(2x + 3)(x - 1)$
c) $(x + 2)(2x - 3)$
d) $(2x - 3)(x + 1)$
Answer: b) $(2x + 3)(x - 1)$

26. The greatest common factor (GCF) of $8x^3y$, $12x^2y^2$, and $16xy$ is:
a) 4xy
b) 8xy
c) 12xy
d) xy
Answer: b) 8xy

27. The common factor of $15a^3b + 20a^2b^2 - 5ab$ is:
a) 5ab
b) $15a^2b$
c) $20ab^2$
d) ab
Answer: a) 5ab

28. The common factor of $24x^2 - 36x$ is:
a) 12x
b) 6x
c) 24x
d) 36x
Answer: a) 12x

29. The highest common factor (HCF) of $18x^2y$, $27xy^2$, $36x^2y$ is:
a) 9xy

b) 18xy
c) $27x^2y$
d) $36x^2y$
Answer: a) 9xy

30. The common factor of $5x^4 + 10x^3 - 15x^2$ is:
a) $5x^2$
b) $10x^3$
c) $15x^2$
d) $5x^3$
Answer: a) $5x^2$

31. The expansion of $(x - 5)^2$ is:
a) $x^2 - 10x + 25$
b) $x^2 + 10x + 25$
c) $x^2 - 25$
d) $x^2 + 5$
Answer: a) $x^2 - 10x + 25$

32. The identity for $(a + b)(a - b)$ is:
a) $a^2 - b^2$
b) $a^2 + b^2$
c) $a^2 + 2ab + b^2$
d) $a^2 - 2ab + b^2$
Answer: a) $a^2 - b^2$

33. The value of $(10 - 6)^2$ using an identity is:
a) 16
b) 36
c) 64
d) 25
Answer: a) 16

34. The value of $(12 + 5)^2$ using an identity is:
a) 289
b) 324
c) 289
d) 256
Answer: a) 289

35. The factors of $5x^2 + 14x + 8$ are:

a) (5x + 4)(x + 2)
b) (5x + 2)(x + 4)
c) (x + 5)(5x + 2)
d) (5x - 2)(x + 4)
Answer: a) (5x + 4)(x + 2)

36. The factors of $x^2 - 21x + 110$ are:
a) (x - 10)(x - 11)
b) (x - 9)(x - 12)
c) (x - 8)(x - 13)
d) (x - 7)(x - 14)
Answer: a) (x - 10)(x - 11)

37. The factors of $x^2 + 6x - 16$ are:
a) (x - 8)(x + 2)
b) (x + 8)(x - 2)
c) (x - 6)(x - 4)
d) (x + 6)(x + 4)
Answer: b) (x + 8)(x - 2)

38. The factors of $6x^2 + 11x - 10$ are:
a) (2x - 1)(3x + 5)
b) (3x - 2)(2x + 5)
c) (x + 3)(6x - 2)
d) (6x - 5)(x + 2)
Answer: b) (3x - 2)(2x + 5)

39. The remainder when $x^2 - 7x + 10$ is divided by x - 2 is:
a) 1
b) 0
c) -1
d) 2
Answer: b) 0

40. If a + b = 18 and ab = 80, then $a^2 + b^2$ is:
a) 164
b) 196
c) 144
d) 100
Answer: a) 164

Chapter 5: Linear equations and inequalities

MCQs

1. A linear equation in one variable has the form:
a) $ax^2 + bx + c = 0$
b) $ax + b = 0$
c) $ax^3 + bx^2 + c = 0$
d) $ax^2 + by + c = 0$
Answer: b) $ax + b = 0$

2. The equation $3x - 7 = 2x + 5$ has how many solutions?
a) One
b) Two
c) Infinite
d) No solution
Answer: a) One

3. The value of x in the equation $5x - 10 = 20$ is:
a) 4
b) 6
c) 5
d) 8
Answer: b) 6

4. The equation $2x + 3 = 2(x + 1) + 1$ is:
a) Always true
b) Always false
c) True for one value of x
d) Has no solution
Answer: a) Always true

5. Which of the following is not a linear equation?
a) $3x + 5 = 0$
b) $x^2 - 4 = 0$
c) $2x - 7 = 3$
d) $4x + 2y = 8$
Answer: b) $x^2 - 4 = 0$

6. If $x - 3 = 7$, then $x = ?$
a) 10

b) 4
c) -4
d) 3
Answer: a) 10

7. The solution of 2(x - 5) = 4 is:
a) 6
b) 8
c) 4
d) 5
Answer: c) 4

8. If 3x - 2 = 2x + 5, then x = ?
a) 3
b) 5
c) 7
d) 2
Answer: a) 7

9. If 4x + 3 = 2x + 11, then x = ?
a) 5
b) 6
c) 4
d) 3
Answer: d) 4

10. The equation x/2 + 3 = 7 simplifies to:
a) x = 8
b) x = 6
c) x = 10
d) x = 5
Answer: b) x = 8

11. If x + 3 > 7, then x is:
a) Greater than 4
b) Less than 4
c) Equal to 4
d) Less than or equal to 4
Answer: a) Greater than 4

12. If $2x - 5 \leq 9$, then x is:
a) $x \leq 7$
b) $x \geq 7$
c) $x \leq 5$
d) $x \geq 5$
Answer: a) $x \leq 7$

13. The inequality $x - 2 < 5$ is equivalent to:
a) $x < 7$
b) $x > 7$
c) $x \leq 7$
d) $x \geq 7$
Answer: a) $x < 7$

14. If $-3x > 9$, then x is:
a) $x < -3$
b) $x > -3$
c) $x < 3$
d) $x > 3$
Answer: c) $x < -3$

15. The inequality $x/4 > 3$ simplifies to:
a) $x > 12$
b) $x > -12$
c) $x < 12$
d) $x < -12$
Answer: a) $x > 12$

16. A number is 5 more than twice another number. If their sum is 29, what is the smaller number?
a) 8
b) 6
c) 7
d) 5
Answer: c) 8

17. The sum of two consecutive integers is 45. The smaller integer is:
a) 21
b) 22
c) 23

d) 24
Answer: b) 22

18. If the perimeter of a rectangle is 30 and the length is 4 more than the width, then the width is:
a) 5
b) 6
c) 7
d) 8
Answer: a) 5

19. A number is 3 less than 4 times another number. If their sum is 27, the larger number is:
a) 20
b) 19
c) 18
d) 15
Answer: d) 15

20. If a student needs at least 40 marks to pass and he scores 3x + 10 marks, which inequality represents this situation?
a) 3x + 10 ≥ 40
b) 3x + 10 ≤ 40
c) 3x + 10 > 40
d) 3x + 10 < 40
Answer: a) 3x + 10 ≥ 40

21. The equation 7x - 4 = 3x + 8 simplifies to:
a) x = 3
b) x = 2
c) x = 4
d) x = 6
Answer: c) x = 3

22. If 4(x - 2) = 2(2x - 3), then x = ?
a) 1
b) 2
c) 3
d) 4
Answer: a) 3

23. The equation 5(x + 1) - 3(x - 2) = 4x + 6 is:
a) x = 5
b) x = 4
c) x = 3
d) x = 2
Answer: d) x = 2

24. If 2x + 3 = 7x - 2, then x = ?
a) 1
b) 2
c) 3
d) 4
Answer: a) 1

25. Which of the following is NOT a solution of the equation 2x - 5 = 3x - 8?
a) x = 1
b) x = -3
c) x = 0
d) x = -5
Answer: d) x = -5

26. The graph of a linear equation is always a:
a) Circle
b) Parabola
c) Straight Line
d) Curve
Answer: c) Straight Line

27. The slope of the equation y = 3x - 7 is:
a) -7
b) 3
c) -3
d) 7
Answer: b) 3

28. If a line passes through points (2, 3) and (4, 7), its slope is:
a) 2
b) 3
c) 1

d) 4
Answer: a) 2

29. The x-intercept of y = 4x - 8 is:
a) 4
b) 2
c) -2
d) -4
Answer: b) 2

30. The equation y = 5x + 2 represents a line that:
a) Passes through the origin
b) Has a y-intercept of 2
c) Has a slope of -5
d) Is parallel to the x-axis
Answer: b) Has a y-intercept of 2

31. The solution set of 3x - 5 > 4 is:
a) x > 3
b) x > 9
c) x < 3
d) x < 9
Answer: a) x > 3

32. If 5 - 2x ≤ 1, then x is:
a) x ≥ 2
b) x ≤ 2
c) x ≥ -2
d) x ≤ -2
Answer: a) x ≥ 2

33. If -3x > 6, then x is:
a) x < -2
b) x > -2
c) x < 2
d) x > 2
Answer: c) x < -2

34. The solution to 4x + 1 ≤ 9 is:
a) x ≤ 2

b) $x \geq 2$
c) $x \leq -2$
d) $x \geq -2$
Answer: a) $x \leq 2$

35. If $x + 4 > 9$, then x is:
a) $x > 5$
b) $x < 5$
c) $x \geq 5$
d) $x \leq 5$
Answer: a) $x > 5$

36. The sum of two numbers is 32. One number is 4 times the other. The smaller number is:
a) 4
b) 6
c) 8
d) 5
Answer: c) 8

37. The perimeter of a rectangle is 40 cm. If the length is 2 cm more than twice the width, what is the width?
a) 6 cm
b) 7 cm
c) 8 cm
d) 9 cm
Answer: a) 6 cm

38. A number is 5 more than three times another number. Their sum is 45. The smaller number is:
a) 10
b) 12
c) 15
d) 18
Answer: b) 12

39. If a student needs at least 50 marks to pass and they score $4x + 10$, which inequality represents this?
a) $4x + 10 \geq 50$
b) $4x + 10 \leq 50$

c) 4x + 10 > 50
d) 4x + 10 < 50
Answer: a) 4x + 10 ≥ 50

40. A shopkeeper earns at least $5000 per month. If he earns $200 per day, which inequality represents this?
a) 200d ≥ 5000
b) 200d ≤ 5000
c) 200d > 5000
d) 200d < 5000
Answer: a) 200d ≥ 5000

41. If 3(x - 2) = 2(x + 1), then x = ?
a) 3
b) 4
c) 5
d) 6
Answer: a) 4

42. The solution to 5x - 4 = 3x + 8 is:
a) x = 2
b) x = 6
c) x = 3
d) x = 5
Answer: b) x = 6

43. If 2x + 5 = 9 - x, then x = ?
a) 4
b) 3
c) 2
d) 1
Answer: c) 2

44. The equation 7x - 2 = 3x + 10 has:
a) One solution
b) No solution
c) Infinite solutions
d) Cannot be solved
Answer: a) One solution

45. If 4(x - 3) = 2(2x - 1), then the equation is:
a) Always true
b) Always false
c) Has no solution
d) True for one value of x
Answer: b) Always false

46. The equation y = -2x + 5 represents a line that:
a) Has a slope of -2
b) Passes through (0,5)
c) Decreases as x increases
d) All of the above
Answer: d) All of the above

47. The slope of y = 5x - 3 is:
a) 5
b) -3
c) 3
d) -5
Answer: a) 5

48. The equation 3x + 2y = 6 is written in slope-intercept form as:
a) y = -3/2x + 3
b) y = -3x + 2
c) y = -3/2x + 6
d) y = 3/2x - 3
Answer: a) y = -3/2x + 3

49. The x-intercept of 2x - 4y = 8 is:
a) 4
b) -4
c) 2
d) -2
Answer: a) 4

50. The graph of y = x + 4 passes through which of the following points?
a) (0,4)
b) (-4,0)
c) (2,6)
d) All of the above

Answer: d) All of the above

51. The solution of 3x - 4 > 8 is:
a) x > 4
b) x < 4
c) x > 5
d) x < 5
Answer: c) x > 4

52. If -5x ≤ 15, then x is:
a) x ≥ -3
b) x ≤ -3
c) x ≥ 3
d) x ≤ 3
Answer: b) x ≤ -3

53. The inequality x - 3 ≤ 10 simplifies to:
a) x ≤ 13
b) x ≥ 13
c) x < 13
d) x > 13
Answer: a) x ≤ 13

54. The inequality 4x - 2 > 10 is equivalent to:
a) x > 3
b) x < 3
c) x ≥ 3
d) x ≤ 3
Answer: a) x > 3

55. If 2x + 3 ≤ 9, then x is:
a) x ≤ 3
b) x ≥ 3
c) x ≤ 6
d) x ≥ 6
Answer: a) x ≤ 3

56. A number is twice another number. Their sum is 30. The smaller number is:
a) 10
b) 12

c) 14
d) 15
Answer: a) 10

57. A car rental company charges $50 plus $10 per hour. If a customer can spend at most $120, what is the maximum number of hours they can rent the car?
a) 5 hours
b) 6 hours
c) 7 hours
d) 8 hours
Answer: a) 7 hours

58. The sum of three consecutive odd numbers is 27. The smallest number is:
a) 7
b) 9
c) 11
d) 13
Answer: a) 7

59. A person needs at least 70 marks to pass. If they scored 4x + 10 marks, which inequality represents this situation?
a) 4x + 10 ≥ 70
b) 4x + 10 ≤ 70
c) 4x + 10 > 70
d) 4x + 10 < 70
Answer: a) 4x + 10 ≥ 70

60. A farmer wants to fence a rectangular field. The perimeter should not exceed 100 meters. If the length is twice the width, what is the maximum width possible?
a) 20 meters
b) 25 meters
c) 30 meters
d) 35 meters
Answer: a) 20 meters

Chapter 6: Trigonometry and Bearing

MCQs:

1. Which of the following is the correct definition of sine in a right-angled triangle?
a) Opposite / Hypotenuse
b) Adjacent / Hypotenuse
c) Opposite / Adjacent
d) Hypotenuse / Opposite
Answer: a) Opposite / Hypotenuse

2. In a right-angled triangle, cosine of an angle is the ratio of:
a) Opposite / Hypotenuse
b) Adjacent / Hypotenuse
c) Opposite / Adjacent
d) Hypotenuse / Opposite
Answer: b) Adjacent / Hypotenuse

3. What is the tangent of an angle in a right-angled triangle?
a) Opposite / Hypotenuse
b) Adjacent / Hypotenuse
c) Opposite / Adjacent
d) Hypotenuse / Opposite
Answer: c) Opposite / Adjacent

4. Which of the following is equal to cot(θ)?
a) 1 / tan(θ)
b) 1 / sin(θ)
c) 1 / cos(θ)
d) tan(θ)
Answer: a) 1 / tan(θ)

5. If sin(30°) = 1/2, what is cos(30°)?
a) √3 / 2
b) 1
c) 1/2
d) √2 / 2
Answer: a) √3 / 2

6. If a right-angled triangle has hypotenuse = 10 cm and opposite side = 6 cm, what is sin(θ)?
a) 0.4
b) 0.6
c) 0.8
d) 1.0
Answer: b) 0.6

7. If cos(θ) = 0.8, what is sin(θ)?
a) 0.6
b) 0.8
c) 0.4
d) 0.2
Answer: a) 0.6

8. In a right-angled triangle, if tan(θ) = 3/4, what is sin(θ)?
a) 3/5
b) 4/5
c) 3/4
d) 5/4
Answer: a) 3/5

9. The hypotenuse of a right-angled triangle is 13 cm, and one leg is 5 cm. What is the other leg?
a) 10 cm
b) 12 cm
c) 8 cm
d) 6 cm
Answer: b) 12 cm

10. If sin(θ) = 0.5, what is the angle θ?
a) 30°
b) 45°
c) 60°
d) 90°
Answer: a) 30°

11. Bearings are measured in which direction?
a) Clockwise from North
b) Counterclockwise from South

c) Clockwise from East
d) Counterclockwise from West
Answer: a) Clockwise from North

12. A ship sails 30° East of North. What is its bearing?
a) 30°
b) 60°
c) 120°
d) 210°
Answer: a) 30°

13. If an airplane is flying 135° from North, in which direction is it traveling?
a) Northeast
b) Southeast
c) Southwest
d) Northwest
Answer: b) Southeast

14. A person walks 40° West of North. What is their bearing?
a) 40°
b) 50°
c) 320°
d) 140°
Answer: c) 320°

15. If a car moves at a bearing of 270°, in which direction is it traveling?
a) North
b) East
c) West
d) South
Answer: c) West

16. A ladder is leaning against a wall making a 60° angle with the ground. If the ladder is 10 meters long, how high does it reach on the wall?
a) 5 m
b) 8.66 m
c) 10 m
d) 6 m
Answer: b) 8.66 m

17. The angle of elevation of the top of a tree is 45°. If the observer is 10 meters away from the base, what is the height of the tree?
a) 5 m
b) 10 m
c) 15 m
d) 20 m
Answer: b) 10 m

18. A 15-meter ladder makes an angle of 30° with the ground. How far is the base of the ladder from the wall?
a) 7.5 m
b) 12.99 m
c) 14.5 m
d) 8.66 m
Answer: b) 12.99 m

19. If the angle of depression from a lighthouse to a ship is 20° and the lighthouse is 50 meters high, how far is the ship from the base of the lighthouse?
a) 137.5 m
b) 50 m
c) 145 m
d) 75 m
Answer: a) 137.5 m

20. A kite is flying at a height of 30 meters and the string makes an angle of 60° with the ground. What is the length of the string?
a) 30 m
b) 34.6 m
c) 60 m
d) 50 m
Answer: b) 34.6 m

21. The value of tan 45° is:
a) 1
b) 0
c) $\sqrt{2}$
d) Undefined
Answer: a) 1

22. Which of the following is a Pythagorean identity?

a) $\sin^2\theta + \cos^2\theta = 1$
b) $\tan^2\theta + 1 = \cos^2\theta$
c) $\sin^2\theta - \cos^2\theta = 1$
d) $\sin^2\theta + \tan^2\theta = 1$
Answer: a) $\sin^2\theta + \cos^2\theta = 1$

23. The value of cos 90° is:
a) 0
b) 1
c) -1
d) Undefined
Answer: a) 0

24. If sin(θ) = 4/5, what is cos(θ)?
a) 3/5
b) 4/5
c) 5/4
d) 1
Answer: a) 3/5

25. What is the reciprocal of sin(θ)?
a) cos(θ)
b) tan(θ)
c) sec(θ)
d) csc(θ)
Answer: d) csc(θ)

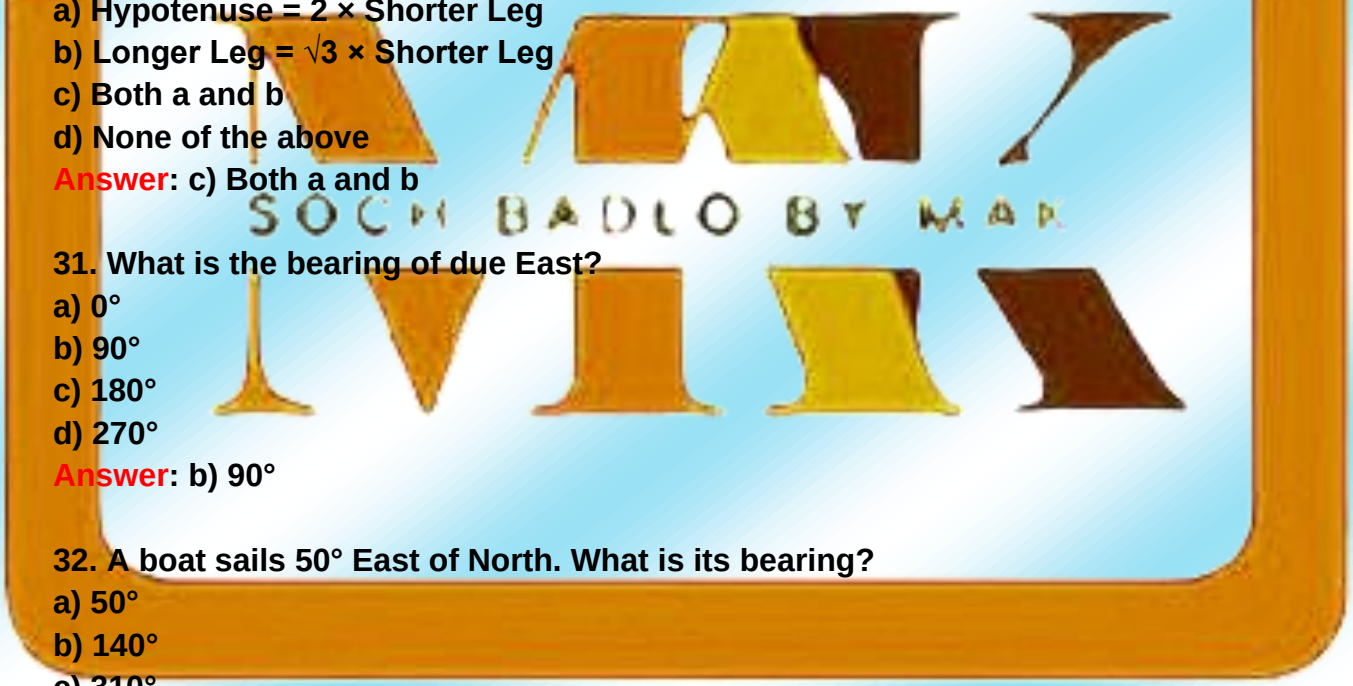
26. If the opposite side is 7 cm and the hypotenuse is 25 cm, what is cos(θ)?
a) 24/25
b) 7/25
c) 25/7
d) 1
Answer: a) 24/25

27. If tan(θ) = 5/12, then sin(θ) = ?
a) 5/13
b) 12/13
c) 5/12
d) 1/2
Answer: a) 5/13

28. In a right-angled triangle, the adjacent side is 9 cm, and the hypotenuse is 15 cm. What is sin(θ)?
a) 3/5
b) 4/5
c) 9/15
d) 5/9
Answer: b) 4/5

29. If tan(θ) = 0, what is the value of θ?
a) 0°
b) 45°
c) 60°
d) 90°
Answer: a) 0°

30. Which of the following is true for a 30°-60°-90° triangle?
a) Hypotenuse = 2 × Shorter Leg
b) Longer Leg = √3 × Shorter Leg
c) Both a and b
d) None of the above
Answer: c) Both a and b



31. What is the bearing of due East?
a) 0°
b) 90°
c) 180°
d) 270°
Answer: b) 90°

32. A boat sails 50° East of North. What is its bearing?
a) 50°
b) 140°
c) 310°
d) 230°
Answer: a) 50°

33. A plane is flying at a bearing of 225°. In which direction is it moving?
a) Northeast
b) Southwest

c) Northwest
d) Southeast
Answer: b) Southwest

34. A person walks 30° West of South. What is their bearing?
a) 60°
b) 120°
c) 210°
d) 330°
Answer: c) 210°

35. If a ship travels 180°, in which direction is it going?
a) East
b) West
c) South
d) North
Answer: c) South

36. The angle of elevation of a tower from a point 20 meters away is 30°. What is the height of the tower?
a) 10 m
b) 11.5 m
c) 15 m
d) 20 m
Answer: b) 11.5 m

37. A tree casts a shadow 8 meters long when the angle of elevation of the sun is 45°. What is the height of the tree?
a) 4 m
b) 8 m
c) 12 m
d) 16 m
Answer: b) 8 m

38. A building is 50 meters tall. The angle of depression from the top to a car is 30°. How far is the car from the base of the building?
a) 50 m
b) 86.6 m
c) 100 m
d) 25 m

Answer: b) 86.6 m

39. A kite is flying at a height of 40 meters. The string makes an angle of 60° with the ground. What is the length of the string?
a) 40 m
b) 50 m
c) 60 m
d) 80 m
Answer: c) 60 m

40. A flagpole casts a 12-meter shadow. If the angle of elevation of the sun is 60°, what is the height of the flagpole?
a) 12 m
b) 20.8 m
c) 15 m
d) 30 m
Answer: b) 20.8 m

41. The value of sin 0° is:
a) 1
b) 0
c) Undefined
d) -1
Answer: b) 0

42. The value of tan 90° is:
a) 0
b) 1
c) Undefined
d) -1
Answer: c) Undefined

43. Which of the following is equal to sec(θ)?
a) 1 / sin(θ)
b) 1 / cos(θ)
c) 1 / tan(θ)
d) sin(θ) / cos(θ)
Answer: b) 1 / cos(θ)

44. What is the reciprocal of tan(θ)?

a) cos(θ)
b) sin(θ)
c) cot(θ)
d) sec(θ)
Answer: c) cot(θ)

45. Which of the following is a correct trigonometric identity?
a) $\sin^2\theta - \cos^2\theta = 1$
b) $\sin^2\theta + \cos^2\theta = 1$
c) $\tan^2\theta - \sec^2\theta = 1$
d) $\sin\theta / \cos\theta = \cos\theta / \sin\theta$
Answer: b) $\sin^2\theta + \cos^2\theta = 1$

46. If tan(θ) = 4/3, what is sin(θ)?
a) 4/5
b) 3/5
c) 4/3
d) 5/4
Answer: a) 4/5

47. In a right-angled triangle, if sin(θ) = 0.6, what is cos(θ)?
a) 0.4
b) 0.8
c) 0.5
d) 1
Answer: b) 0.8

48. A right-angled triangle has a hypotenuse of 10 cm and a base of 8 cm. What is the height?
a) 5 cm
b) 6 cm
c) 8 cm
d) 4 cm
Answer: b) 6 cm

49. If sin(θ) = 3/5, what is tan(θ)?
a) 3/4
b) 4/3
c) 5/3
d) 1
Answer: a) 3/4

50. In a right-angled triangle, if the adjacent side is 5 cm and the opposite side is 12 cm, what is the hypotenuse?
a) 10 cm
b) 12 cm
c) 13 cm
d) 15 cm
Answer: c) 13 cm
51. A ship is sailing 20° West of North. What is its bearing?
a) 20°
b) 340°
c) 160°
d) 200°
Answer: b) 340°

52. If a car is traveling at 90°, in which direction is it moving?
a) North
b) South
c) East
d) West
Answer: c) East

53. A plane is flying at a bearing of 315°. In which direction is it traveling?
a) Northeast
b) Northwest
c) Southeast
d) Southwest
Answer: b) Northwest

54. A person walks 60° East of South. What is their bearing?
a) 60°
b) 120°
c) 150°
d) 240°
Answer: c) 150°

55. If a ship travels 270°, in which direction is it going?
a) North
b) South
c) West

d) East
Answer: c) West
56. A ladder of 10 meters leans against a wall, making an angle of 45° with the ground. How high does it reach?
a) 5 m
b) 7.07 m
c) 10 m
d) 8 m
Answer: b) 7.07 m

57. The angle of elevation of the top of a tree is 60°. If the observer is 15 meters away, what is the height of the tree?
a) 10 m
b) 15√3 m
c) 15 m
d) 20 m
Answer: b) 15√3 m

58. A flagpole is 25 meters high. The angle of depression from the top to a car is 40°. How far is the car from the base?
a) 25 m
b) 30 m
c) 35 m
d) 20 m
Answer: c) 35 m

59. A man standing 50 meters away from a tower observes the top at an angle of elevation of 30°. What is the height of the tower?
a) 28.87 m
b) 25 m
c) 40 m
d) 50 m
Answer: a) 28.87 m

60. A kite is flying at a height of 50 meters, and the string makes an angle of 45° with the ground. What is the length of the string?
a) 50 m
b) 70.7 m
c) 80 m
d) 100 m

Answer: b) 70.7 m

Chapter 7: Coordinate Geometry

MCQs

1. The coordinates of the origin in the Cartesian plane are:
a) (0,0)
b) (1,1)
c) (-1,-1)
d) (0,1)
Answer: a) (0,0)

2. The x-coordinate of any point on the y-axis is always:
a) 0
b) 1
c) -1
d) Any real number
Answer: a) 0

3. The y-coordinate of any point on the x-axis is always:
a) 0
b) 1
c) -1
d) Any real number
Answer: a) 0

4. The point (3, -5) lies in which quadrant?
a) First
b) Second
c) Third
d) Fourth
Answer: d) Fourth

5. If the coordinates of a point are (-4, 6), it lies in:
a) First quadrant
b) Second quadrant
c) Third quadrant
d) Fourth quadrant
Answer: b) Second quadrant

6. The distance between two points (x_1, y_1) and (x_2, y_2) is given by:

a) $\sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$
b) $(x_2 - x_1) + (y_2 - y_1)$
c) $(x_2 + x_1) + (y_2 + y_1)$
d) $\sqrt{[(x_1 - x_2)^2 + (y_1 - y_2)^2]}$
Answer: a) $\sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$

7. Find the distance between the points (3, 4) and (6, 8).
a) 5
b) 6
c) 7
d) $5\sqrt{2}$
Answer: d) $5\sqrt{2}$

8. What is the distance between the points (-2, 1) and (3, 5)?
a) 5
b) 6
c) $\sqrt{41}$
d) 10
Answer: c) $\sqrt{41}$

9. If a point lies on the x-axis, its y-coordinate is always:
a) 0
b) 1
c) Any real number
d) -1
Answer: a) 0

10. If the distance between (5, -3) and (x, 2) is 10, then the value of x is:
a) 1
b) -1
c) 2
d) -2
Answer: c) 2

11. The midpoint of two points (x_1, y_1) and (x_2, y_2) is given by:
a) $[(x_1 + x_2)/2, (y_1 + y_2)/2]$
b) $[(x_1 - x_2)/2, (y_1 - y_2)/2]$
c) $[(x_1 \times x_2)/2, (y_1 \times y_2)/2]$
d) $[(x_1 + x_2), (y_1 + y_2)]$
Answer: a) $[(x_1 + x_2)/2, (y_1 + y_2)/2]$

12. Find the midpoint of the line segment joining (-2, 4) and (6, 8).
a) (2, 6)
b) (4, 6)
c) (2, 5)
d) (1, 6)
Answer: a) (2, 6)

13. If the midpoint of (3, 5) and (x, 7) is (5, 6), then x = ?
a) 6
b) 7
c) 8
d) 9
Answer: c) 8

14. The slope of a line passing through (x_1, y_1) and (x_2, y_2) is given by:
a) $(y_2 - y_1) / (x_2 - x_1)$
b) $(y_2 + y_1) / (x_2 + x_1)$
c) $(y_1 - y_2) / (x_1 - x_2)$
d) x_1 / x_2
Answer: a) $(y_2 - y_1) / (x_2 - x_1)$

15. What is the slope of a vertical line?
a) 0
b) Undefined
c) 1
d) -1
Answer: b) Undefined

16. The slope of the line joining (3, 4) and (7, 8) is:
a) 1
b) 2
c) 3
d) 4
Answer: a) 1

17. If the slope of a line is 0, then the line is:
a) Vertical
b) Horizontal
c) Inclined at 45°

d) Perpendicular to x-axis
Answer: b) Horizontal

18. If a line has a slope of -3, it means:
a) The line is increasing
b) The line is decreasing
c) The line is horizontal
d) The line is vertical
Answer: b) The line is decreasing

19. The general equation of a straight line is:
a) y = mx + c
b) x = my + c
c) y = cx + m
d) x = c + my
Answer: a) y = mx + c

20. If a line passes through (2,3) with slope 4, its equation is:
a) y = 4x + 5
b) y = 4x - 5
c) y - 3 = 4(x - 2)
d) y + 3 = 4(x + 2)
Answer: c) y - 3 = 4(x - 2)

21. The x-axis and y-axis divide the coordinate plane into how many quadrants?
a) 2
b) 3
c) 4
d) 5
Answer: c) 4

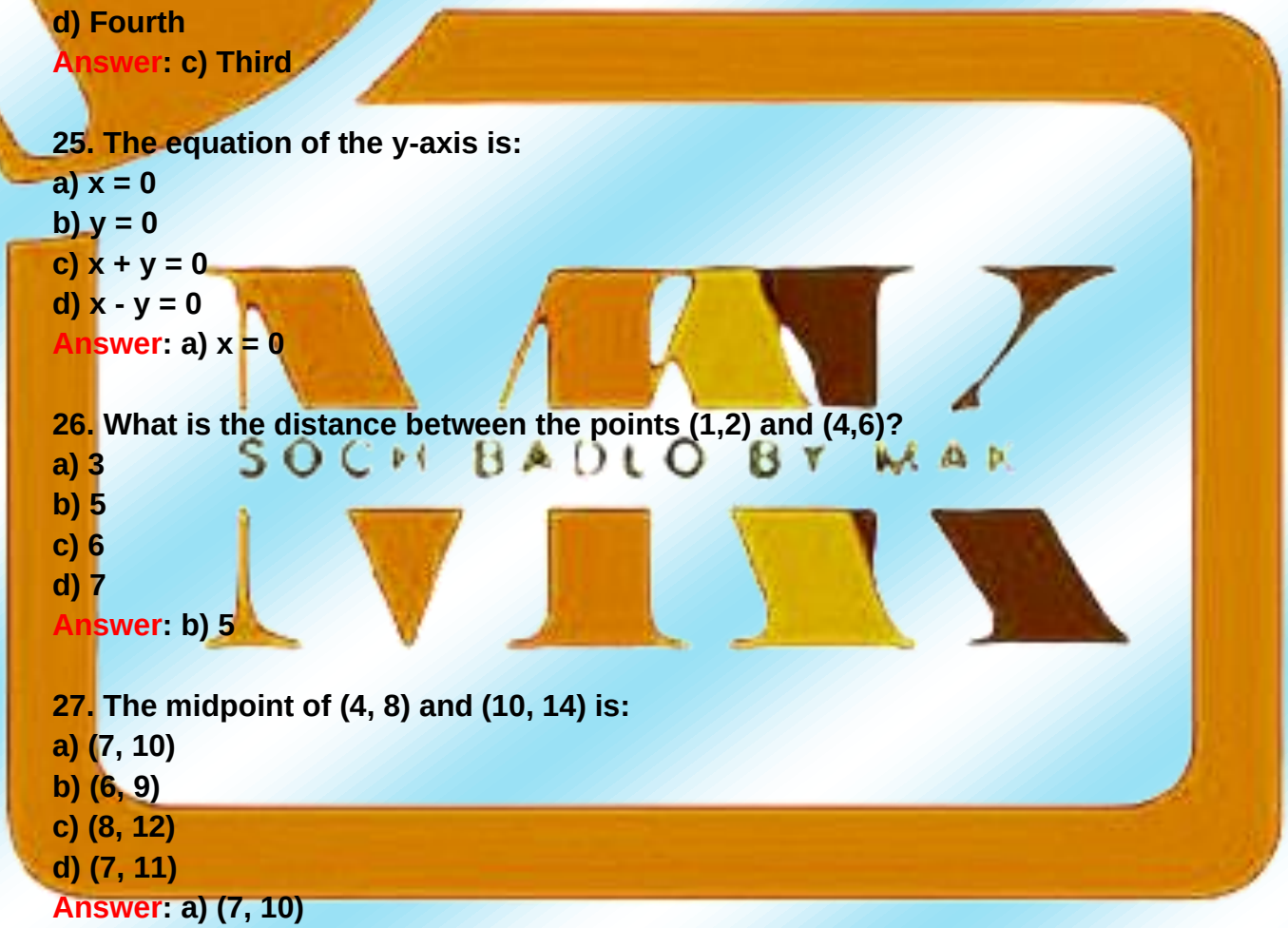
22. If a point lies in the second quadrant, its coordinates will be in which sign pattern?
a) (+, +)
b) (-, +)
c) (-, -)
d) (+, -)
Answer: b) (-, +)

23. The coordinates of a point that lies on both the x-axis and y-axis are:

a) (1,1)
b) (0,0)
c) (1,0)
d) (0,1)
Answer: b) (0,0)

24. If the x-coordinate of a point is negative and the y-coordinate is also negative, the point lies in which quadrant?
a) First
b) Second
c) Third
d) Fourth
Answer: c) Third

25. The equation of the y-axis is:
a) x = 0
b) y = 0
c) x + y = 0
d) x - y = 0
Answer: a) x = 0



26. What is the distance between the points (1,2) and (4,6)?
a) 3
b) 5
c) 6
d) 7
Answer: b) 5

27. The midpoint of (4, 8) and (10, 14) is:
a) (7, 10)
b) (6, 9)
c) (8, 12)
d) (7, 11)
Answer: a) (7, 10)

28. Find the midpoint of the segment joining (-5, 3) and (7, 9).
a) (1, 6)
b) (2, 5)
c) (3, 4)
d) (-1, 8)

Answer: a) (1, 6)

29. If the distance between (x, 4) and (2, 6) is 5, find x.
a) 5
b) 1
c) 3
d) 2
Answer: c) 3

30. The length of the line segment joining (2, -3) and (5, -3) is:
a) 2
b) 3
c) 4
d) 5
Answer: b) 3

31. The slope of the x-axis is:
a) 0
b) Undefined
c) 1
d) -1
Answer: a) 0

32. If two lines are parallel, their slopes are:
a) Equal
b) Negative reciprocals
c) Zero
d) Undefined
Answer: a) Equal

33. The slope of a line perpendicular to a line with slope 3 is:
a) 3
b) -3
c) 1/3
d) -1/3
Answer: d) -1/3

34. If the slope of a line is negative, the line:
a) Slopes upward from left to right
b) Slopes downward from left to right

c) Is horizontal
d) Is vertical
Answer: b) Slopes downward from left to right

35. The slope of a line passing through (2,3) and (5,9) is:
a) 1
b) 2
c) 3
d) 4
Answer: b) 2

36. The equation of a horizontal line passing through (3, 5) is:
a) y = 5
b) x = 3
c) y = x + 5
d) y = 3x
Answer: a) y = 5

37. The equation of a vertical line passing through (-4, 7) is:
a) x = -4
b) y = -4
c) y = 7
d) x = 7
Answer: a) x = -4

38. The equation of a line with slope 3 and y-intercept -2 is:
a) y = 3x + 2
b) y = 3x - 2
c) y = -3x + 2
d) y = -3x - 2
Answer: b) y = 3x - 2

39. The equation of a line passing through (4,5) with slope 2 is:
a) y - 5 = 2(x - 4)
b) y + 5 = 2(x + 4)
c) y = 2x + 5
d) y = 2x - 4
Answer: a) y - 5 = 2(x - 4)

40. If a line has an equation y = -3x + 7, its slope is:

a) 3
b) -3
c) 7
d) -7
Answer: b) -3

41. The point (-7, 0) lies on which axis?
a) x-axis
b) y-axis
c) Both axes
d) Neither axis
Answer: a) x-axis

42. If a point is equidistant from the x-axis and y-axis, which condition must be true?
a) x = y
b) |x| = |y|
c) x > y
d) x < y
Answer: b) |x| = |y|

43. A point that lies on the negative side of both axes is in which quadrant?
a) First
b) Second
c) Third
d) Fourth
Answer: c) Third

44. The equation of the line passing through the origin with a slope of 5 is:
a) y = 5x
b) y = 5x + 1
c) y = x + 5
d) y = x - 5
Answer: a) y = 5x

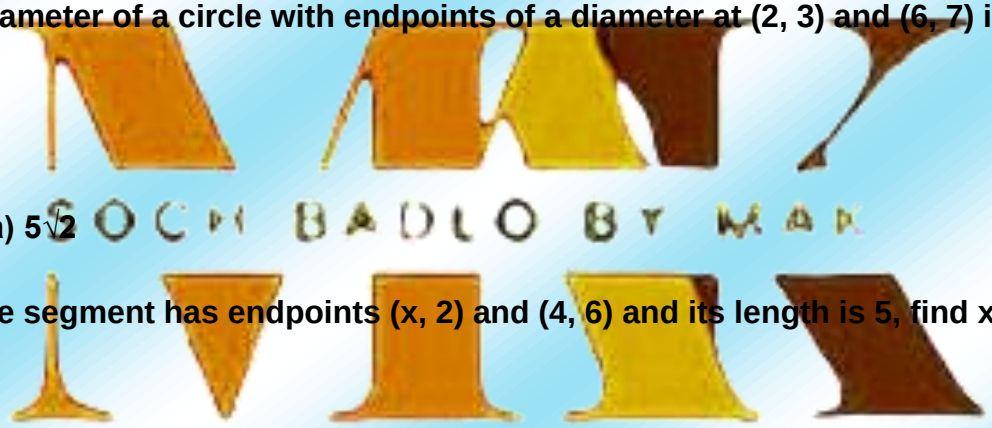
45. The coordinates of the centroid of a triangle with vertices (2, 3), (4, 7), and (6, 5) are:
a) (4, 5)
b) (3, 6)
c) (2, 7)

d) (5, 4)
Answer: a) (4, 5)

46. The distance between (-2, -3) and (4, 3) is:
a) 6
b) 7
c) √72
d) 10
Answer: d) 10

47. The distance between (1, 1) and (4, 5) is:
a) 5
b) √10
c) √25
d) 6
Answer: c) √25

48. The diameter of a circle with endpoints of a diameter at (2, 3) and (6, 7) is:
a) 5√2
b) 10
c) 4√2
d) 6
Answer: a) 5√2



49. If a line segment has endpoints (x, 2) and (4, 6) and its length is 5, find x.
a) 0
b) 1
c) 2
d) 3
Answer: d) 3

50. If a point is at equal distances from (1,2) and (5,6), its x-coordinate satisfies which equation?
a) $(x - 1)^2 + (2 - y)^2 = (x - 5)^2 + (6 - y)^2$
b) (x - 1) + (y - 2) = (x - 5) + (y - 6)
c) x + y = 0
d) $x^2 + y^2 = 25$
Answer: a) $(x - 1)^2 + (2 - y)^2 = (x - 5)^2 + (6 - y)^2$

51. If the slope of one line is 2/3, what is the slope of a line parallel to it?

a) 2/3
b) -3/2
c) -2/3
d) 3/2
Answer: a) 2/3

52. The equation of a line passing through (-2, 5) with slope -1 is:
a) y - 5 = -1(x + 2)
b) y - 5 = 1(x + 2)
c) y + 5 = -1(x - 2)
d) y - 5 = -1(x - 2)
Answer: a) y - 5 = -1(x + 2)

53. The equation of a line parallel to y = 4x - 2 passing through (1,1) is:
a) y = 4x + 3
b) y = 4x - 3
c) y = -4x + 3
d) y = -4x - 3
Answer: b) y = 4x - 3

54. The slope of a line perpendicular to the line 2x + 3y = 5 is:
a) -3/2
b) 2/3
c) 3/2
d) -2/3
Answer: d) -2/3

55. If two lines are perpendicular, their slopes are:
a) Equal
b) Negative reciprocals
c) Zero
d) Undefined
Answer: b) Negative reciprocals

56. If three points (x_1, y_1), (x_2, y_2), and (x_3, y_3) are collinear, then:
a) They lie on the same straight line
b) They form a triangle
c) Their slopes are different
d) Their sum is zero
Answer: a) They lie on the same straight line

57. If three points (1,2), (3,4), and (5,6) are collinear, what is their slope?
a) 1
b) 2
c) 3
d) 4
Answer: a) 1

58. If the area of a triangle formed by points (x_1, y_1), (x_2, y_2), and (x_3, y_3) is zero, then the points are:
a) Vertices of a triangle
b) Collinear
c) Non-collinear
d) Undefined
Answer: b) Collinear

59. The centroid of a triangle is the point where:
a) All medians meet
b) All perpendicular bisectors meet
c) All angle bisectors meet
d) All altitudes meet
Answer: a) All medians meet

60. The slope of a line joining (4, 5) and (8, 9) is:
a) 1
b) 2
c) 3
d) 4
Answer: a) 1

61. The coordinates of a point that lies on the y-axis are always in the form:
a) (x, 0)
b) (0, y)
c) (x, y)
d) (y, x)
Answer: b) (0, y)

62. If a point is in the fourth quadrant, then:
a) x > 0, y > 0
b) x < 0, y > 0

c) x < 0, y < 0
d) x > 0, y < 0
Answer: d) x > 0, y < 0

63. If the coordinates of a point are (a, b), its reflection across the x-axis is:
a) (-a, -b)
b) (-a, b)
c) (a, -b)
d) (b, a)
Answer: c) (a, -b)

64. The equation of a vertical line is always of the form:
a) x = constant
b) y = constant
c) x + y = constant
d) x - y = constant
Answer: a) x = constant

65. The equation of a horizontal line is always of the form:
a) x = constant
b) y = constant
c) x + y = constant
d) x - y = constant
Answer: b) y = constant

66. The distance between points (3, 4) and (6, 8) is:
a) 4
b) 5
c) 6
d) 7
Answer: b) 5

67. Find the midpoint of the segment joining (-2, 5) and (4, 9).
a) (1, 7)
b) (3, 6)
c) (2, 8)
d) (0, 5)
Answer: a) (1, 7)

68. The midpoint of the line segment joining (7, 2) and (5, 8) is:

a) (6, 5)
b) (12, 10)
c) (2, 5)
d) (1, 6)
Answer: a) (6, 5)

69. If the midpoint of a segment is (3, 5) and one endpoint is (1, 4), what is the other endpoint?
a) (5, 6)
b) (4, 7)
c) (2, 6)
d) (6, 8)
Answer: a) (5, 6)

70. If the distance between two points (x, 2) and (4, 6) is 5, then x is:
a) 2
b) 3
c) 4
d) 5
Answer: b) 3

71. The slope of the line passing through (2,3) and (6,7) is:
a) 4
b) 1
c) 2
d) 3
Answer: b) 1

72. If the slope of a line is negative, it means:
a) The line is horizontal
b) The line slopes downward from left to right
c) The line slopes upward from left to right
d) The line is vertical
Answer: b) The line slopes downward from left to right

73. The slope of a line perpendicular to a line with slope 2/5 is:
a) -5/2
b) 5/2
c) -2/5
d) 2/5

Answer: a) -5/2

74. The slope of a horizontal line is:
a) Undefined
b) 0
c) 1
d) -1
Answer: b) 0

75. The slope of a vertical line is:
a) Undefined
b) 0
c) 1
d) -1
Answer: a) Undefined

76. The equation of a line passing through (2, 5) with slope 3 is:
a) y - 5 = 3(x - 2)
b) y + 5 = 3(x + 2)
c) y - 2 = 3(x - 5)
d) y = 3x + 5
Answer: a) y - 5 = 3(x - 2)

77. The equation of a line parallel to y = 2x + 3 passing through (4,5) is:
a) y = 2x - 3
b) y = 2x + 1
c) y = -2x + 5
d) y = -2x - 3
Answer: b) y = 2x + 1

78. The equation of a line perpendicular to y = -4x + 2 passing through (1, 3) is:
a) y = 1/4 x + 2
b) y - 3 = (1/4)(x - 1)
c) y = 4x + 3
d) y - 1 = 4(x - 3)
Answer: b) y - 3 = (1/4)(x - 1)

79. The slope-intercept form of a line is given by:
a) y = mx + c
b) x = my + c

c) y = cx + m
d) y = mx - c
Answer: a) y = mx + c

80. If the equation of a line is 5x - 2y = 10, then its slope is:
a) 5/2
b) -5/2
c) 2/5
d) -2/5
Answer: b) -5/2

Chapter 8: Geometry of straight lines

MCQs

1. A straight line has how many dimensions?
a) 0
b) 1
c) 2
d) 3
Answer: b) 1

2. How many points are needed to determine a unique straight line?
a) 1
b) 2
c) 3
d) 4
Answer: b) 2

3. Two lines that never intersect are called:
a) Parallel lines
b) Perpendicular lines
c) Intersecting lines
d) Collinear lines
Answer: a) Parallel lines

4. If two lines intersect, the number of common points they have is:
a) 0
b) 1
c) 2
d) Infinite
Answer: b) 1

5. The angle between two perpendicular lines is:
a) 0°
b) 45°
c) 90°
d) 180°
Answer: c) 90°

6. If two lines are parallel, their corresponding angles are:
a) Equal
b) Supplementary
c) Complementary
d) Unequal
Answer: a) Equal

7. When two parallel lines are cut by a transversal, alternate interior angles are:
a) Complementary
b) Equal
c) Supplementary
d) Zero
Answer: b) Equal

8. If a transversal cuts two parallel lines, then the sum of co-interior angles is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: b) 180°

9. The vertically opposite angles formed when two lines intersect are:
a) Equal
b) Supplementary
c) Complementary
d) 360°
Answer: a) Equal

10. If one angle of a linear pair is 110°, the other angle is:
a) 110°
b) 90°
c) 70°
d) 180°
Answer: c) 70°

11. A line that cuts two or more lines at different points is called a:
a) Transversal
b) Perpendicular line
c) Parallel line

d) Tangent
Answer: a) Transversal

12. If two lines are perpendicular, the product of their slopes is:
a) 0
b) 1
c) -1
d) Infinity
Answer: c) -1

13. A line that makes a 45° angle with the x-axis has a slope of:
a) 0
b) 1
c) -1
d) Undefined
Answer: b) 1

14. If a straight line is vertical, its slope is:
a) 0
b) 1
c) Undefined
d) Infinity
Answer: c) Undefined

15. If two lines are perpendicular, then their slopes are:
a) Equal
b) Negative reciprocals
c) Positive reciprocals
d) Complementary
Answer: b) Negative reciprocals

16. The equation of a vertical line passing through (3,2) is:
a) x = 3
b) y = 3
c) x + y = 3
d) y - x = 3
Answer: a) x = 3

17. The equation of a horizontal line passing through (5,7) is:
a) y = 5

b) x = 7
c) y = 7
d) x + y = 7
Answer: c) y = 7

18. If two lines have the same equation, they are:
a) Parallel
b) Perpendicular
c) Coincident
d) Intersecting
Answer: c) Coincident

19. The condition for two lines to be parallel is that their slopes must be:
a) Equal
b) Negative reciprocals
c) Zero
d) Undefined
Answer: a) Equal

20. If the slopes of two lines are m_1 and m_2, and they are perpendicular, then:
a) $m_1 \times m_2 = 1$
b) $m_1 \times m_2 = 0$
c) $m_1 \times m_2 = -1$
d) $m_1 \times m_2 = 2$
Answer: c) $m_1 \times m_2 = -1$

21. If two parallel lines are cut by a transversal, the sum of consecutive interior angles is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: b) 180°

22. If two parallel lines are cut by a transversal, alternate exterior angles are:
a) Complementary
b) Supplementary
c) Equal
d) Unequal
Answer: c) Equal

23. The sum of all angles formed at a point is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: d) 360°

24. If two parallel lines are cut by a transversal and one of the alternate interior angles is 50°, then the other alternate interior angle is:
a) 30°
b) 50°
c) 130°
d) 90°
Answer: b) 50°

25. If two intersecting lines form one angle of 75°, then its vertically opposite angle is:
a) 105°
b) 90°
c) 75°
d) 180°
Answer: c) 75°

26. Two lines that lie in the same plane and do not intersect are called:
a) Perpendicular
b) Parallel
c) Coincident
d) Intersecting
Answer: b) Parallel

27. If two lines are perpendicular, their slopes are:
a) Equal
b) Negative reciprocals
c) Positive reciprocals
d) Complementary
Answer: b) Negative reciprocals

28. The equation of a line parallel to y = 3x + 4 is:
a) y = 3x + 2

b) y = -3x + 4
c) y = x + 4
d) y = 4x + 3
Answer: a) y = 3x + 2

29. The slope of a line that is perpendicular to y = -2x + 3 is:
a) -2
b) 1/2
c) 2
d) -1/2
Answer: b) 1/2

30. If the slopes of two lines are equal, then the lines are:
a) Perpendicular
b) Parallel
c) Intersecting
d) Coincident
Answer: b) Parallel

31. The equation of a horizontal line passing through (6, -2) is:
a) y = -2
b) x = 6
c) y = 6
d) x = -2
Answer: a) y = -2

32. The equation of a vertical line passing through (-4, 3) is:
a) y = -4
b) x = 3
c) x = -4
d) y = 3
Answer: c) x = -4

33. The slope-intercept form of a line equation is:
a) x = my + c
b) y = mx + c
c) y = c + mx²
d) y - x = m
Answer: b) y = mx + c

34. If the equation of a line is 2x - 3y = 6, its slope is:
a) 2/3
b) -2/3
c) 3/2
d) -3/2
Answer: a) 2/3

35. If a line passes through (2,3) and has a slope of 4, its equation is:
a) y - 3 = 4(x - 2)
b) y + 3 = 4(x + 2)
c) y - 2 = 4(x - 3)
d) y = 4x - 3
Answer: a) y - 3 = 4(x - 2)

36. Two lines intersect if their slopes are:
a) Equal
b) Different
c) Negative reciprocals
d) Both b and c
Answer: d) Both b and c

37. The number of points at which two distinct parallel lines intersect is:
a) 0
b) 1
c) 2
d) Infinite
Answer: a) 0

38. If two lines have the same equation, they are:
a) Parallel
b) Perpendicular
c) Coincident
d) Intersecting at one point
Answer: c) Coincident

39. If two non-parallel lines in the same plane do not intersect, they are called:
a) Coincident lines
b) Perpendicular lines
c) Skew lines
d) Parallel lines

Answer: c) Skew lines

40. If a transversal intersects two parallel lines, then the number of angles formed is:
a) 2
b) 4
c) 6
d) 8
Answer: d) 8

41. A straight line extends in how many directions?
a) One
b) Two
c) Three
d) Four
Answer: b) Two

42. The sum of the interior angles of a straight line is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: b) 180°

43. The distance between two parallel lines is:
a) Always the same
b) Varies
c) Zero
d) Infinite
Answer: a) Always the same

44. If two lines are perpendicular to the same line, then they are:
a) Parallel
b) Perpendicular
c) Coincident
d) Skew
Answer: a) Parallel

45. If a line has a negative slope, it moves:
a) Upward from left to right

b) Downward from left to right
c) Horizontally
d) Vertically
Answer: b) Downward from left to right

46. If two parallel lines are cut by a transversal, then each pair of alternate interior angles is:
a) Complementary
b) Supplementary
c) Equal
d) 90°
Answer: c) Equal

47. If a transversal intersects two parallel lines and one angle is 120°, its corresponding angle is:
a) 60°
b) 120°
c) 180°
d) 90°
Answer: b) 120°

48. The sum of the interior angles on the same side of a transversal is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: b) 180°

49. Two angles whose sum is 180° are called:
a) Complementary
b) Supplementary
c) Vertical
d) Reflex
Answer: b) Supplementary

50. When a transversal cuts two lines and alternate exterior angles are equal, the lines are:
a) Perpendicular
b) Parallel
c) Skew

d) Coincident
Answer: b) Parallel

51. The slope of a line passing through (4,5) and (6,9) is:
a) 2
b) -2
c) 4
d) -4
Answer: a) 2

52. The equation of a line in slope-intercept form is:
a) $y = mx + c$
b) $x = my + c$
c) $y = mx^2 + c$
d) $y - x = m$
Answer: a) $y = mx + c$

53. The slope of the x-axis is:
a) 0
b) 1
c) -1
d) Undefined
Answer: a) 0

54. The slope of the y-axis is:
a) 0
b) 1
c) Undefined
d) -1
Answer: c) Undefined

55. If the slope of a line is 3 and it passes through (2,4), its equation is:
a) $y - 4 = 3(x - 2)$
b) $y + 4 = 3(x + 2)$
c) $y - 2 = 3(x - 4)$
d) $y = 3x - 4$
Answer: a) $y - 4 = 3(x - 2)$

56. If the slopes of two lines are equal, the lines are:
a) Parallel

b) Perpendicular
c) Intersecting
d) Coincident
Answer: a) Parallel

57. If the slopes of two lines are negative reciprocals, the lines are:
a) Parallel
b) Perpendicular
c) Coincident
d) Intersecting at any angle
Answer: b) Perpendicular

58. A line perpendicular to y = 5x - 7 will have a slope of:
a) 5
b) -5
c) 1/5
d) -1/5
Answer: d) -1/5

59. The equation of a vertical line passing through (-3,7) is:
a) x = -3
b) y = -3
c) x = 7
d) y = 7
Answer: a) x = -3

60. The point where two lines meet is called:
a) Vertex
b) Intersection point
c) Midpoint
d) Slope point
Answer: b) Intersection point

61. Two distinct lines in a plane that do not intersect are called:
a) Perpendicular lines
b) Parallel lines
c) Coincident lines
d) Intersecting lines
Answer: b) Parallel lines

62. If two lines are coincident, then they:
a) Have the same slope but different y-intercepts
b) Have different slopes
c) Have the same equation
d) Are perpendicular
Answer: c) Have the same equation

63. The measure of a straight angle is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: b) 180°

64. The number of lines that can pass through two distinct points is:
a) One
b) Two
c) Infinite
d) Zero
Answer: a) One

65. If two angles are complementary, their sum is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: a) 90°

66. If a transversal intersects two parallel lines, corresponding angles are:
a) Equal
b) Supplementary
c) Complementary
d) Reflex angles
Answer: a) Equal

67. If two parallel lines are cut by a transversal, each pair of interior angles on the same side of the transversal is:
a) Equal
b) Supplementary
c) Complementary

d) Acute
Answer: b) Supplementary

68. If two alternate interior angles are equal, the two lines:
a) Are perpendicular
b) Are parallel
c) Intersect at a right angle
d) Are skew
Answer: b) Are parallel

69. If a transversal makes one angle 120° with one of two parallel lines, then the corresponding angle is:
a) 60°
b) 90°
c) 120°
d) 180°
Answer: c) 120°

70. If a transversal makes an angle of 75° with one parallel line, then the alternate interior angle is:
a) 75°
b) 90°
c) 105°
d) 180°
Answer: a) 75°

71. The slope of a line perpendicular to a line with slope 2 is:
a) -2
b) 1/2
c) -1/2
d) -1/2
Answer: c) -1/2

72. The equation of a line with slope 4 passing through (1,2) is:
a) y - 2 = 4(x - 1)
b) y + 2 = 4(x + 1)
c) y = 4x + 1
d) y - 1 = 4(x - 2)
Answer: a) y - 2 = 4(x - 1)

73. The slope of the line y = -3x + 7 is:
a) -3
b) 3
c) -7
d) 7
Answer: a) -3

74. The y-intercept of the line 2x - 5y = 10 is:
a) -2
b) 2
c) -5
d) 5
Answer: b) 2

75. The equation of a line parallel to y = -2x + 5 is:
a) y = -2x - 3
b) y = 2x + 5
c) y = -x + 3
d) y = x - 2
Answer: a) y = -2x - 3

76. If two lines intersect at a right angle, then their slopes are:
a) Negative reciprocals
b) Equal
c) The same
d) Complementary
Answer: a) Negative reciprocals

77. The equation of a horizontal line passing through (7,-3) is:
a) x = -3
b) x = 7
c) y = -3
d) y = 7
Answer: c) y = -3

78. The equation of a vertical line passing through (-5,4) is:
a) x = -5
b) x = 4
c) y = -5
d) y = 4

Answer: a) x = -5

79. The slope of a line parallel to the x-axis is:
a) 0
b) 1
c) Undefined
d) -1
Answer: a) 0

80. The slope of a line perpendicular to the y-axis is:
a) 0
b) 1
c) Undefined
d) -1
Answer: c) Undefined

81. Two lines in the same plane that never intersect are called:
a) Perpendicular lines
b) Parallel lines
c) Skew lines
d) Coincident lines
Answer: b) Parallel lines

82. The equation of a straight line passing through the origin is always in the form:
a) y = mx + c
b) y = mx
c) y = c
d) x = m
Answer: b) y = mx

83. If two lines have the same slope but different y-intercepts, they are:
a) Coincident
b) Parallel
c) Perpendicular
d) Intersecting
Answer: b) Parallel

84. If two lines intersect at exactly one point, they are called:
a) Parallel

b) Perpendicular
c) Coincident
d) Intersecting
Answer: d) Intersecting

85. A line that forms equal angles with the x-axis and y-axis has a slope of:
a) 1
b) -1
c) 0
d) Both (a) and (b)
Answer: d) Both (a) and (b)

86. If two lines are perpendicular, the product of their slopes is:
a) 0
b) 1
c) -1
d) Undefined
Answer: c) -1

87. If a transversal makes one angle of 110° with a parallel line, then the corresponding angle is:
a) 110°
b) 70°
c) 180°
d) 90°
Answer: a) 110°

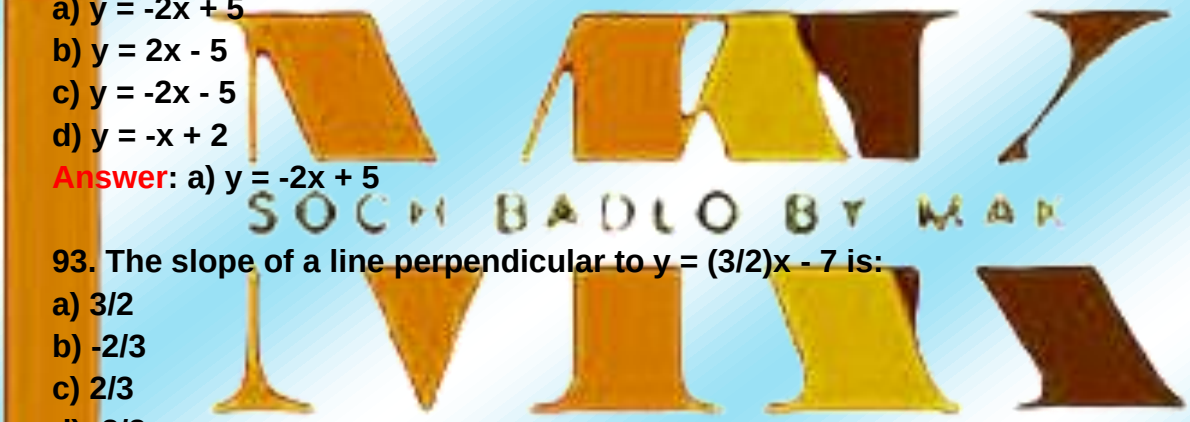
88. If two parallel lines are cut by a transversal, the sum of co-interior angles is:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: b) 180°

89. When a transversal cuts two parallel lines, alternate exterior angles are:
a) Complementary
b) Supplementary
c) Equal
d) 180°
Answer: c) Equal

90. If a transversal cuts two parallel lines and forms a 130° angle, the vertically opposite angle is:
a) 50°
b) 130°
c) 90°
d) 180°
Answer: b) 130°

91. The slope of the line passing through (-3,4) and (5,2) is:
a) -1/4
b) 1/4
c) -1/2
d) 1/2
Answer: c) -1/2

92. The equation of a line with slope -2 passing through (0,5) is:
a) y = -2x + 5
b) y = 2x - 5
c) y = -2x - 5
d) y = -x + 2
Answer: a) y = -2x + 5



93. The slope of a line perpendicular to y = (3/2)x - 7 is:
a) 3/2
b) -2/3
c) 2/3
d) -3/2
Answer: b) -2/3

94. The equation of a line passing through (-2,3) and having slope 4 is:
a) y - 3 = 4(x + 2)
b) y + 2 = 4(x - 3)
c) y - 2 = 4(x - 3)
d) y = 4x + 2
Answer: a) y - 3 = 4(x + 2)

95. The slope of a line making an angle of 60° with the positive x-axis is:
a) √3
b) 1/√3

c) -√3
d) 1
Answer: a) √3

96. If two lines have slopes 5 and -1/5, the lines are:
a) Parallel
b) Perpendicular
c) Coincident
d) Intersecting but not perpendicular
Answer: b) Perpendicular

97. A line perpendicular to the x-axis has an equation of the form:
a) y = c
b) x = c
c) y = mx + c
d) x + y = c
Answer: b) x = c

98. If two lines have the same slope and the same y-intercept, they are:
a) Parallel
b) Perpendicular
c) Coincident
d) Skew
Answer: c) Coincident

99. The y-intercept of the line 3x - 4y = 12 is:
a) -3
b) 3
c) -4
d) 4
Answer: b) 3

100. The point where a line crosses the y-axis is called the:
a) Slope
b) Intercept
c) Origin
d) Intersection point
Answer: b) Intercept

Chapter 9: Geometry And Polygons

MCQs

1. A polygon with all sides and angles equal is called:
a) Regular polygon
b) Irregular polygon
c) Concave polygon
d) Open polygon
Answer: a) Regular polygon

2. The sum of interior angles of a quadrilateral is:
a) 180°
b) 270°
c) 360°
d) 540°
Answer: c) 360°

3. The sum of exterior angles of any polygon is always:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: d) 360°

4. A polygon with 8 sides is called a:
a) Heptagon
b) Octagon
c) Nonagon
d) Decagon
Answer: b) Octagon

5. A triangle with one angle greater than 90° is called:
a) Right triangle
b) Acute triangle

c) Obtuse triangle
d) Equilateral triangle
Answer: c) Obtuse triangle

6. The formula for the sum of interior angles of an n-sided polygon is:
a) (n - 2) × 180°
b) (n - 1) × 180°
c) n × 180°
d) n × 360°
Answer: a) (n - 2) × 180°

7. The measure of each exterior angle of a regular hexagon is:
a) 60°
b) 90°
c) 120°
d) 72°
Answer: d) 72°

8. If each interior angle of a regular polygon is 108°, the polygon is a:
a) Triangle
b) Square
c) Pentagon
d) Hexagon
Answer: c) Pentagon

9. If a polygon has 10 sides, the sum of its interior angles is:
a) 1080°
b) 1440°
c) 1260°
d) 1620°
Answer: a) 1440°

10. The measure of each interior angle of a regular quadrilateral (square) is:
a) 60°
b) 90°
c) 120°
d) 180°
Answer: b) 90°

11. A polygon with at least one angle greater than 180° is called:

a) Convex polygon
b) Concave polygon
c) Regular polygon
d) Equilateral polygon
Answer: b) Concave polygon

12. A parallelogram with four right angles and unequal sides is called:
a) Square
b) Rhombus
c) Rectangle
d) Trapezium
Answer: c) Rectangle

13. The diagonal of a square divides it into:
a) Two congruent triangles
b) Two trapeziums
c) Two rhombuses
d) Two pentagons
Answer: a) Two congruent triangles

14. A quadrilateral with only one pair of parallel sides is called:
a) Parallelogram
b) Rhombus
c) Trapezium
d) Kite
Answer: c) Trapezium

15. In a rhombus, the diagonals:
a) Are equal
b) Are perpendicular to each other
c) Bisect angles unequally
d) Are parallel
Answer: b) Are perpendicular to each other

16. The number of diagonals in a hexagon is given by the formula:
a) n(n - 3)/2
b) n(n - 2)/2
c) (n - 2) × 180°
d) n × 360°
Answer: a) n(n - 3)/2

17. A quadrilateral in which diagonals are equal and bisect each other is:
a) Square
b) Rectangle
c) Rhombus
d) Parallelogram
Answer: b) Rectangle

18. The sum of interior angles of a decagon is:
a) 1080°
b) 1440°
c) 1620°
d) 1800°
Answer: b) 1440°

19. In a regular hexagon, the number of diagonals is:
a) 6
b) 7
c) 9
d) 15
Answer: d) 15

20. A regular polygon has each exterior angle of 30°. The number of sides of the polygon is:
a) 10
b) 12
c) 15
d) 8
Answer: b) 12

21. The sum of interior angles of a pentagon is:
a) 540°
b) 720°
c) 360°
d) 180°
Answer: a) 540°

22. The measure of each interior angle of a regular octagon is:
a) 120°
b) 135°

c) 140°
d) 150°
Answer: b) 135°

23. If an exterior angle of a regular polygon is 45°, the number of sides in the polygon is:
a) 6
b) 8
c) 10
d) 12
Answer: b) 8

24. If a polygon has 12 sides, the sum of its interior angles is:
a) 1800°
b) 1440°
c) 2160°
d) 1260°
Answer: c) 1800°

25. The measure of each interior angle of a regular 15-sided polygon is:
a) 140°
b) 144°
c) 156°
d) 160°
Answer: c) 156°

26. The number of diagonals in a pentagon is:
a) 2
b) 5
c) 7
d) 10
Answer: b) 5

27. The number of sides in a polygon with 27 diagonals is:
a) 7
b) 8
c) 9
d) 10
Answer: c) 9

28. A regular polygon with each interior angle of 120° is a:
a) Pentagon
b) Hexagon
c) Heptagon
d) Octagon
Answer: b) Hexagon

29. A quadrilateral with opposite sides parallel and equal diagonals is a:
a) Parallelogram
b) Trapezium
c) Rectangle
d) Rhombus
Answer: c) Rectangle

30. In a kite, the diagonals:
a) Are equal
b) Are perpendicular to each other
c) Bisect each other
d) Are parallel
Answer: b) Are perpendicular to each other

31. The number of diagonals in a hexagon is:
a) 6
b) 7
c) 9
d) 15
Answer: c) 9

32. The sum of one interior angle and its corresponding exterior angle in any polygon is:
a) 90°
b) 120°
c) 180°
d) 360°
Answer: c) 180°

33. A regular polygon with each exterior angle of 24° has how many sides?
a) 10
b) 12
c) 15

d) 18
Answer: d) 15

34. In a regular quadrilateral, the measure of each exterior angle is:
a) 60°
b) 72°
c) 90°
d) 120°
Answer: c) 90°

35. The measure of each interior angle of a regular 20-sided polygon is:
a) 160°
b) 162°
c) 165°
d) 170°
Answer: b) 162°

36. The sum of all exterior angles of a 15-sided polygon is:
a) 270°
b) 360°
c) 540°
d) 180°
Answer: b) 360°

37. The total number of diagonals in a heptagon is:
a) 7
b) 9
c) 14
d) 21
Answer: c) 14

38. A regular polygon with 18 sides has each exterior angle of:
a) 15°
b) 20°
c) 25°
d) 30°
Answer: b) 20°

39. If a polygon has 9 sides, how many triangles can be formed by drawing diagonals from one vertex?

a) 6
b) 7
c) 8
d) 9
Answer: b) 7

40. The largest possible exterior angle of a regular polygon is:
a) 45°
b) 60°
c) 90°
d) 120°
Answer: d) 120°

41. A polygon with 20 sides is called a:
a) Hexadecagon
b) Icosagon
c) Heptadecagon
d) Dodecagon
Answer: b) Icosagon

42. The number of diagonals in a decagon is:
a) 25
b) 35
c) 45
d) 55
Answer: b) 35

43. A regular polygon has each interior angle equal to 150°. How many sides does it have?
a) 10
b) 12
c) 15
d) 24
Answer: c) 12

44. A polygon with all angles less than 180° is called a:
a) Convex polygon
b) Concave polygon
c) Irregular polygon
d) Open polygon

Answer: a) Convex polygon

45. A triangle in which two sides are equal is called:
a) Scalene triangle
b) Isosceles triangle
c) Equilateral triangle
d) Right triangle
Answer: b) Isosceles triangle

46. If a regular polygon has 18 sides, the measure of each exterior angle is:
a) 10°
b) 15°
c) 20°
d) 25°
Answer: c) 20°

47. The measure of each interior angle of a 24-sided polygon is:
a) 160°
b) 162°
c) 165°
d) 172.5°
Answer: d) 172.5°

48. The number of sides of a regular polygon whose each exterior angle is 40° is:
a) 6
b) 8
c) 9
d) 12
Answer: c) 9

49. The measure of each exterior angle of a regular decagon is:
a) 36°
b) 40°
c) 45°
d) 50°
Answer: b) 36°

50. If a polygon has 50 sides, the sum of its interior angles is:
a) 8640°
b) 9000°

c) 8640°
d) 7200°
Answer: d) 8640°

51. A quadrilateral with opposite sides equal and diagonals bisecting each other at right angles is a:
a) Rhombus
b) Rectangle
c) Trapezium
d) Kite
Answer: a) Rhombus

52. A trapezium has how many pairs of parallel sides?
a) 1
b) 2
c) 3
d) 4
Answer: a) 1

53. A quadrilateral with one pair of parallel sides and non-parallel sides equal is a:
a) Square
b) Rhombus
c) Kite
d) Isosceles trapezium
Answer: d) Isosceles trapezium

54. In a parallelogram, the opposite angles are:
a) Equal
b) Complementary
c) Supplementary
d) None of these
Answer: a) Equal

55. A square is always a:
a) Rectangle
b) Rhombus
c) Parallelogram
d) All of these
Answer: d) All of these

56. A regular polygon has 120° as each interior angle. How many sides does it have?
a) 5
b) 6
c) 7
d) 8
Answer: b) 6

57. A regular polygon with 16 sides has each exterior angle equal to:
a) 15°
b) 18°
c) 22.5°
d) 30°
Answer: c) 22.5°

58. The number of diagonals in an octagon is:
a) 20
b) 21
c) 25
d) 28
Answer: a) 20

59. The total number of triangles formed by drawing diagonals from one vertex in a hexagon is:
a) 2
b) 3
c) 4
d) 6
Answer: c) 4

60. The number of sides in a polygon where the sum of interior angles is 900° is:
a) 6
b) 7
c) 8
d) 9
Answer: b) 7

61. A polygon with 15 sides is called a:
a) Decagon
b) Hexadecagon

c) Pentadecagon
d) Heptadecagon
Answer: c) Pentadecagon

62. The sum of the exterior angles of any polygon is always:
a) 180°
b) 270°
c) 360°
d) 540°
Answer: c) 360°

63. The sum of interior angles of a nonagon is:
a) 900°
b) 1080°
c) 1260°
d) 1440°
Answer: a) 1260°

64. The number of diagonals in a 20-sided polygon is:
a) 150
b) 170
c) 180
d) 190
Answer: a) 170

65. A regular polygon with an exterior angle of 30° has how many sides?
a) 10
b) 12
c) 15
d) 18
Answer: b) 12

66. A parallelogram with equal diagonals is a:
a) Rhombus
b) Rectangle
c) Trapezium
d) Kite
Answer: b) Rectangle

67. A trapezium is a quadrilateral with:

a) One pair of opposite sides parallel
b) Two pairs of opposite sides parallel
c) All sides equal
d) All angles equal
Answer: a) One pair of opposite sides parallel

68. A quadrilateral with all sides equal but angles not equal to 90° is called a:
a) Square
b) Rectangle
c) Rhombus
d) Trapezium
Answer: c) Rhombus

69. The sum of the interior angles of a quadrilateral is always:
a) 180°
b) 270°
c) 360°
d) 450°
Answer: c) 360°

70. In a kite, which of the following is always true?
a) Opposite sides are parallel
b) Diagonals bisect each other
c) One diagonal bisects the other at right angles
d) All angles are equal
Answer: c) One diagonal bisects the other at right angles

71. The sum of the interior angles of a polygon with n sides is given by the formula:
a) (n - 2) × 90°
b) (n - 2) × 180°
c) (n + 2) × 180°
d) (n + 2) × 90°
Answer: b) (n - 2) × 180°

72. The sum of the exterior angles of a dodecagon is:
a) 180°
b) 270°
c) 360°
d) 540°

Answer: c) 360°

73. The number of triangles formed by diagonals from one vertex in a heptagon is:
a) 3
b) 4
c) 5
d) 7
Answer: c) 5

74. A polygon has each exterior angle equal to 20°. The number of sides in the polygon is:
a) 12
b) 15
c) 18
d) 24
Answer: d) 18

75. The measure of each interior angle in a regular hexagon is:
a) 108°
b) 120°
c) 135°
d) 150°
Answer: b) 120°

76. A regular polygon with an interior angle of 144° has how many sides?
a) 10
b) 12
c) 15
d) 18
Answer: a) 10

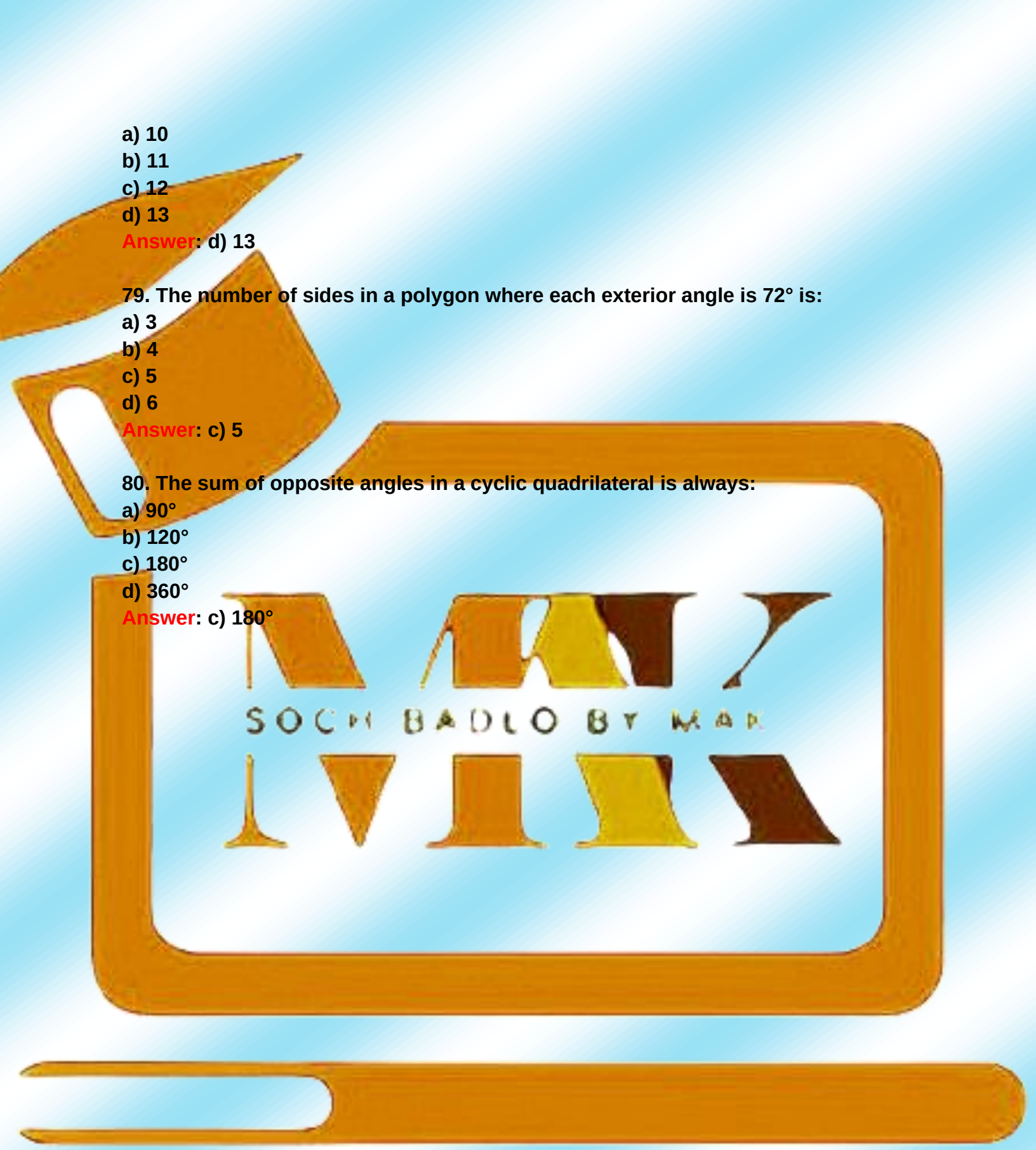
77. In a parallelogram, which statement is always true?
a) Diagonals are equal
b) Adjacent angles are equal
c) Opposite angles are equal
d) All sides are equal
Answer: c) Opposite angles are equal

78. A polygon with an interior angle sum of 1980° has how many sides?

a) 10
b) 11
c) 12
d) 13
Answer: d) 13

79. The number of sides in a polygon where each exterior angle is 72° is:
a) 3
b) 4
c) 5
d) 6
Answer: c) 5

80. The sum of opposite angles in a cyclic quadrilateral is always:
a) 90°
b) 120°
c) 180°
d) 360°
Answer: c) 180°



Chapter 10: Practical Geometry

MCQs

1. Which instrument is used to draw arcs and circles in practical geometry?
a) Ruler
b) Compass
c) Protractor
d) Divider
Answer: b) Compass

2. Which tool is used to measure and draw angles accurately?
a) Ruler
b) Protractor
c) Compass
d) Divider
Answer: b) Protractor

3. A perpendicular bisector of a line segment:
a) Divides it into three equal parts
b) Passes through one of its endpoints
c) Passes through its midpoint at 90°
d) Is parallel to the segment
Answer: c) Passes through its midpoint at 90°

4. The sum of the angles in a triangle is always:
a) 90°
b) 120°
c) 180°
d) 360°
Answer: c) 180°

5. A triangle with all three angles less than 90° is called:
a) Obtuse-angled triangle
b) Right-angled triangle
c) Acute-angled triangle
d) Scalene triangle
Answer: c) Acute-angled triangle

6. To construct a right-angled triangle, which method is most commonly used?
a) Protractor method
b) Compass method
c) Pythagoras theorem
d) All of these
Answer: d) All of these

7. A triangle can be constructed if:
a) Three sides are given
b) Two sides and one angle are given
c) Two angles and one side are given
d) All of these
Answer: d) All of these

8. To construct a perpendicular line from a point outside a line, we use a:
a) Compass
b) Ruler
c) Protractor
d) Divider
Answer: a) Compass

9. To construct an angle bisector, we use a:
a) Protractor
b) Compass and ruler
c) Ruler only
d) None of these
Answer: b) Compass and ruler

10. The shortest distance from a point to a line is:
a) A perpendicular line
b) A parallel line
c) A diagonal line

d) None of these
Answer: a) A perpendicular line

11. Two lines are perpendicular if they intersect at:
a) 45°
b) 60°
c) 90°
d) 120°
Answer: c) 90°

12. If two parallel lines are cut by a transversal, which angles are equal?
a) Corresponding angles
b) Alternate interior angles
c) Vertically opposite angles
d) Both (a) and (b)
Answer: d) Both (a) and (b)

13. If two lines do not intersect and are always the same distance apart, they are:
a) Perpendicular
b) Parallel
c) Intersecting
d) Skew
Answer: b) Parallel

14. The sum of interior angles on the same side of a transversal intersecting two parallel lines is:
a) 90°
b) 120°
c) 180°
d) 360°
Answer: c) 180°

15. If two lines are perpendicular, their slopes are:
a) Equal
b) Negative reciprocals
c) Both positive
d) Zero
Answer: b) Negative reciprocals

16. A quadrilateral can be constructed if we know:

a) Three sides and one diagonal
b) Four sides and one diagonal
c) Two adjacent sides and three angles
d) All of these
Answer: d) All of these

17. To construct a square using a compass and ruler, we must:
a) Draw one side and construct 90° angles
b) Draw diagonals and mark the four points
c) Use only a ruler
d) Use only a compass
Answer: a) Draw one side and construct 90° angles

18. The circumcenter of a triangle is the point where:
a) Medians intersect
b) Perpendicular bisectors intersect
c) Angle bisectors intersect
d) Altitudes intersect
Answer: b) Perpendicular bisectors intersect

19. The incenter of a triangle is found by constructing:
a) Perpendicular bisectors
b) Medians
c) Angle bisectors
d) Altitudes
Answer: c) Angle bisectors

20. A regular hexagon can be constructed using:
a) Protractor only
b) Compass only
c) Compass and ruler
d) Ruler only
Answer: c) Compass and ruler

21. The instrument used to draw and measure straight lines is:
a) Protractor
b) Compass
c) Ruler
d) Set square
Answer: c) Ruler

22. To construct a 60° angle without a protractor, we use:
a) A compass
b) A ruler
c) A set square
d) A divider
Answer: a) A compass

23. Which of the following angles cannot be constructed using only a compass and straightedge?
a) 45°
b) 60°
c) 75°
d) 37°
Answer: d) 37°

24. The perpendicular bisector of a segment is a line that:
a) Passes through the midpoint of the segment
b) Makes a 45° angle with the segment
c) Divides the segment into three equal parts
d) Is parallel to the segment
Answer: a) Passes through the midpoint of the segment

25. The method of constructing an angle of 90° using a compass involves:
a) Drawing a semicircle and marking intersections
b) Using a protractor
c) Drawing a square first
d) Measuring with a ruler
Answer: a) Drawing a semicircle and marking intersections

26. A triangle can always be constructed when given:
a) Any three angles
b) Any two sides and an included angle
c) Any two angles and one side
d) (b) and (c)
Answer: d) (b) and (c)

27. A right-angled triangle is best constructed using:
a) A compass
b) A protractor

c) A set square
d) A straightedge
Answer: c) A set square

28. The point where the altitudes of a triangle meet is called the:
a) Centroid
b) Circumcenter
c) Incenter
d) Orthocenter
Answer: d) Orthocenter

29. The perpendicular bisectors of a triangle always meet at the:
a) Incenter
b) Circumcenter
c) Centroid
d) Orthocenter
Answer: b) Circumcenter

30. If the three sides of a triangle are known, which construction method is used?
a) Side-Angle-Side (SAS)
b) Angle-Side-Angle (ASA)
c) Side-Side-Side (SSS)
d) None of these
Answer: c) Side-Side-Side (SSS)

31. A quadrilateral can be constructed if we know:
a) Four sides
b) Three sides and a diagonal
c) Two diagonals and three angles
d) All of these
Answer: d) All of these

32. Which of the following quadrilaterals cannot be constructed without additional information?
a) Square
b) Parallelogram
c) Trapezium
d) General quadrilateral
Answer: d) General quadrilateral

33. The diagonals of a rhombus always:
a) Bisect each other at right angles
b) Are equal in length
c) Are parallel
d) Are perpendicular but not bisecting
Answer: a) Bisect each other at right angles

34. The centroid of a triangle divides each median in the ratio:
a) 1:1
b) 1:2
c) 2:1
d) 3:2
Answer: c) 2:1

35. The sum of the interior angles of a quadrilateral is always:
a) 90°
b) 180°
c) 270°
d) 360°
Answer: d) 360°

36. The circumcircle of a triangle is the circle that:
a) Passes through the midpoints of the sides
b) Passes through all three vertices of the triangle
c) Touches the sides at one point each
d) Has the incenter as its center
Answer: b) Passes through all three vertices of the triangle

37. The point where the three angle bisectors of a triangle meet is called:
a) Centroid
b) Incenter
c) Orthocenter
d) Circumcenter
Answer: b) Incenter

38. The perpendicular bisector of a chord of a circle always:
a) Passes through the center of the circle
b) Passes through another point on the circle
c) Lies outside the circle
d) Is parallel to the chord

Answer: a) Passes through the center of the circle

39. The largest possible circle inside a triangle is called the:
a) Circumcircle
b) Incircle
c) Excircle
d) None of these
Answer: b) Incircle

40. If a triangle is equilateral, then its centroid, incenter, circumcenter, and orthocenter:
a) Are at different locations
b) Coincide at a single point
c) Form a rectangle inside the triangle
d) Form a perpendicular bisector
Answer: b) Coincide at a single point

41. A compass is mainly used to:
a) Draw angles
b) Measure distances
c) Draw arcs and circles
d) Construct perpendicular lines
Answer: c) Draw arcs and circles

42. A set square is commonly used to construct angles of:
a) 30° and 45°
b) 60° and 90°
c) 30°, 45°, 60°, and 90°
d) 120° and 150°
Answer: c) 30°, 45°, 60°, and 90°

43. The best method to construct a 45° angle without a protractor is by:
a) Using a compass to construct a 60° angle first
b) Bisecting a 90° angle
c) Measuring with a ruler
d) Using a set square
Answer: b) Bisecting a 90° angle

44. The line that divides an angle into two equal parts is called:
a) Perpendicular bisector

b) Median
c) Angle bisector
d) Altitude
Answer: c) Angle bisector

45. A triangle can be uniquely constructed when:
a) Two sides and one angle are given
b) Three sides are given
c) Two angles and one side are given
d) All of these
Answer: d) All of these

46. If the three angles of a triangle are given, can the triangle be constructed?
a) Always
b) Never
c) Sometimes, if at least one side is known
d) Only if one angle is 90°
Answer: c) Sometimes, if at least one side is known

47. The medians of a triangle intersect at a point called the:
a) Circumcenter
b) Incenter
c) Centroid
d) Orthocenter
Answer: c) Centroid

48. The perpendicular distance from a vertex to the opposite side in a triangle is called:
a) Median
b) Angle bisector
c) Perpendicular bisector
d) Altitude
Answer: d) Altitude

49. A triangle in which all angles are equal is called:
a) Isosceles triangle
b) Scalene triangle
c) Equilateral triangle
d) Right-angled triangle
Answer: c) Equilateral triangle

50. The circumcenter of a triangle is the point where:
a) The three angle bisectors meet
b) The three perpendicular bisectors meet
c) The three medians meet
d) The three altitudes meet
Answer: b) The three perpendicular bisectors meet

51. To construct a parallelogram, we need to know:
a) Two adjacent sides and one diagonal
b) Two opposite angles and one diagonal
c) Two adjacent sides and one angle
d) Any two sides and one diagonal
Answer: c) Two adjacent sides and one angle

52. The sum of interior angles of any polygon with "n" sides is:
a) (n - 2) × 180°
b) (n - 2) × 90°
c) n × 180°
d) (n + 2) × 90°
Answer: a) (n - 2) × 180°

53. In a rhombus, all angles are:
a) Equal
b) Right angles
c) Equal but not necessarily right angles
d) None of these
Answer: d) None of these

54. A square can be constructed if we know:
a) One diagonal
b) One side
c) One angle and one diagonal
d) Any one of these
Answer: b) One side

55. If a transversal cuts two parallel lines, then the corresponding angles are:
a) Supplementary
b) Complementary
c) Equal

d) None of these
Answer: c) Equal

56. The center of a circle is located using:
a) Two perpendicular diameters
b) One diameter only
c) Any two non-parallel chords
d) A ruler
Answer: c) Any two non-parallel chords

57. The longest chord of a circle is:
a) A radius
b) A secant
c) A diameter
d) A tangent
Answer: c) A diameter

58. A line that touches a circle at only one point is called:
a) A secant
b) A chord
c) A radius
d) A tangent
Answer: d) A tangent

59. If a circle has radius r, its diameter is:
a) r/2
b) 2r
c) 3r
d) πr
Answer: b) 2r

60. A triangle inscribed inside a circle where one side is the diameter is always:
a) Isosceles
b) Right-angled
c) Scalene
d) Equilateral
Answer: b) Right-angled

61. The correct method to construct a 90° angle is:
a) Using a ruler and compass

b) Measuring directly with a protractor
c) Bisecting a 180° angle
d) Drawing a semicircle and marking intersections
Answer: d) Drawing a semicircle and marking intersections

62. A perpendicular line to a given line can be constructed using:
a) A ruler only
b) A compass only
c) A set square
d) Both b and c
Answer: d) Both b and c

63. If a point is equidistant from the endpoints of a segment, it must lie on:
a) The perpendicular bisector of the segment
b) The angle bisector of the segment
c) The median of the segment
d) The altitude of the segment
Answer: a) The perpendicular bisector of the segment

64. The correct construction to bisect a line segment is:
a) Draw a circle with the segment as a radius
b) Measure half of the segment and mark a point
c) Use a compass to draw arcs from both ends
d) None of these
Answer: c) Use a compass to draw arcs from both ends

65. The locus of points equidistant from two parallel lines is:
a) A circle
b) A straight line in between
c) A perpendicular bisector
d) A triangle
Answer: b) A straight line in between

66. A triangle can be constructed using SAS rule when:
a) Two angles and a side are known
b) Two sides and an included angle are known
c) Three angles are known
d) One side and two non-included angles are known
Answer: b) Two sides and an included angle are known

67. If we are given two angles and one side, we use which rule?
a) SSS
b) SAS
c) ASA
d) None of these
Answer: c) ASA

68. The centroid of a triangle divides each median in the ratio:
a) 1:2
b) 2:1
c) 3:1
d) 1:1
Answer: b) 2:1

69. The altitudes of a triangle always meet at the:
a) Incenter
b) Circumcenter
c) Centroid
d) Orthocenter
Answer: d) Orthocenter

70. If a triangle is right-angled, its circumcenter lies:
a) Inside the triangle
b) Outside the triangle
c) On the hypotenuse
d) At the centroid
Answer: c) On the hypotenuse

71. A parallelogram can be constructed if we know:
a) Two adjacent sides and one diagonal
b) Two opposite angles and one diagonal
c) Two adjacent sides and one angle
d) Any two sides and one diagonal
Answer: c) Two adjacent sides and one angle

72. A square is best constructed by:
a) Constructing four equal sides
b) Constructing a rectangle first
c) Using a protractor and a ruler
d) Measuring diagonals only

Answer: a) Constructing four equal sides

73. The diagonals of a rhombus:
a) Are equal
b) Bisect each other perpendicularly
c) Are parallel
d) None of these
Answer: b) Bisect each other perpendicularly

74. The sum of interior angles of a quadrilateral is:
a) 180°
b) 270°
c) 360°
d) 540°
Answer: c) 360°

75. The diagonals of a rectangle:
a) Are perpendicular to each other
b) Are equal and bisect each other
c) Are unequal and bisect each other
d) Do not bisect each other
Answer: b) Are equal and bisect each other

76. A circle can be constructed if we know:
a) Only the radius
b) Only the diameter
c) Only one chord
d) Either (a) or (b)
Answer: d) Either (a) or (b)

77. If a circle is tangent to two given lines, its center lies on:
a) Their bisector
b) Their perpendicular bisector
c) Their common chord
d) Their circumcircle
Answer: a) Their bisector

78. A chord passing through the center of a circle is called:
a) Radius
b) Diameter

c) Tangent
d) Secant
Answer: b) Diameter

79. The perpendicular bisector of any chord in a circle always passes through:
a) The center
b) Another chord
c) A tangent
d) The arc
Answer: a) The center

80. A tangent to a circle always makes what angle with the radius at the point of contact?
a) 30°
b) 60°
c) 90°
d) 120°
Answer: c) 90°

Chapter 11: Basic Statistics

MCQs

1. Statistics is the branch of mathematics that deals with:
a) Geometry
b) Data collection, organization, and analysis
c) Algebra
d) Trigonometry
Answer: b) Data collection, organization, and analysis

2. The average of a data set is called:
a) Mode
b) Median
c) Mean
d) Range
Answer: c) Mean

3. The most frequently occurring value in a data set is called:
a) Mean
b) Median
c) Mode
d) Range
Answer: c) Mode

4. The middle value when data is arranged in ascending or descending order is:
a) Mean
b) Median
c) Mode
d) Standard deviation
Answer: b) Median

5. The difference between the highest and lowest values in a data set is called:
a) Mean

b) Mode
c) Range
d) Variance
Answer: c) Range
6. Data collected in numerical form is called:
a) Qualitative data
b) Categorical data
c) Quantitative data
d) Discrete data
Answer: c) Quantitative data
7. Categorical data represents:
a) Numbers only
b) Labels or categories
c) Both numbers and labels
d) Only whole numbers
Answer: b) Labels or categories
8. Data that can only take specific values (such as whole numbers) is called:
a) Continuous data
b) Discrete data
c) Categorical data
d) Unorganized data
Answer: b) Discrete data
9. Data that can take any value within a range is called:
a) Discrete data
b) Ordinal data
c) Continuous data
d) Nominal data
Answer: c) Continuous data
10. The number of siblings a student has is an example of:
a) Discrete data
b) Continuous data
c) Categorical data
d) Ordinal data
Answer: a) Discrete data
11. A bar graph is used to represent:
a) Continuous data
b) Discrete data
c) Both a and b
d) None of these
Answer: c) Both a and b

12. A histogram is different from a bar graph because:
a) It has gaps between bars
b) The bars are connected
c) It only represents categorical data
d) It is 3D
Answer: b) The bars are connected
13. A pie chart is best used to show:
a) Trends over time
b) Proportions of a whole
c) Frequency distribution
d) Individual numbers
Answer: b) Proportions of a whole
14. A line graph is mainly used for:
a) Showing data over time
b) Comparing categories
c) Displaying individual numbers
d) Finding averages
Answer: a) Showing data over time
15. A pictogram represents data using:
a) Lines
b) Bars
c) Pictures or symbols
d) Dots
Answer: c) Pictures or symbols
16. The measure of how spread out the data is called:
a) Mean
b) Mode
c) Range
d) Variance
Answer: d) Variance
17. A low standard deviation means the data values are:
a) Spread out
b) Close to the mean
c) Randomly distributed
d) Very large
Answer: b) Close to the mean
18. A high range indicates:
a) Less variation in data
b) More variation in data
c) No variation in data

d) A lower mean
Answer: b) More variation in data
19. If the mode of a dataset is not unique, the dataset is called:
a) Bimodal or multimodal
b) Unimodal
c) Continuous
d) Normal
Answer: a) Bimodal or multimodal
20. If a dataset has no repeating values, the mode is:
a) The highest value
b) The lowest value
c) Not defined
d) The median
Answer: c) Not defined
21. The first step in a statistical study is:
a) Analyzing data
b) Collecting data
c) Organizing data
d) Drawing conclusions
Answer: b) Collecting data
22. The term population in statistics refers to:
a) A small selected group
b) The entire group under study
c) Only the numerical data
d) Only a sample
Answer: b) The entire group under study
23. A subset of a population selected for analysis is called:
a) Sample
b) Data
c) Population
d) Parameter
Answer: a) Sample
24. A study that collects data from every member of a population is called:
a) Survey
b) Census
c) Sample study
d) Data analysis
Answer: b) Census
25. The process of arranging data in a meaningful order is called:
a) Data collection

b) Data sorting
c) Data organization
d) Data summarization
Answer: c) Data organization
26. If the mean of three numbers 5, x, and 9 is 7, the value of x is:
a) 5
b) 6
c) 7
d) 9
Answer: c) 7
27. If all values in a dataset are the same, the mean and median are:
a) Different
b) Equal
c) Cannot be determined
d) Zero
Answer: b) Equal
28. The mean of 6, 8, 10, 12, 14 is:
a) 9
b) 10
c) 11
d) 12
Answer: b) 10
29. If the mode of a dataset is 15, it means:
a) The mean is also 15
b) 15 is the most frequently occurring value
c) 15 is the middle value
d) The range is 15
Answer: b) 15 is the most frequently occurring value
30. If a dataset has an even number of observations, the median is:
a) The middle number
b) The highest value
c) The average of the two middle numbers
d) The lowest value
Answer: c) The average of the two middle numbers
31. A frequency table is used to:
a) Organize data into groups
b) Show trends over time
c) Compare two datasets
d) Display data pictorially
Answer: a) Organize data into groups

32. The sum of all frequencies in a frequency distribution equals:
a) The mean
b) The total number of observations
c) The median
d) The range
Answer: b) The total number of observations
33. A cumulative frequency is:
a) The sum of all data points
b) The total of all previous frequencies up to a certain point
c) The highest frequency in a table
d) The mode of a dataset
Answer: b) The total of all previous frequencies up to a certain point
34. The best graph to show how a quantity changes over time is:
a) Bar graph
b) Pie chart
c) Line graph
d) Histogram
Answer: c) Line graph
35. A stem-and-leaf plot is a way to:
a) Display data using digits
b) Compare two bar graphs
c) Find the mean
d) Calculate the standard deviation
Answer: a) Display data using digits
36. The probability of an impossible event is:
a) 1
b) 0
c) 0.5
d) 2
Answer: b) 0
37. The probability of an event always lies between:
a) -1 and 1
b) 0 and 1
c) 0 and 100
d) 1 and 2
Answer: b) 0 and 1
38. If a coin is tossed, the probability of getting heads is:
a) 1
b) 0.5
c) 0

d) 2

Answer: b) 0.5

39. If a die is rolled, the probability of getting an even number is:

a) 1/6

b) 1/2

c) 1/3

d) 2/3

Answer: b) 1/2

40. If a deck has 52 playing cards, what is the probability of drawing a heart?

a) 1/4

b) 1/3

c) 1/2

d) 1/5

Answer: a) 1/4

41. The method of collecting data by personally visiting people and asking questions is called:

a) Questionnaire method

b) Direct observation

c) Interview method

d) Experimentation

Answer: c) Interview method

42. The method where data is collected without direct interaction is called:

a) Survey

b) Direct observation

c) Secondary data collection

d) Census

Answer: b) Direct observation

43. A random sample is one in which:

a) Every member has an equal chance of selection

b) Only selected groups are included

c) The researcher selects the sample manually

d) Data is collected from the entire population

Answer: a) Every member has an equal chance of selection

44. When a population is divided into groups and a sample is taken from each, it is called:

a) Simple random sampling

b) Systematic sampling

c) Stratified sampling

d) Cluster sampling

Answer: c) Stratified sampling

45. The process of collecting data from already published sources is called:
a) Primary data collection
b) Secondary data collection
c) Census
d) Direct sampling
Answer: b) Secondary data collection
46. Which of the following is a measure of dispersion?
a) Mean
b) Median
c) Mode
d) Standard deviation
Answer: d) Standard deviation
47. The larger the standard deviation, the:
a) More spread out the data
b) Less spread out the data
c) Closer all values are to the mean
d) Data becomes constant
Answer: a) More spread out the data
48. The range of the data set 5, 8, 12, 15, 20 is:
a) 5
b) 8
c) 15
d) 20
Answer: c) 15 (20 - 5)
49. If all values in a dataset are identical, the standard deviation is:
a) 0
b) 1
c) Negative
d) Infinity
Answer: a) 0
50. The difference between a data value and the mean is called:
a) Range
b) Deviation
c) Median
d) Mode
Answer: b) Deviation
51. A box plot is used to display:
a) Measures of central tendency
b) Measures of dispersion
c) The distribution of a dataset

d) Only the mean and median
Answer: c) The distribution of a dataset
52. A frequency polygon is a type of:
a) Bar graph
b) Line graph
c) Histogram
d) Pie chart
Answer: b) Line graph
53. In a histogram, bars are placed:
a) Close together without gaps
b) With gaps
c) Randomly
d) In descending order
Answer: a) Close together without gaps
54. Which graph is best for comparing parts of a whole?
a) Line graph
b) Pie chart
c) Histogram
d) Box plot
Answer: b) Pie chart
55. A scatter plot is used to show:
a) Trends over time
b) The relationship between two variables
c) Frequency of data
d) Categorical data
Answer: b) The relationship between two variables
56. If a probability is 1, it means:
a) The event is impossible
b) The event is certain
c) The event cannot happen
d) The event is rare
Answer: b) The event is certain
57. The probability of an event that will never happen is:
a) 0
b) 0.5
c) 1
d) 2
Answer: a) 0
58. If a dice is rolled, what is the probability of getting a number greater than 4?
a) 1/3

b) 1/2
c) 2/3
d) 5/6
Answer: a) 1/3 (Only 5 and 6 are greater than 4, so 2/6 = 1/3)
59. A box contains 4 red, 3 blue, and 2 green balls. If a ball is picked at random, what is the probability of getting a blue ball?
a) 1/3
b) 3/9
c) 2/3
d) 3/10
Answer: b) 3/9 (or 1/3)
60. If a fair coin is flipped twice, what is the probability of getting two heads?
a) 1/2
b) 1/4
c) 1/3
d) 2/3
Answer: b) 1/4 (Probability of heads = 1/2, so (1/2) × (1/2) = 1/4)