

Mathematics MCQ Practice

+2 1st Year (Class XI)

55 questions · 14 chapters · answers with explanations

How to use: attempt each chapter's questions without looking, then check the Answer Key at the end. Read the one-line explanation for every question you got wrong, and revise that topic in your notes.

Sets

1. If A has 3 elements, the number of subsets of A is
(a) 3 (b) 6
(c) 8 (d) 9
2. $A \cup A'$ equals
(a) A (b) ϕ
(c) the universal set U (d) A'
3. If $n(A) = 10$, $n(B) = 15$ and $n(A \cap B) = 5$, then $n(A \cup B)$ is
(a) 25 (b) 20
(c) 30 (d) 15
4. Which of these is the empty set?
(a) $\{0\}$
(b) $\{x : x \text{ is a natural number less than } 1\}$
(c) $\{\phi\}$
(d) $\{1\}$

Relations and Functions

5. If $A = \{1, 2\}$ and $B = \{a, b, c\}$, the number of elements in $A \times B$ is
(a) 5 (b) 6
(c) 8 (d) 9
6. The domain of $f(x) = \sqrt{x - 2}$ is
(a) $x \geq 2$ (b) $x > 2$
(c) $x \leq 2$ (d) all real x
7. If $f(x) = x^2 + 1$, then $f(-2)$ is
(a) -3 (b) 5
(c) 3 (d) -5
8. The range of $f(x) = |x|$ is
(a) all real numbers (b) $[0, \infty)$
(c) $(0, \infty)$ (d) $(-\infty, 0]$

Trigonometric Functions

9. 180° equals how many radians?

- (a) $\pi/2$ (b) π
(c) 2π (d) 1

10. $\sin^2\theta + \cos^2\theta$ equals

- (a) 0 (b) 1
(c) 2 (d) $\tan^2\theta$

11. The value of $\sin 30^\circ$ is

- (a) $1/2$ (b) $\sqrt{3}/2$
(c) 1 (d) 0

12. The period of $\sin x$ is

- (a) π (b) 2π
(c) $\pi/2$ (d) 4π

13. $\cos(A + B)$ equals

- (a) $\cos A \cos B + \sin A \sin B$ (b) $\cos A \cos B - \sin A \sin B$
(c) $\sin A \cos B + \cos A \sin B$ (d) $\sin A \sin B - \cos A \cos B$

Complex Numbers and Quadratic Equations

14. The value of i^2 is

- (a) 1 (b) -1
(c) i (d) 0

15. i^4 equals

- (a) i (b) -1
(c) 1 (d) $-i$

16. The modulus of $3 + 4i$ is

- (a) 5 (b) 7
(c) 25 (d) 1

17. The conjugate of $2 - 3i$ is

- (a) $2 + 3i$ (b) $-2 + 3i$
(c) $-2 - 3i$ (d) $3 - 2i$

18. The roots of $x^2 + 1 = 0$ are

- (a) ± 1 (b) $\pm i$
(c) 0 and 1 (d) no roots at all

Linear Inequalities

19. The solution of $2x - 3 > 5$ is

- (a) $x > 4$ (b) $x < 4$
(c) $x > 1$ (d) $x \geq 4$

20. If $-3x > 9$, then

- (a) $x > -3$ (b) $x < -3$
(c) $x > 3$ (d) $x < 3$

21. The solution of $|x| < 3$ is

- (a) $x < 3$ (b) $-3 < x < 3$
(c) $x > -3$ (d) $x > 3$ or $x < -3$

Permutations and Combinations

22. The value of $5!$ is
(a) 20 (b) 60
(c) 120 (d) 24
23. 5C_2 equals
(a) 10 (b) 20
(c) 5 (d) 15
24. The number of ways to arrange the letters of the word "CAT" is
(a) 3 (b) 6
(c) 9 (d) 27
25. nC_r equals
(a) ${}^nC_{n-r}$ (b) nP_r
(c) $r!$ (d) $n!$

Binomial Theorem

26. The number of terms in the expansion of $(a + b)^8$ is
(a) 8 (b) 9
(c) 7 (d) 16
27. The sum of the binomial coefficients in $(1 + x)^n$ is
(a) n (b) 2^n
(c) n^2 (d) $n!$
28. The general term in $(a + b)^n$ is
(a) ${}^nC_r a^r b^{n-r}$ (b) ${}^nC_r a^{n-r} b^r$
(c) ${}^nP_r a^{n-r} b^r$ (d) $a^n b^r$
29. The middle term of $(x + y)^6$ is the
(a) 3rd term (b) 4th term
(c) 5th term (d) 6th term

Sequences and Series

30. The 10th term of the AP 2, 5, 8, ... is
(a) 29 (b) 32
(c) 30 (d) 27
31. The sum of the first n natural numbers is
(a) $n(n + 1)$ (b) $n(n + 1)/2$
(c) n^2 (d) $n(n - 1)/2$
32. The common ratio of the GP 3, 6, 12, ... is
(a) 3 (b) 2
(c) 6 (d) $1/2$
33. The sum of the infinite GP $1 + 1/2 + 1/4 + \dots$ is
(a) 1 (b) 2
(c) ∞ (d) $3/2$

Straight Lines

34. The slope of the line joining (1, 2) and (3, 6) is
 (a) 2 (b) 4
 (c) $\frac{1}{2}$ (d) 3
35. Two lines are perpendicular if the product of their slopes is
 (a) 1 (b) 0
 (c) -1 (d) ∞
36. The slope of the line $2x + 3y = 6$ is
 (a) $\frac{2}{3}$ (b) $-\frac{2}{3}$
 (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$
37. The distance between (0, 0) and (3, 4) is
 (a) 5 (b) 7
 (c) 25 (d) 1

Conic Sections

38. The centre and radius of $x^2 + y^2 = 25$ are
 (a) (0, 0), 5 (b) (0, 0), 25
 (c) (5, 5), 5 (d) (1, 1), 5
39. The eccentricity of a circle is
 (a) 0 (b) 1
 (c) greater than 1 (d) between 0 and 1
40. The focus of the parabola $y^2 = 8x$ is
 (a) (2, 0) (b) (8, 0)
 (c) (0, 2) (d) (4, 0)
41. For a hyperbola, the eccentricity is
 (a) 0 (b) 1
 (c) greater than 1 (d) less than 1

Introduction to Three-Dimensional Geometry

42. The distance of the point (1, 2, 2) from the origin is
 (a) 3 (b) 5
 (c) $\sqrt{5}$ (d) 9
43. A point on the x-axis has coordinates of the form
 (a) (x, 0, 0) (b) (0, y, 0)
 (c) (0, 0, z) (d) (x, y, 0)
44. The midpoint of (2, 4, 6) and (4, 6, 8) is
 (a) (3, 5, 7) (b) (6, 10, 14)
 (c) (1, 1, 1) (d) (2, 2, 2)

Limits and Derivatives

45. $\lim_{x \rightarrow 0} \sin x / x$ is
 (a) 0 (b) 1
 (c) ∞ (d) does not exist

46. The derivative of x^3 is

(a) $3x^2$

(c) $3x$

(b) x^2

(d) $x^4/4$

47. The derivative of $\sin x$ is

(a) $\cos x$

(c) $-\sin x$

(b) $-\cos x$

(d) $\tan x$

48. $\lim_{x \rightarrow 2}$ of $(x^2 - 4)/(x - 2)$ is

(a) 0

(c) 4

(b) 2

(d) ∞

Statistics

49. The variance is the square of the

(a) mean

(c) median

(b) standard deviation

(d) range

50. The mean of 2, 4, 6, 8, 10 is

(a) 5

(c) 7

(b) 6

(d) 30

51. The range of 3, 7, 1, 9, 5 is

(a) 8

(c) 6

(b) 9

(d) 1

Probability

52. The probability of getting a head when a fair coin is tossed is

(a) 0

(c) 1

(b) $1/2$

(d) $1/4$

53. The probability of an impossible event is

(a) 0

(c) $1/2$

(b) 1

(d) -1

54. A die is thrown. The probability of getting an even number is

(a) $1/6$

(c) $1/2$

(b) $1/3$

(d) $2/3$

55. If $P(A) = 0.3$, then $P(\text{not } A)$ is

(a) 0.3

(c) 1.3

(b) 0.7

(d) 0

Answer Key with Explanations

Sets

1. (c) $8 - 2^3 = 8$.
2. (c) the universal set $U - A$ set and its complement together make U .
3. (b) $20 - 10 + 15 - 5 = 20$.
4. (b) $\{x : x \text{ is a natural number less than } 1\}$ — There is no natural number less than 1.

Relations and Functions

5. (b) $6 - 2 \times 3 = 6$.
6. (a) $x \geq 2$ — The value under the root must be ≥ 0 .
7. (b) $5 - (-2)^2 + 1 = 5$.
8. (b) $[0, \infty)$ — The modulus is never negative.

Trigonometric Functions

9. (b) $\pi - \pi \text{ radians} = 180^\circ$.
10. (b) 1 — Basic identity.
11. (a) $1/2$ — Standard value.
12. (b) $2\pi - \sin(x + 2\pi) = \sin x$.
13. (b) $\cos A \cos B - \sin A \sin B$ — Compound angle formula.

Complex Numbers and Quadratic Equations

14. (b) $-1 - i = \sqrt{-1}$.
15. (c) $1 - (i^2)^2 = (-1)^2 = 1$.
16. (a) $5 - \sqrt{9 + 16} = 5$.
17. (a) $2 + 3i$ — Change the sign of the imaginary part.
18. (b) $\pm i - x^2 = -1 \rightarrow x = \pm i$.

Linear Inequalities

19. (a) $x > 4 - 2x > 8 \rightarrow x > 4$.
20. (b) $x < -3$ — Dividing by a negative number reverses the sign.
21. (b) $-3 < x < 3$ — The distance from 0 is less than 3.

Permutations and Combinations

22. (c) $120 - 5 \times 4 \times 3 \times 2 \times 1$.
23. (a) $10 - 5!/(2! 3!) = 10$.
24. (b) $6 - 3! = 6$.
25. (a) ${}^nC_{n-r}$ — Choosing r is the same as leaving out $n - r$.

Binomial Theorem

26. (b) 9 — $n + 1$ terms.
27. (b) 2^n — Put $x = 1$.
28. (b) ${}^nC_r a^{n-r} b^r - T_{r+1} = {}^nC_r a^{n-r} b^r$.
29. (b) 4th term — 7 terms, so the middle one is the 4th.

Sequences and Series

30. (a) 29 — $a + 9d = 2 + 27 = 29$.
31. (b) $n(n + 1)/2$ — Standard formula.
32. (b) $2 - 6/3 = 2$.
33. (b) 2 — $S = a/(1 - r) = 1/(1/2) = 2$.

Straight Lines

34. (a) 2 — $(6 - 2)/(3 - 1) = 2$.
35. (c) $-1 - m_1 m_2 = -1$.

36. (b) $-2/3$ — $y = -(2/3)x + 2$.

37. (a) 5 — $\sqrt{9 + 16} = 5$.

Conic Sections

38. (a) $(0, 0)$, 5 — Standard form $x^2 + y^2 = r^2$.

39. (a) 0 — A circle is an ellipse with $e = 0$.

40. (a) $(2, 0)$ — $y^2 = 4ax \rightarrow a = 2$, focus $(a, 0)$.

41. (c) greater than 1 — $e > 1$ for every hyperbola.

Introduction to Three-Dimensional Geometry

42. (a) 3 — $\sqrt{1 + 4 + 4} = 3$.

43. (a) $(x, 0, 0)$ — $y = z = 0$ on the x-axis.

44. (a) $(3, 5, 7)$ — Average each coordinate.

Limits and Derivatives

45. (b) 1 — Standard limit.

46. (a) $3x^2$ — $d/dx(x^n) = n x^{n-1}$.

47. (a) $\cos x$ — Standard result.

48. (c) 4 — It simplifies to $x + 2 = 4$.

Statistics

49. (b) standard deviation — $\sigma^2 = \text{variance}$.

50. (b) 6 — $30/5 = 6$.

51. (a) 8 — $9 - 1 = 8$.

Probability

52. (b) $1/2$ — Two equally likely outcomes.

53. (a) 0 — It can never happen.

54. (c) $1/2$ — 3 out of 6 outcomes.

55. (b) 0.7 — $1 - 0.3$.