

SCO INTERNATIONAL MATHS OLYMPIAD

CLASS 11 | QUESTION PAPER SET H

Solved and formatted edition with answer key, explanations, and corrected question blocks

Designed for website publishing, student practice, teacher review, and parent-guided preparation.

- 35 carefully formatted questions across General Mathematics, Assertion and Reason, Everyday Mathematics, and Achievers Section.
- Each question is placed in a clean question block with options, correct answer, and explanation.
- Passage-style word problems are kept inside the question block for easy copying into web pages or PDFs.
- Reviewed for answer-key accuracy, grammar, duplicate ambiguity, and grade-appropriate mathematical clarity.

Maths	Reasoning	Calendar	Word Problems
Time	Fractions	Data	Achievers

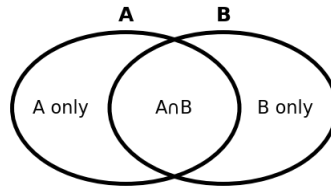
Class	Questions	Time	Type
11	35	1 hour	Objective MCQ

Section A - General Mathematics

Q.1

Sets

In a class, 18 students like algebra, 12 students like geometry, and 25 students like at least one of the two topics. How many students like both algebra and geometry?



A. 3

B. 5

C. 7

D. 8

Answer: B

Explanation: Use $n(A \cup B) = n(A) + n(B) - n(A \cap B)$. Thus $25 = 18 + 12 - x$, so $x = 5$.

Q.2

Relations and Functions

On the set of integers, define a relation R by aRb if $a-b$ is even. Which statement is correct?

A. R is not reflexive

B. R is reflexive, symmetric and transitive

C. R is symmetric only

D. R is transitive only

Answer: B

Explanation: For any integer a , $a-a=0$ is even, so reflexive. If $a-b$ is even, then $b-a$ is even, so symmetric. If $a-b$ and $b-c$ are even, then $a-c$ is even, so transitive.

Q.3

Relations and Functions

 If $f(x) = (2x-3)/(x+1)$, find $f(2)$.

 A. $1/3$

 B. $2/3$

C. 1

D. 3

Answer: A

 Explanation: $f(2) = (2(2)-3)/(2+1) = (4-3)/3 = 1/3$.

Q.4

Trigonometric Functions

 Find the solutions of $\sin(2x) = \sqrt{3}/2$ for $0 \leq x \leq \pi$.

 A. $x = \pi/6, \pi/3$

 B. $x = \pi/3$ only

 C. $x = \pi/6$ only

 D. $x = \pi/4, 3\pi/4$
Answer: A

 Explanation: Since $2x$ lies in $[0, 2\pi]$, $\sin(2x) = \sqrt{3}/2$ at $2x = \pi/3$ and $2\pi/3$. Hence $x = \pi/6$ and $\pi/3$.

Q.5

Principle of Mathematical Induction

Which statement is suitable for proving by mathematical induction?

A. Every real number is positive

 B. $7^n - 1$ is divisible by 6 for every positive integer n

 C. π is rational

D. Every triangle is equilateral

Answer: B

 Explanation: Induction is used for statements indexed by natural numbers. The divisibility statement involving n is a standard induction claim.

Q.6

Complex NumbersIf $z=3+4i$, find $|z|$.

A. 3

B. 4

C. 5

D. 7

Answer: CExplanation: $|z|=\sqrt{(3^2+4^2)}=\sqrt{25}=5$.

Q.7

Quadratic EquationsFor what value of k does $x^2-4x+k=0$ have equal roots?

A. 2

B. 3

C. 4

D. 5

Answer: CExplanation: Equal roots require discriminant 0. Here $(-4)^2-4(1)(k)=0$ gives $16-4k=0$, so $k=4$.

Q.8

Linear InequalitiesSolve the inequality $3x-5\leq 7$.A. $x\leq 4$ B. $x\geq 4$ C. $x<4$ D. $x>4$ **Answer: A**Explanation: $3x\leq 12$, so $x\leq 4$.

Q.9

Permutations and Combinations

How many distinct arrangements can be made from the letters of the word LEVEL?

A. 20

B. 30

C. 60

D. 120

Answer: BExplanation: LEVEL has 5 letters with L repeated twice and E repeated twice. Distinct arrangements = $5!/(2!2!) = 30$.

Q.10

Permutations and Combinations

A committee of 3 students is to be selected from 8 students. How many committees are possible?

A. 24

B. 56

C. 336

D. 512

Answer: BExplanation: Committees are unordered selections. Number of committees = $C(8,3)=56$.

Q.11

Binomial TheoremFind the coefficient of x^3 in the expansion of $(1+2x)^5$.

A. 40

B. 60

C. 80

D. 120

Answer: CExplanation: Coefficient of x^3 is $C(5,3)(2)^3 = 10 \times 8 = 80$.

Q.12

Sequences and Series

The first term of an arithmetic progression is 7 and the common difference is 5. What is the 8th term?

A. 37

B. 42

C. 47

D. 52

Answer: B

 Explanation: $a_8 = a + 7d = 7 + 7(5) = 42$.

Q.13

Sequences and Series

Find the sum of the first 6 terms of the geometric progression 3, 6, 12, ...

A. 93

B. 96

C. 189

D. 192

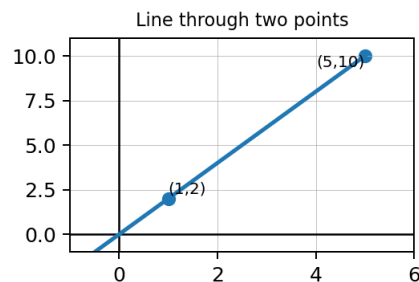
Answer: C

 Explanation: Here $a=3$ and $r=2$. Sum = $a(r^6-1)/(r-1) = 3(64-1)=189$.

Q.14

Straight Lines

Find the slope of the line joining (1,2) and (5,10).



A. 1

B. 2

C. 3

D. 4

Answer: B

Explanation: Slope = $(10-2)/(5-1) = 8/4 = 2$.

Q.15

Straight Lines

Find the distance from the point (2,-1) to the line $3x+4y+5=0$.

A. 1/5

B. 3/5

C. 7/5

D. 5

Answer: C

Explanation: Distance = $|3(2)+4(-1)+5|/\sqrt{3^2+4^2} = |6-4+5|/5 = 7/5$.

Q.16

Conic Sections

Find the centre and radius of the circle $x^2+y^2-6x+8y-11=0$.

A. Centre (3,-4), radius 6

B. Centre (-3,4), radius 6

C. Centre (3,4), radius 6

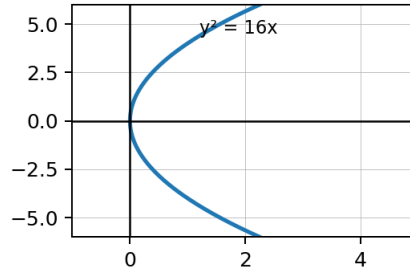
D. Centre (3,-4), radius 3

Answer: A

Explanation: Complete squares: $(x-3)^2 + (y+4)^2 = 36$. Centre is (3,-4) and radius is 6.

Q.17

Conic Sections

 For the parabola $y^2=16x$, what is the length of the latus rectum?


A. 4	B. 8
C. 16	D. 32

Answer: C

 Explanation: For $y^2=4ax$, we have $4a=16$, so $a=4$. Length of latus rectum = $4a = 16$.

Q.18

Three Dimensional Geometry

Find the distance between points A(1,2,3) and B(4,6,3).

A. 3	B. 4
C. 5	D. 6

Answer: C

 Explanation: Distance = $\sqrt{[(4-1)^2+(6-2)^2+(3-3)^2]} = \sqrt{9+16} = 5$.

Q.19

Limits

 Evaluate $\lim_{x \rightarrow 3} (x^2-9)/(x-3)$.

A. 0	B. 3
C. 6	D. 9

Answer: C

Explanation: Factor $x^2-9=(x-3)(x+3)$. After cancellation, the limit is $x+3$ at $x=3$, equal to 6.

Q.20

Derivatives

If $f(x)=x^3-5x$, find $f'(2)$.

A. 5	B. 7
C. 9	D. 12

Answer: B

Explanation: $f'(x)=3x^2-5$. Hence $f'(2)=12-5=7$.

Section B - Reasoning / Assertion and Applied Mathematics

Q.21

Mathematical Reasoning

The contrapositive of “If a number is divisible by 4, then it is even” is:

A. If a number is not divisible by 4, then it is not even.	B. If a number is even, then it is divisible by 4.
C. If a number is not even, then it is not divisible by 4.	D. If a number is divisible by 4, then it is not even.

Answer: C

Explanation: Contrapositive of $P \Rightarrow Q$ is not $Q \Rightarrow$ not P . Here P is divisible by 4 and Q is even.

Q.22

Statistics

Find the variance of the data set 2, 4, 6, 8 using population variance.

A. 4	B. 5
C. 6	D. 8

Answer: B

Explanation: Mean = 5. Squared deviations are 9,1,1,9; average = $(9+1+1+9)/4 = 5$.

Q.23

Probability

Three fair coins are tossed. What is the probability of getting exactly two heads?

A. $1/8$

B. $3/8$

C. $1/2$

D. $5/8$

Answer: B

Explanation: Total outcomes = 8. Exactly two heads: HHT, HTH, THH, so probability = $3/8$.

Q.24

Probability

A card is drawn from a standard deck of 52 cards. What is the probability that it is either a king or a heart?

A. $4/13$

B. $17/52$

C. $16/52$

D. $1/4$

Answer: C

Explanation: There are 4 kings and 13 hearts, but the king of hearts is counted twice. Favourable = $4+13-1=16$. Probability = $16/52$.

Q.25

Functions

Find the domain of $f(x) = \sqrt{x-2}/(x-5)$.

A. $x \geq 2$

B. $x \geq 2$ and $x \neq 5$

C. $x > 5$

D. All real x

Answer: B

Explanation: The square root requires $x-2 \geq 0$, so $x \geq 2$. The denominator requires $x \neq 5$. Domain is $x \geq 2$ and $x \neq 5$.

Q.26

FunctionsIf $f(x)=x^2+1$ and $g(x)=2x$, find $f(g(3))$.

A. 13

B. 25

C. 37

D. 49

Answer: CExplanation: $g(3)=6$. Then $f(6)=6^2+1=37$.

Q.27

Complex NumbersThe solutions of $z^2+1=0$ are:A. $z=1,-1$ B. $z=i,-i$ C. $z=0,1$

D. No complex solution

Answer: BExplanation: $z^2=-1$, so $z=\pm i$.

Q.28

Binomial TheoremFind the term independent of x in $(x + 1/x)^6$.

A. 10

B. 15

C. 20

D. 30

Answer: CExplanation: General term has $x^{(6-r)}x^{-r}=x^{(6-2r)}$. For independent term, $6-2r=0$, so $r=3$. Coefficient = $C(6,3)=20$.

Q.29

Permutations

How many arrangements of the letters of MATHS have M fixed in the first position?

A. 12

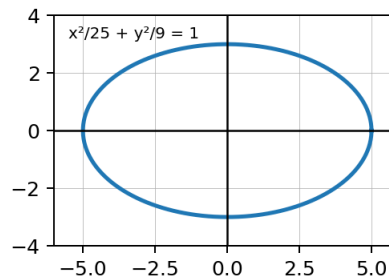
B. 24

C. 60

D. 120

Answer: BExplanation: With M fixed, the remaining four letters can be arranged in $4! = 24$ ways.

Q.30

Conic SectionsFor the ellipse $x^2/25 + y^2/9 = 1$, find the eccentricity.A. $3/5$ B. $4/5$ C. $5/4$ D. $2/5$ **Answer: B**Explanation: Here $a^2=25$ and $b^2=9$. $c^2=a^2-b^2=25-9=16$, so $c=4$ and $a=5$. Eccentricity $e=c/a=4/5$.**Section C - Case Study and Achievers Section**

Q.31

Conic Sections

The standard equation $y^2=12x$ represents a parabola opening in which direction?

A. Left

B. Right

C. Upward

D. Downward

Answer: B

Explanation: $y^2=4ax$ with $a>0$ opens to the right. Here $4a=12$, so $a=3$.

Q.32

Derivatives

Find the slope of the tangent to $y=x^2+2x$ at $x=1$.

A. 2

B. 3

C. 4

D. 5

Answer: C

Explanation: $dy/dx=2x+2$. At $x=1$, slope= $2(1)+2=4$.

Q.33

Statistics

For the data 4, 4, 6, 6, find the mean deviation about the mean.

A. 0

B. 1

C. 2

D. 4

Answer: B

Explanation: Mean = 5. Absolute deviations are 1,1,1,1. Mean deviation = $(1+1+1+1)/4 = 1$.

Q.34

Probability

A bag contains 3 red balls and 2 blue balls. Two balls are drawn without replacement. What is the probability that both are red?

 A. $1/10$

 B. $3/10$

 C. $2/5$

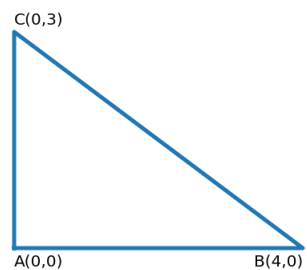
 D. $3/5$
Answer: B

 Explanation: Probability = $(3/5)(2/4) = 6/20 = 3/10$.

Q.35

Case Study: Coordinate Geometry

A triangular park has vertices A(0,0), B(4,0), and C(0,3). A straight walking path is planned from B to C. What is the length of this path?



A. 3 units

B. 4 units

C. 5 units

D. 7 units

Answer: C

 Explanation: Distance between B(4,0) and C(0,3) is $\sqrt{[(4-0)^2 + (0-3)^2]} = \sqrt{16+9} = 5$ units.

Consolidated Answer Key

Q.No.	Answer	Topic	Q.No.	Answer
1	B	Sets	19	C
2	B	Relations and Functions	20	B
3	A	Relations and Functions	21	C
4	A	Trigonometric Functions	22	B
5	B	Principle of Mathematical Induction	23	B
6	C	Complex Numbers	24	C
7	C	Quadratic Equations	25	B
8	A	Linear Inequalities	26	C
9	B	Permutations and Combinations	27	B
10	B	Permutations and Combinations	28	C
11	C	Binomial Theorem	29	B
12	B	Sequences and Series	30	B
13	C	Sequences and Series	31	B
14	B	Straight Lines	32	C
15	C	Straight Lines	33	B
16	A	Conic Sections	34	B
17	C	Conic Sections	35	C
18	C	Three Dimensional Geometry		

