

CLASS

10

SAMPLE PAPER



International Mathematics Olympiad

The actual test paper has 50 questions. Time allowed : 60 minutes. There are 3 sections: 20 questions in section I, 20 in section II and 10 in section III.

SYLLABUS

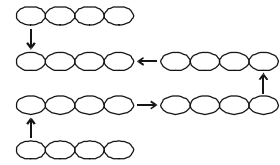
Section – I (Logical Reasoning) : Direction sense test, Mathematical operations, Number ranking & Time sequence Test, Coding-Decoding, Distance, Speed, Time and general reasoning based on prescribed syllabus.

Section – II (Mathematical Reasoning) : Real Numbers, Polynomials, Pair of Linear Equations in Two Variables, Quadratic Equations, Arithmetic Progressions, Triangles, Coordinate Geometry, Introduction to Trigonometry, Some Applications of Trigonometry, Circles, Constructions, Areas Related to Circles, Surface Areas and Volumes, Statistics, Probability.

Section III (Everyday Mathematics) : The Syllabus of this section will be based on the syllabus of Mathematical Reasoning.

LOGICAL REASONING

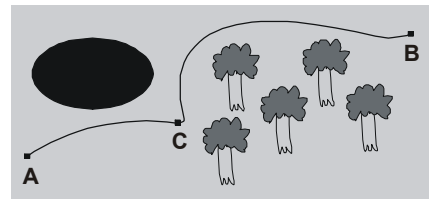
1. There are 6 short pieces of link chain, each having 4 links. It takes 10 seconds to cut a link and 25 seconds to weld it back together. What is the shortest possible time to make the longest chain?
- (A) 175 seconds (B) 210 seconds
(C) 150 seconds (D) 60 seconds



2. What should come at the place of '?' so that every column or diagonal has the same sum?
- (A) 19 (B) 12
(C) 13 (D) 15



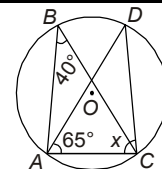
3. Points A and B on a map are 12 km apart if you follow the path. A troop of boy scouts leaves point A at 11:00 a.m. They are all carrying packs and travel 3 km/hr until they reach point C at 12:45. If they want to reach point B by 2:00, how fast will they have to go?
- (A) 5.4 km/hr (B) 6.75 km/hr
(C) 5.25 km/hr (D) 1.75 km/hr



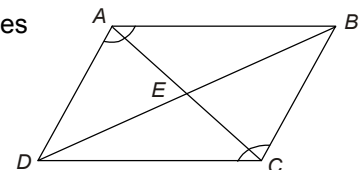
4. A child was looking for his father. He went 90 metres in the East before turning to his right. He went 20 metres before turning to his right again to look for his father at his uncle's place 30 metres from this point. His father was not there. From here he went 100 metres to the North before meeting his father in a street. How far did the son meet his father from the starting point?
- (A) 80 metres (B) 100 metres (C) 140 metres (D) 260 metres
5. If DELHI is coded as 73541 and CALCUTTA as 82589662, how can CALICUT be coded?
- (A) 5279431 (B) 5978213 (C) 8251896 (D) 8543691
6. If 1st October is Sunday, then 1st November will be
- (A) Monday (B) Tuesday (C) Wednesday (D) Thursday
7. If + stands for 'division', × stands for 'addition', – stands for 'multiplication' and ÷ stands for 'subtraction', then which of the following equations is correct?
- (A) $36 \times 6 + 7 \div 2 - 6 = 20$ (B) $36 \div 6 + 3 \times 5 - 3 = 45$
(C) $36 + 6 - 3 \times 5 \div 3 = 24$ (D) $36 - 6 + 3 \times 5 \div 3 = 74$

MATHEMATICAL REASONING

8. If O is the centre of the circle, find the value of x in the following figure.
- (A) 75° (B) 40°
(C) 65° (D) 90°



9. Parallelogram ABCD is shown in the adjoining figure. Which pair of triangles can be established to be congruent to prove that $\angle DAB \cong \angle BCD$?
- (A) $\triangle ADC$ and $\triangle BCD$ (B) $\triangle AED$ and $\triangle BEC$
(C) $\triangle DAB$ and $\triangle BCD$ (D) $\triangle DEC$ and $\triangle BEA$

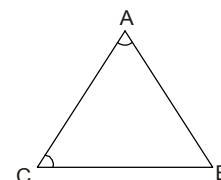


10. What is the complete solution to the equation $|3 - 6x| = 15$?
- (A) $x = 2; x = 3$ (B) $x = -2; x = 3$
(C) $x = 2; x = -3$ (D) $x = -2; x = -3$

11. In the figure given here, $AB > BC$.

If we assume that $m\angle A = m\angle C$, it follows that $AB = BC$. This contradicts the given statement that $AB > BC$. What conclusion can be drawn from this contradiction?

- (A) $m\angle A = m\angle B$ (B) $m\angle A \neq m\angle B$
 (C) $m\angle A = m\angle C$ (D) $m\angle A \neq m\angle C$



12. Which polynomial represents $(3x^2 + x - 4)(2x - 5)$?

- (A) $6x^3 - 13x^2 - 13x - 20$ (B) $6x^3 - 13x^2 - 13x + 20$
 (C) $6x^3 + 13x^2 + 3x - 20$ (D) $6x^3 + 13x^2 + 3x + 20$

13. $2x + 7 \overline{)2x^4 + 21x^3 + 35x^2 - 37x + 46} =$

- (A) $x^3 + 7x^2 - 7x + 6 - \frac{4}{2x+7}$ (B) $2x^3 + 14x^2 - 14x + 12 - \frac{4}{2x+7}$
 (C) $x^3 - 7x^2 + 7x - 6 + \frac{4}{2x+7}$ (D) $x^3 + 7x^2 - 7x + 6 + \frac{4}{2x+7}$

14. There are two numbers with the following properties.

- 1) The second number is 3 more than the first number.
 2) The product of the two numbers is 9 more than their sum.

Which of the following represents possible values of these two numbers?

- (A) $-6, -3$ (B) $-4, -1$ (C) $-1, 4$ (D) $-3, 6$

15. If $i = \sqrt{-1}$, what is the value of i^4 ?

- (A) i (B) $-i$ (C) 1 (D) -1

16. A copper sphere of diameter 18 cm is drawn into a wire of diameter 4 mm. Find the length of the wire.

- (A) 240 m (B) 242 m (C) 243 m (D) 245 m

17. What is the n th term in the arithmetic series given below?

$$3 + 7 + 11 + 15 + 19 \dots$$

- (A) $4n$ (B) $3 + 4n$ (C) $2n + 1$ (D) $4n - 1$

EVERYDAY MATHEMATICS

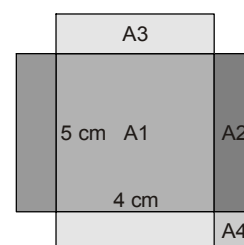
18. Three ducks and two ducklings weigh 32 kg. Four ducks and three ducklings weigh 44 kg. All ducks weigh the same and all ducklings weigh the same. What is the weight of two ducks and one duckling?

- (A) 20 kg. (B) 40 kg.
 (C) 60 kg. (D) 64 kg.

19. A rectangular sheet of wood has four small squares removed from the corners. It is then cut to make a box that is 5 cm by 4 cm with a volume of 60 cm^3 . (Four pieces of size A4 are removed.)

Find the original area of the sheet of wood.

- (A) 200 cm sq. (B) 110 cm sq.
 (C) 96 cm sq. (D) 100 cm sq.

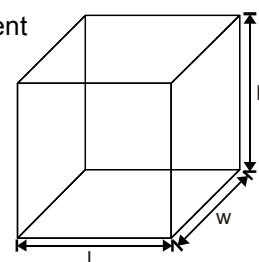


20. A cereal company decided to increase the height of its boxes by 30 percent and reduce the width in order to maintain the same volume.

Initially, length = 20 cm, height = 40 cm, width = 30 cm

What will the new width be if the length stays the same?

- (A) 52 cm (B) 20 cm
 (C) 23.08 cm (D) 23 cm



SAMPLE ANSWER SHEET

1. **NAME** : If your name is SACHITAIYER, then you should write as follows :

S	A	C	H	I	T	A	I	Y	E	R										
---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--

2. **Father's Name** : If your father's name is SATISH KUMAR SHARMA, then you should write as follows :

S	A	T	I	S	H	K	U	M	A	R	S	H	A	R	M	A				
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--

SCHOOL CODE					
M	H	0	5	4	7
A	A	0	0	0	0
B	B	1	1	1	1
C	C	2	2	2	2
D	D	3	3	3	3
E	E	4	4	4	4
F	F	5	5	5	5
G	G	6	6	6	6
H	H	7	7	7	7
I	I	8	8	8	8
J	J	9	9	9	9
K	K				
L	L				
M	M				
N	N				
O	O				
P	P				
Q	Q				
R	R				
S	S				
T	T				
U	U				
V	V				
W	W				
X	X				
Y	Y				
Z	Z				

3. **SCHOOL CODE**
Write your school code
i.e. if your school code
is MH0547 darken as
follows :

Darken
the circle

6. **GENDER**
If you are a boy,
then darken
Male circle

GENDER	
MALE	FEMALE

4. **CLASS**
If you are in Class
10, then you should
darken as follows :

5. **ROLL NO.**
If your roll no. is 587,
then you should write
and darken the circles
as follows :

CLASS		ROLL NO.		
1	0	5	8	7
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Darken
the circle

CORRECT
way to darken
the circle

WRONG
way to darken
the circle

7. If your choice for Answer 1 is C, then you should darken the circle as follows : 1. (A) (B) (C) (D)

MARK YOUR ANSWERS WITH HB PENCIL/BALL POINT PEN (BLUE/BLACK)

International Mathematics Olympiad

- | | | | | |
|--------------------|--------------------|---------------------|---------------------|---------------------|
| 1. (A) (B) (C) (D) | 5. (A) (B) (C) (D) | 9. (A) (B) (C) (D) | 13. (A) (B) (C) (D) | 17. (A) (B) (C) (D) |
| 2. (A) (B) (C) (D) | 6. (A) (B) (C) (D) | 10. (A) (B) (C) (D) | 14. (A) (B) (C) (D) | 18. (A) (B) (C) (D) |
| 3. (A) (B) (C) (D) | 7. (A) (B) (C) (D) | 11. (A) (B) (C) (D) | 15. (A) (B) (C) (D) | 19. (A) (B) (C) (D) |
| 4. (A) (B) (C) (D) | 8. (A) (B) (C) (D) | 12. (A) (B) (C) (D) | 16. (A) (B) (C) (D) | 20. (A) (B) (C) (D) |

ANSWERS

International Mathematics Olympiad

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (A) | 2. (B) | 3. (A) | 4. (B) | 5. (C) | 6. (C) | 7. (D) | 8. (A) | 9. (C) | 10. (B) |
| 11. (D) | 12. (B) | 13. (D) | 14. (B) | 15. (C) | 16. (C) | 17. (D) | 18. (A) | 19. (B) | 20. (C) |