SAMPLE PAPER

SOF
SCIENCE OLYMPIAD FOUNDATION

I M SOF

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) : Mathematical operations, Series completion, Arithmetical Reasoning, Problems on cubes and dice, Number ranking & Time sequence Test, Inserting missing character and general reasoning based on prescribed syllabus.

Section – II (Mathematical reasoning) : Number Systems, Polynomials, Coordinate Geometry, Linear Equations in Two Variables, Introduction to Euclid's Geometry, Lines and Angles, Triangles, Quadrilaterals, Areas of Parallelograms and Triangles, Circles, Constructions, Heron's Formula, 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. Apples, cherries and grapes are arranged on a platter in the following fashion: opposite sectors contain fruit which is of equal value. To equal the value of two bunches of grapes, how much fruit must be placed in the empty sector?
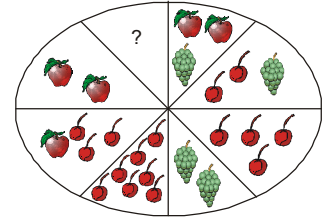
(A)

(B)

(C)

(D)

2. There are twenty people working in an office. The first group of five works between 8.00 A.M. and 2.00 P.M. The second group of ten works between 10.00 A.M. and 4.00 P.M. And the third group of five works between 12 noon and 6.00 P.M. There are three computers in the office which all the employees frequently use. During which of the following hours are the computers likely to be used most?
(A) 10.00 A.M. – 12 noon
(B) 12 noon – 2.00 P.M.
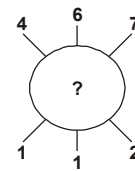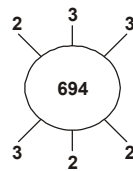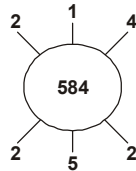(C) 1.00 P.M. – 3.00 P.M.
(D) 2.00 P.M. – 4.00 P.M.

3. If L denotes ÷, M denotes ×, P denotes + and Q denotes –, then which of the following statements is true?

(A) 32 P 8 L 16 Q 4 = $-\dfrac{3}{2}$

(B) 6 M 18 Q 26 L 13 P 7 = $\dfrac{173}{13}$

(C) 11 M 34 L 17 Q 8 L 3 = $\dfrac{38}{3}$

(D) 9 P 9 L 9 Q 9 M 9 = – 71

4. A student got twice as many sums wrong as he got right. If he attempted 48 sums in all, how many did he solve correctly?
(A) 12   (B) 16   (C) 24   (D) 18

5. Find the missing number :

(A) 937   (B) 824   (C) 769   (D) 678

6. In a certain code, '256' means 'you are good'; '637' means 'we are bad' and '358' means 'good and bad'. Which of the following represents 'and' in that code?
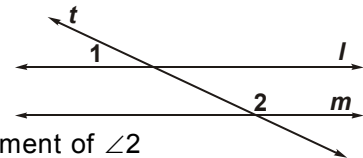(A) 2   (B) 5   (C) 8   (D) 3

7. Complete the pattern.   6, 11, 21, 36, 56, (.....)
(A) 42   (B) 51   (C) 81   (D) 91

MATHEMATICAL REASONING

8. In the accompanying diagram, parallel lines *l* and *m* are cut by transversal *t*.
Which statement about angles 1 and 2 must be true?

(A) ∠1 ≅ ∠2
(B) ∠1 is the complement of ∠2
(C) ∠1 is the supplement of ∠2
(D) ∠1 and ∠2 are right angles

9. What values of *a* and *b* make quadrilateral *MNOP* a parallelogram?
(A) *a* = 1, *b* = 5
(B) *a* = 5, *b* = 1

(C) $a = \dfrac{11}{7}$, $b = \dfrac{34}{7}$

(D) $a = \dfrac{34}{7}$, $b = \dfrac{11}{7}$
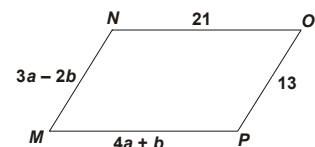
10. For the quadrilateral shown below, what is m∠a + m∠c?
(A) 53°
(B) 137°
(C) 180°
(D) 233°

11. If a cylindrical barrel measures 22 cm in diameter, how many cm will it roll in 8 revolutions along a smooth surface?
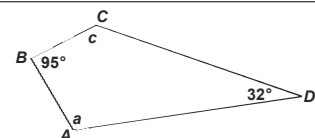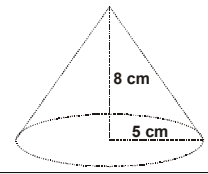
(A) 121π cm (B) 168π cm (C) 176π cm (D) 228π cm
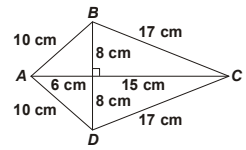
12. A right circular cone has radius 5 cm and height 8 cm. What is the lateral surface area of the cone?

(A) 40π sq cm (B) 445π sq cm

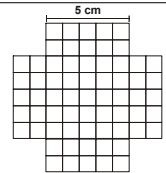(C) $5\pi \sqrt{39}$ sq cm (D) $5\pi \sqrt{89}$ sq cm

13. Figure *ABCD* is a kite.
What is the area of figure *ABCD*, in square centimetres?

(A) 120 (B) 154
(C) 168 (D) 336

14. The four sides of this figure will be folded up and taped to make an open box. What will be the volume of the box?

(A) 50 cm³ (B) 75 cm³
(C) 100 cm³ (D) 125 cm³

15. Look at the given coordinate grid.
Points R and S will be added to the grid to form rectangle *PQRS* with an area of 20 square units. Which ordered pairs could be the coordinates of points *R* and *S*?

(A) (5, –1) and (1, –1)

(B) (5, –2) and (1, –2)

(C) (5, –3) and (1, –3)

(D) (5, –4) and (1, –4)
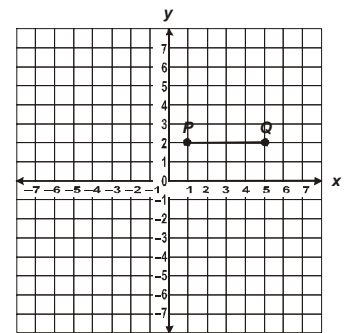
16. What is value of *x*?

(A) 35° (B) 60°
(C) 85° (D) 95°
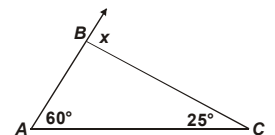
17. Which graph shows $y = -x^2$?

(A) (B) (C) (D)

EVERYDAY MATHEMATICS

18. One snail started from the dot. What side will it be on when it has crawled 13/20 of the distance around the regular pentagon of equal sides?

(A) A (B) C
(C) D (D) E
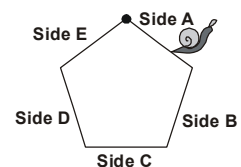
19. A rectangular kitchen table is three times as long as it is wide. If it was 3 m shorter and 3 m wider it would be a square. What are the dimensions of the rectangular table?

(A) 9 × 3 (B) 4 × 2
(C) 12 × 6 (D) 16 × 4
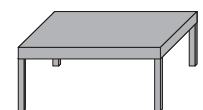
20. Two carpenters decided to design desks for students at the Junior High School. The dimensions of the desk are as shown. How much wood (in cm²) would they need for 30 desks?

(A) 2700 cm² (B) 80000 cm²
(C) 21000 cm² (D) 81000 cm²

1. NAME : If your name is SACHIT A IYER, 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

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

Darken the circle

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.**

Darken the circle

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

GENDER

MALE ● FEMALE ○

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. Ⓐ Ⓑ ● Ⓓ

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

International Mathematics Olympiad

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

ANSWERS

International Mathematics Olympiad

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