



**SOF INTERNATIONAL  
MATHEMATICS OLYMPIAD**

**SYLLABUS**

**Section – 1 :** Verbal and Non-Verbal Reasoning.

**Section – 2 :** 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 – 3 :** The syllabus of this section will be based on the syllabus of Mathematical Reasoning and Quantitative Aptitude.

**Section – 4 :** Higher Order Thinking Questions - Syllabus as per Section – 2.

Total Questions : 50

Time : 1 hr.

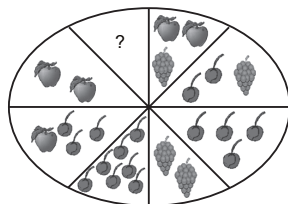
PATTERN & MARKING SCHEME				
Section	(1) Logical Reasoning	(2) Mathematical Reasoning	(3) Everyday Mathematics	(4) Achievers Section
No. of Questions	15	20	10	5
Marks per Ques.	1	1	1	3

**LOGICAL REASONING**

1. If L denotes  $\div$ , M denotes  $\times$ , P denotes  $+$  and Q denotes  $-$ , then which of the following statements is true?

- (A)  $32 P 8 L 16 Q 4 = - \frac{3}{2}$   
 (B)  $6 M 18 Q 26 L 13 P 7 = \frac{173}{13}$   
 (C)  $11 M 34 L 17 Q 8 L 3 = \frac{38}{3}$   
 (D)  $9 P 9 L 9 Q 9 M 9 = - 71$

2. 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)

3. Find the missing number, if the same rule is followed in three figures.

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

4. Complete the pattern.

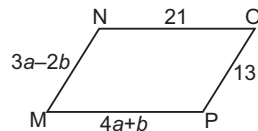
6, 11, 21, 36, 56, (...?..)

- (A) 42 (B) 51  
(C) 81 (D) 91

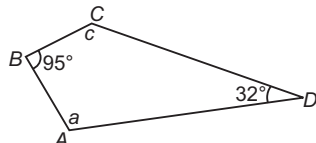
**MATHEMATICAL REASONING**

5. What values of  $a$  and  $b$  make quadrilateral MNOP a parallelogram?

- (A)  $a = 1, b = 5$   
 (B)  $a = 5, b = 1$   
 (C)  $a = \frac{11}{7}, b = \frac{34}{7}$   
 (D)  $a = \frac{34}{7}, b = \frac{11}{7}$



6. For the quadrilateral shown here, what is the value of  $\angle a + \angle c$ ?



- (A)  $53^\circ$   
 (B)  $137^\circ$   
 (C)  $180^\circ$   
 (D)  $233^\circ$

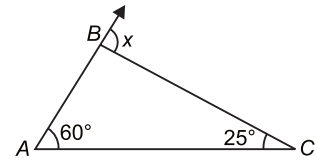
7. Simplify :  $\frac{16 \times 2^{n+1} - 4 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+2}}$

- (A) 1 (B) 6/11  
(C) 0 (D) 1/2

8. Find the remainder when  $p(y) = y^3 + y^2 + 2y + 3$  is divided by  $y + 2$ .

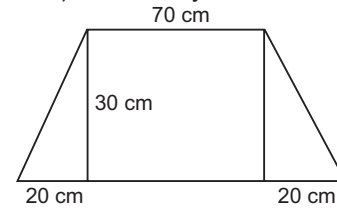
- (A) 1 (B) 4  
(C) -5 (D) 3

9. The ordinate of any point on x-axis is \_\_\_\_\_.
- (A) 0  
(B) 1  
(C) -1  
(D) Any number
10. What is value of  $x$ ?
- (A)  $35^\circ$   
(B)  $60^\circ$   
(C)  $85^\circ$   
(D)  $95^\circ$



### EVERYDAY MATHEMATICS

11. A right circular cone has radius 5 cm and height 8 cm. What is the lateral surface area of the cone?
- (A)  $40\pi$  sq. cm      (B)  $445\pi$  sq. cm  
(C)  $5\pi\sqrt{39}$  sq. cm      (D)  $5\pi\sqrt{89}$  sq. cm
13. 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  $\text{cm}^2$ ) would they need for 30 desks?



- (A)  $9 \times 3$       (B)  $4 \times 2$   
(C)  $12 \times 6$       (D)  $16 \times 4$
- (A)  $2700 \text{ cm}^2$       (B)  $80000 \text{ cm}^2$   
(C)  $21000 \text{ cm}^2$       (D)  $81000 \text{ cm}^2$

### ACHIEVERS SECTION

14. Select the correct match.

$$\text{Let } f(x) = \frac{(x-2)(x-4)}{x}$$

- (A)  $f(x)$  is a polynomial      As  $(x-2)$ ,  $(x-4)$ ,  $x$  are polynomials
- (B)  $f(x)$  is an equation      As it can be written as  $ax^2 + bx + c$
- (C)  $f(x)$  is a rational number      As it is of the form  $\frac{p}{q}$ ,  $q \neq 0$
- (D)  $f(x)$  is not a polynomial      As the exponents of  $x$  are not whole numbers.

15. The marks scored by some students for a question in the Science test are shown in the table below.

Marks	0	1	2	3	4	5
Number of students	3	2	3	5	$x$	1

- (a) If the mode is 4, write down the smallest possible value of  $x$ .
- (b) If the mean is  $2\frac{1}{4}$ , find the value of  $x$ .
- (a)      (b)
- (A) 6      2  
(B) 5      2  
(C) 6      4  
(D) 6      3

SPACE FOR ROUGH WORK

### ANSWERS

IMO – 1. (D) 2. (C) 3. (D) 4. (C) 5. (B) 6. (D) 7. (D) 8. (C) 9. (A) 10. (C) 11. (D) 12. (A) 13. (D) 14. (D) 15. (A)

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