

CLASS
9

SET
3



**SOF INTERNATIONAL
MATHEMATICS OLYMPIAD**

Level - 1

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

Total Questions : 50 | Time : 1 hr.

Guidelines for the Candidate

1. You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
2. Write your **Name, School Code, Class, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it. We will share your marks / result and other information related to SOF exams on your mobile number.
3. The Question Paper comprises four sections:

Logical Reasoning (15 Questions), **Mathematical Reasoning** (20 Questions), **Everyday Mathematics** (10 Questions) and **Achievers Section** (5 Questions)

Each question in Achievers Section carries 3 marks, whereas all other questions carry one mark each.

4. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
5. There is only ONE correct answer. Choose only ONE option for an answer.
6. To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only. E.g.

Q.16: Rahul bought 4 kg 90 g of apples, 2 kg 60 g of grapes and 5 kg 300 g of mangoes. The total weight of all the fruits he bought is_____.

- A. 11.450 kg B. 11.000 kg C. 11.350 kg D. 11.250 kg

As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.

16. ● (B) (C) (D)

7. Rough work should be done in the blank space provided in the booklet.
8. Return the OMR Sheet to the invigilator at the end of the exam.
9. Please fill in your personal details in the space provided on this page before attempting the paper.



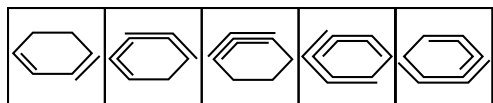
Name:.....

SOF Olympiad Roll No.:..... Contact No.:.....

LOGICAL REASONING

1. Select a figure from the options which will continue the same series as established by the Problem Figures.

Problem Figures



- A.
- B.
- C.
- D.

2. How many such numbers are there in the given arrangement, each of which is immediately preceded by a consonant and immediately followed by a symbol?

G E 5 D A 8 \$ 3 T I Q 7 @ B R 2 * % U 1 M 6 +

- A. Zero
B. One
C. Two
D. Three
3. In a certain code language, 'mind is power' is written as 'ki po chi', 'use power well' is written as 'mi chi ro' and 'kind is good' is written as 'tu vi po'. What is the code for 'mind' in that language?

- A. chi
B. mi
C. po
D. ki

4. Which of the following options satisfies the same condition of placement of dots as in the Fig.(X)?

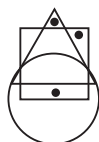
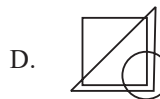


Fig. (X)

- A.
- B.



5. Select the odd one out.

- A. YVSP
B. NKHE
C. OLJG
D. TQNK

6. Which of the following options will complete the pattern in Fig. (X)?



Fig. (X)

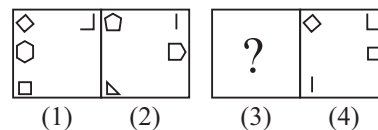
- A.
- B.
- C.
- D.

7. Arrange the given words as they occur in the dictionary and select the correct option.

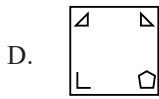
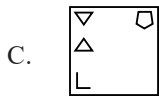
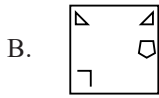
1. Retain 2. Research 3. Reduce 4. Right 5. Rigid

- A. 3, 1, 2, 5, 4
B. 3, 2, 1, 4, 5
C. 3, 1, 2, 4, 5
D. 3, 4, 1, 2, 5

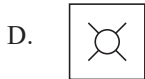
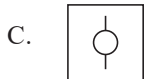
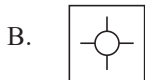
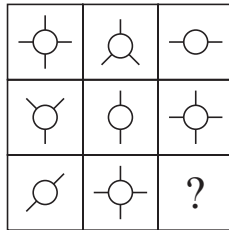
8. There is a definite relationship between figures (1) and (2). Establish a similar relationship between figures (3) and (4) by selecting a suitable figure from the options that would replace the (?) in figure (3).



- A.



9. Which of the following options complete the given figure matrix?



10. Study the given information carefully and answer the following question.

'A + B' means 'A is the daughter of B'.

'A - B' means 'A is the son of B'.

'A ÷ B' means 'A is the mother of B'.

'A × B' means 'A is the wife of B'.

How is T related to S in $T + P \times R - S$?

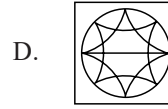
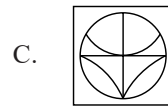
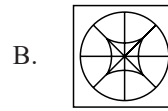
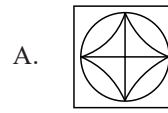
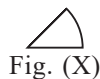
- A. Daughter
B. Granddaughter
C. Grandmother
D. Sister

11. Select the correct water image of the given combination of numbers and alphabets.

WIN7T6E2R

- A. R2E7T6E2RWIN
B. W1N7T6E2R
C. LMIUJQESK
D. LIIMJQESK

12. Select the figure from the options in which Fig. (X) is exactly embedded as one of its parts.



13. Six friends P, Q, R, S, T and U are sitting in a row facing towards North. R is sitting exactly between P and T. S is not at the end. Q is sitting immediate right of T. U is not at the right end. How many persons are there to the left of R?

- A. One
B. Two
C. Three
D. Four

14. A word arrangement machine, when given a particular input, rearranges them following a particular rule in each step. The following is an illustration of the input and the steps of rearrangement.

Input : gone are take enough brought station

Step I : take gone are enough brought station

Step II : take are gone enough brought station

Step III : take are station gone enough brought

Step IV : take are station brought gone enough

Step IV is the last step for this input. As per the rule followed in the given steps, which of the following will be the last step of the following input?

Input : ink hurry yet for the victory

- A. Step III
B. Step IV
C. Step V
D. Step VI

15. A child is 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 his last turning 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 child meet his father from child's starting point?

- A. 80 metres
B. 100 metres
C. 140 metres
D. 260 metres

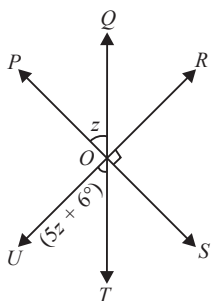
16. The perpendicular distances of a point A from the y axis and x -axis are 6 units and 3 units respectively and point A lies in II quadrant, then coordinates of point A are

A. (6, 3)
B. (3, -6)
C. (3, 6)
D. (-6, 3)

17. If $x = \sqrt{3} + 2\sqrt{2}$ and $y = \sqrt{3} - 2\sqrt{2}$, then evaluate $x^4 + y^4 + 6x^2y^2$.

A. 585
B. 584
C. 580
D. 595

18. In the given figure, the value of z is _____.



A. 12°
B. 10°
C. 14°
D. 25°

19. The three sides of a triangle are in the ratio 5 : 12 : 13. If the difference between longest and shortest side of the triangle is 32 cm, then the area of the triangle is

A. 1280 cm^2
B. 960 cm^2
C. 480 cm^2
D. 240 cm^2

20. In a dart game, Monika hits the dart 12 times out of 48 trials. What is the probability that in a given throw, Monika does not hit the dart?

A. $\frac{1}{3}$
B. $\frac{1}{6}$
C. $\frac{3}{8}$
D. $\frac{3}{4}$

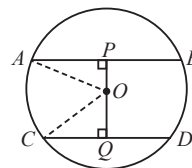
21. In $\triangle ABC$, $\angle B = 45^\circ$, $\angle C = 55^\circ$ and bisector of $\angle A$ meets BC at a point D . Find $\angle ADB$ and $\angle ADC$ respectively.

A. $75^\circ, 105^\circ$
B. $90^\circ, 90^\circ$
C. $95^\circ, 85^\circ$
D. $100^\circ, 80^\circ$

22. Find the value of $(x^3y + 3x^2y^3 + x)(4xy^2 - 5x^2 - 6y) + xy^2$ if $x = -2$ and $y = -3$.

A. 22330
B. 1
C. 0
D. 43320

23. In the given figure, AB and CD are two parallel chords of a circle with centre O and radius 5 cm such that $AB = 8$ cm and $CD = 6$ cm. If $OP \perp AB$ and $OQ \perp CD$, then determine the length PQ .



A. 3 cm
B. 5 cm
C. 6 cm
D. 7 cm

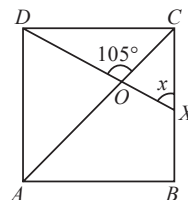
24. The curved surface area of a cone is 12320 sq. cm. If the radius of its base is 56 cm, find its height.

A. 45 cm
B. 48 cm
C. 42 cm
D. 43 cm

25. Which of the following is a solution of the equation $2x + 3y = 6$?

A. (-2, 3)
B. (3, 4)
C. $(\sqrt{2}, \sqrt{7})$
D. (12, -6)

26. In the given figure, $ABCD$ is a square. A line segment DX cuts the side BC at X and the diagonal AC at O such that $\angle COD = 105^\circ$ and $\angle OXC = x$. Find the value of x .



- A. 25°
- B. 70°
- C. 75°
- D. 60°

27. If the radius of a wire is decreased to one-third and volume remains the same, then the length of the wire will become _____ the original length of wire.

- A. 2 times
- B. 3 times
- C. 6 times
- D. 9 times

28. In the given figure, if $PR = QT$ and $PQ = QS$, then



- A. $QT = RQ$
- B. $PR = TS$
- C. $RQ = TS$
- D. $QS = PR$

29. Factorise: $125x^3 + 225x^2y + 135xy^2 + 27y^3$.

- A. $(5x + 3y)(5x + 3y)(5x + 3y)$
- B. $(3x + 5y)(3x + 5y)(3x + 5y)$
- C. $(5x - 3y)(5x - 3y)(5x - 3y)$
- D. $(-5x + 3y)(-5x + 3y)(-5x + 3y)$

30. The total surface area of a cuboid is 1152 cm^2 . Find the volume if the dimensions are in the ratio $6 : 3 : 2$.

- A. 2500 cm^3
- B. 1826 cm^3
- C. 2260 cm^3
- D. 2304 cm^3

31. If $\sqrt{1369} + \sqrt{0.0615 + x} = 37.25$, then x is equal to

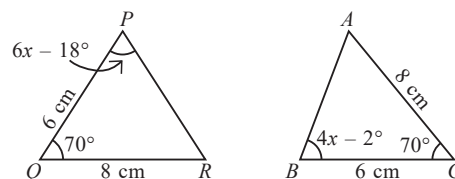
- A. 10^{-1}

- B. 10^{-2}
- C. 10^{-3}
- D. 10

32. If $a^{1/3} + \frac{1}{a^{1/3}} = 6$, then find the value of $a^3 + \frac{1}{a^3}$.

- A. 67345492
- B. 67342496
- C. 7762392
- D. 7761798

33. In the given figure, what is the measure of $\angle BAC$?



- A. 30°
- B. 70°
- C. 60°
- D. 80°

34. The linear equation $4x + 7y = 5(1 - y) + 8$ has

- A. Unique solution
- B. Two solutions
- C. Three solutions
- D. Infinitely many solutions

35. The class marks of a frequency distribution are 7, 12, 17, 22, 27,..... Find the class corresponding to class mark 22.

- A. 20.5 – 25.5
- B. 19 – 24
- C. 19.5 – 24.5
- D. 20 – 24

EVERYDAY MATHEMATICS

36. Twenty-four men can complete a work in sixteen days. Thirty-two women can complete the same work in twenty-four days. Sixteen men and sixteen women started working and worked for twelve days. How many more men are to be added to complete the remaining work in 2 days?

- A. 16
- B. 24
- C. 36
- D. 48

37. A money-lender borrows money at 5% p.a. and pays interest at the end of two years. He lends it at 8% p.a. compound interest compounded annually and receives the interest at the end of two years. Thus, he gains ₹ 398.4. The amount of money he borrows,

is _____.

- A. ₹ 3500
- B. ₹ 5000
- C. ₹ 6500
- D. ₹ 6000

38. One year ago, the age of Deepak was three times as that of his son. Seven years hence, the age of Deepak will exceed by 32 years. The present age of his son is _____.

- A. 15 years
- B. 32 years
- C. 21 years
- D. 17 years

39. In a lottery, there are 39 prizes and 12 blanks. A lottery is drawn at random. What is the probability of getting a prize?
- A. $\frac{13}{15}$
 B. $\frac{3}{5}$
 C. $\frac{4}{17}$
 D. $\frac{13}{17}$
-
40. The radius of a spherical balloon increases from 3 cm to 9 cm as air is being pumped into it. The ratio of the surface areas of the balloon in the two cases is _____.
- A. 1 : 9
 B. 1 : 3
 C. 2 : 3
 D. 2 : 7
-
41. The dimensions of a room are 10 m \times 7 m \times 5 m. There are 2 doors and 3 windows in the room. The dimensions of the doors are 1 m \times 3 m. One window is of size 2 m \times 1.5 m and the other two windows are of size 1 m \times 1.5 m each. The cost of painting the walls at ₹ 3 per m² is _____.
- A. ₹ 474
 B. ₹ 578
 C. ₹ 684
 D. ₹ 894
-
42. *A* walks at a uniform speed of 4 km/hour and 4 hours after his start, *B* cycles after him at the uniform speed of 10 km/hour. How far from the starting point will *B* catch *A*?
- A. 16.79 km
 B. 18.62 km
 C. 21.45 km
 D. 26.67 km
-
43. There are 180 students in two classrooms *A* and *B*. If 10 students are sent from *A* to *B*, then the number of students in the two classrooms are equal. How many students are there in classroom *A*?
- A. 85
 B. 90
 C. 95
 D. 100
-
44. While solving a problem, Samidha squared a number and then subtracted 25 from it rather than the required, i.e. first subtracting 25 from the number and then squaring it. But she got the right answer. What was the given number?
- A. 13
 B. 38
 C. 48
 D. None of these
-
45. An advertisement board is in the form of an isosceles triangle with its sides equal to 12 m, 10 m and 10 m. Find the cost of painting it at ₹ 2.25 per m².
- A. ₹ 98
 B. ₹ 112
 C. ₹ 48
 D. ₹ 108

ACHIEVERS SECTION

46. Find the value of
- $$\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$$
- A. 2
 B. 5
 C. 9
 D. 12
-
47. Match the following and select the correct option.
- | Column I | Column II |
|--|-----------|
| (i) If $(5a - 8, -12) = (-12, 6b + 8)$, then the value of $5(a - b)$ is | P. -26 |
| (ii) If the coordinates of the two points <i>A</i> and <i>B</i> are $(-6, 8)$ and $(5, -7)$ respectively, then (abscissa of <i>A</i> + ordinate of <i>B</i>) – (abscissa of <i>B</i> + ordinate of <i>A</i>) = | Q. 5 |
-
- (iii) The sum of the distance of a point *R*. $\frac{38}{3}$ (2, 3) from the *x*-axis and the *y*-axis is
- | (i) | (ii) | (iii) |
|------|------|-------|
| A. R | Q | P |
| B. P | Q | R |
| C. P | R | Q |
| D. R | P | Q |
-
48. Read the statements carefully and select the correct option.
- Statement - I :** The ratio of radius and height of a cone is 7 : 1. If its curved surface area is 616 cm², then the volume of the cone is $\frac{1032}{3}$ cm³. (Take $\sqrt{2} = 1.4$)
- Statement - II :** A sphere of diameter 10 cm weighs 4.4 kg. The weight of a sphere of the same material whose diameter is 6 cm is 0.9504 kg.

- A. Statement - I is true but Statement - II is false.
- B. Statement - I is false but Statement - II is true.
- C. Both Statement - I and Statement - II are true.
- D. Both Statement - I and Statement - II are false.

49. Fill in the blanks.

- (i) The line joining the mid-points of the adjacent sides of a quadrilateral is a P.
- (ii) If two adjacent angles of a parallelogram are $5x + 3^\circ$ and $9x - 5^\circ$, then $x =$ Q.
- (iii) The bisectors of angles of a parallelogram forms a R.

	P	Q	R
A.	Parallelogram	13°	Rhombus
B.	Trapezium	24°	Rhombus
C.	Parallelogram	13°	Rectangle
D.	Trapezium	24°	Rectangle

50. Read the statements carefully and state 'T' for true and 'F' for false.

- (i) If $x = -2$ is a zero of the polynomial $x^3 - mx^2 + 2x + 40$, then the value of m is 7.
- (ii) The value of polynomial $6x^3 + 7x^2 + 12x + 18$ at $x = -1$ is 5.
- (iii) If $p(x) = x^3 - x^2 + 5x$, then the value of $p(-3) + p(3)$ is -18 .

	(i)	(ii)	(iii)
A.	T	F	T
B.	F	T	F
C.	T	T	F
D.	F	F	T

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK