Please check the examination details below before entering your candidate information

Candidate Name	Class	Section

BLOOM Mathematics
Olympiad (BMO)
Question Paper 2023-24

Class 8

Total Questions: **50 + 5** (Tie-Breaking Section)

Total Time Allotted : 60 minutes	**Total Marks** 60

Instructions

1. There are **50 Multiple Choice Questions** in this booklet having 4 options out of which **ONLY ONE** is correct.
2. There are two sections in the Question Paper; Section 1 having 40 Questions carrying 1 Mark each & Section 2 having 10 Higher Difficulty Order Questions carrying 2 Marks each.
3. All questions are compulsory. There is **NO negative** marking for incorrect answers.
4. Total time allotted to complete the paper is 60 minutes.
5. Please fill in your details in the space provided on this page before attempting the paper.

OMR Sheet Instructions

1. Before starting the paper, fill in all the details in the OMR Sheet.
2. Additional 10 minutes will be provided to fill up the OMR sheet, before the start of the exam.
3. Use HB Pencil to darken the circle of the correct Option in OMR sheet. The correct way to darken the circle in OMR sheet is shown below.

4. Use black or blue ball point pen/HB pencil to fill the information in the OMR sheet. Partially filled OMR sheet will not be checked.
5. Return the OMR sheet to the invigilator after the exam.

CODE#1

M8

BLOOM CAP
Founded by | arihant

Bloom Mathematics Olympiad Class 8

Section 1 (1 Mark)

1. The value of $\sqrt{10+\sqrt{25+\sqrt{121}}}$ is

(a) 12 (b) 4 (c) 16 (d) 18

2. If $2x+\frac{2}{x}=3$, then the value of $x^3+\frac{1}{x^3}+3$ is equal to

(a) $\frac{13}{4}$ (b) $\frac{14}{5}$

(c) $\frac{15}{4}$ (d) None of these

3. The ratio of the ages of two boys is $3:4$. After 3 yr, the ratio will be $4:5$. Then, the ratio of their ages after 21 yr will be

(a) $11:12$ (b) $10:11$
(c) $14:17$ (d) $17:19$

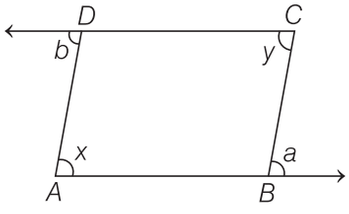
4. The average of the largest and the smallest 3-digit numbers that can be formed using the digits 0, 2 and 8 would be

(a) 424 (b) 514
(c) 454 (d) 145

5. If $A=\frac{1}{4}B$ and $B=\frac{5}{2}C$, then by approximately, what percent is C more than A ?

(a) 60% (b) 37%
(c) 48% (d) 52%

6. Sides AB and CD of a quadrilateral $ABCD$ are extended as shown in the figure. Then, $a+b$ is equal to



(a) $x+2y$ (b) $x-y$
(c) $x+y$ (d) $2x+y$

7. The average weight of the first 11 persons among the 12 is 95 kg. The weight of the 12th person is 33 kg more than the average weight of all the 12 persons. Then, the weight of the 12th persons is

(a) 128 kg (b) 97.45 kg
(c) 128.75 kg (d) 131 kg

8. 42 km separate the locations R and S. At the same moment that Yashika starts from S toward R with some uniform speed, Kanika starts from R with a uniform speed of 4 km/h in the other direction. After 6 h, they finally cross paths. Yashika moves with a speed of

(a) 6 km/h (b) 3 km/h
(c) 18 km/h (d) None of these

9. When $(m-2n)^2-4m+8n$ is divided by $(m-2n-4)$, the following is the result

(a) 0 (b) $m-2n$
(c) 1 (d) $m+n$

10. The value of the expression $\sqrt{13+x}+\sqrt{117+y}+\sqrt{z-1}$, if $x=3$, $y=4$ and $z=2$ is

(a) 20 (b) 18 (c) 16 (d) 12.

11. A circular wire having a radius of 84 cm bent into a square, then the side length of the square is

(a) 132 cm (b) 225 cm
(c) 152 cm (d) 168 cm

12. The value of x in $\frac{25^{2x+1}\times 125^5}{(625)^2}=3125^{3x}$ is

(a) 0 (b) 1 (c) $\frac{9}{11}$ (d) $\frac{11}{9}$

13. If $\left(\sqrt{5}-\frac{1}{\sqrt{5}}\right)^2=\frac{a}{b}$, then $a+b$ is

(a) 16 (b) 11 (c) 21 (d) 25

14. The value of $\sqrt[3]{8^4}$ is

(a) 2 (b) 8 (c) 16 (d) 64

15. Factorise $8a^2 + 36a + 36$

(a) $(4a + 12)(2a + 3)$ (b) $(4a + 12)(2a - 3)$
(c) $(4a - 12)(2a + 3)$ (d) $(4a - 12)(2a - 3)$

16. The product of
$(-3a^2b)(4a^2b - 3ab^2 + 4a - 5b)$ is

(a) $12a^3b^2 + 9a^2b^2 - 12a^4b + 15a^3b^3$

(b) $-12a^4b^2 + 9a^3b^3 - 12a^3b + 15a^2b^2$

(c) $-12ab^2 + 9a^3b^2 - 12a^3b + 15ab$

(d) $12ab^3 + 9ab - 12ab^2 + 15a^2b$

17. Two successive discounts of x% and y% on a western grown is same as the single discount of

(a) $\left(x + y + \frac{xy}{100}\right)\%$ (b) $\left(x - y - \frac{xy}{100}\right)\%$

(c) $\left(x + y - \frac{xy}{100}\right)\%$ (d) $\left(y - x - \frac{xy}{100}\right)\%$

18. 10% of A is equal to 5% of B, then 25% of B is equal to

(a) 25% of A (b) 20% of A
(c) 50% of A (d) 40% of A

19. If $\sqrt{2^n} = 32$, then n is

(a) 3 (b) 5 (c) 10 (d) 8

20. The cost price of 25 chairs is equal to the selling price of 30 chairs, then the loss percent is

(a) $17\frac{2}{3}\%$ (b) $16\frac{2}{3}\%$ (c) $17\frac{1}{3}\%$ (d) $16\frac{1}{3}\%$

21. If $x - y = 3$ and $x^2 + y^2 = 29$, then xy is equal to

(a) 5 (b) 10
(c) 15 (d) 20

22. Which one is a rational number?

(a) $7 - \sqrt{56}$ (b) $8 - \sqrt{25}$
(c) $6 - \sqrt{31}$ (d) $2 - \sqrt{73}$

23. If $\frac{25 \times x^{-4}}{5^{-3} \times 10 \times x^{-8}} = \frac{1}{2}$, then the value of x is

(a) $\frac{1}{5}$ (b) 5 (c) $\frac{2}{5}$ (d) 25

24. The solution of which of the following equations is a fraction not an integer?

(a) $3x + 2 = 5x + 2$ (b) $9x - 4 = 4x + 21$
(c) $5x + 8 = 2x + 16$ (d) $7x - 10 = x + 8$

25. Which is the smallest square number that is divisible by each of the number 4, 9 and 10?

(a) 810 (b) 720
(c) 900 (d) 360

26. Simple form of $\cfrac{1}{3 - \cfrac{1}{2 - \frac{1}{7}}}$ is

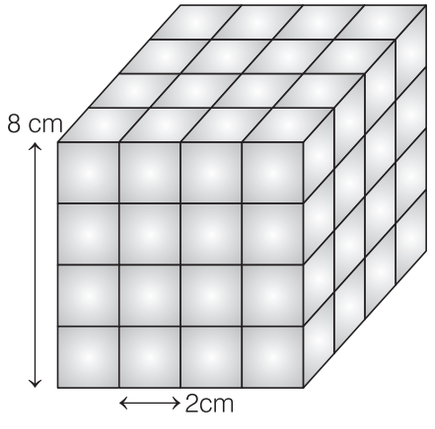
(a) $\frac{13}{32}$ (b) $\frac{15}{32}$ (c) $\frac{1}{32}$ (d) $\frac{3}{32}$

27. The smallest natural number by which 704 must be divided to obtain a perfect cube is

(a) 22 (b) 12 (c) 11 (d) 13

28. A solid cube of each side 8 cm has been painted red, blue and black on pairs of opposite faces. It is, then cut into cubical blocks of each side 2 cm.

How many cubes have only two faces painted?

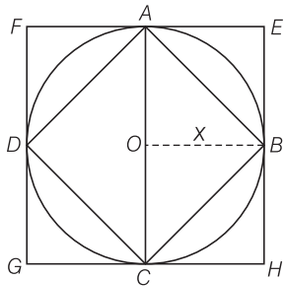


(a) 24 (b) 2
(c) 22 (d) 12

29. A geometric representation showing the relationship between a whole and its parts is a

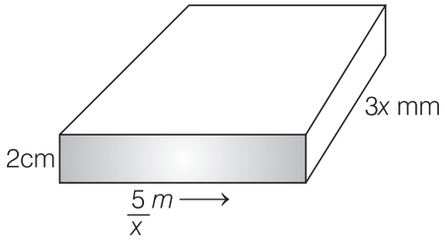
(a) Pie chart (b) Histogram
(c) Bar graph (d) Pictograph

30. The difference of the area of the circumscribed and the inscribed square of a circle is 35 sq cm. Then, the area of the circle is



(a) 55 sq cm (b) 70 sq cm
(c) 55 sq m (d) 70 sq m

31. What is the volume (in cm^3) of rectangular solid show below?



(a) 100 cm^3 (b) 150 cm^3
(c) 300 cm^3 (d) 620 cm^3

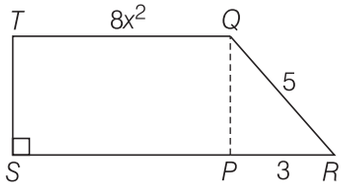
32. **P** Every fraction is a rational number.

Q Every rational number is a fraction.

Which of the following option is correct?

(a) P is true and Q is false.
(b) P is false and Q is true.
(c) Both P and Q are true.
(d) Both P and Q are false.

33. The area of trapezoid *QRST* 38 sq units, then value of *x* is



(a) 1, 2 (b) 1, – 1 (c) 2, 3 (d) 1, – 2

34. Which property is used in the equation given below?

$12(x + 4) = 12x + 48$

(a) Associative property of addition
(b) Commutative property of addition
(c) Distributive property
(d) Reflexive property

35. The value of *x* is

$$\frac{9x+7}{2} - \left[x - \left(\frac{x-2}{7}\right)\right] = 36$$

(a) 9 (b) 18
(c) 5 (d) 4

36. The edge of cube is doubled, then the percentage increase in the volume of cube is

(a) 100% (b) 500%
(c) 300% (d) 700%

37. Whole number such that twice of its square added to itself gives 10?

(a) 2 (b) 3 (c) 4 (d) 5

38. Which of the following is a factor of $xy + x - y - 1$?

(a) $x + 1$
(b) $y + 1$
(c) $x + y$
(d) $x - y$

39. Mani bought two horses at ₹ 20000 each. He sold first horse at 15% gain. But he had to sell the second horse at a loss. If he had suffered a loss of ₹ 1800 on the transaction, then the selling price (in rupees) of the second horse?

(a) ₹ 12490
(b) ₹ 13690
(c) ₹ 14560
(d) ₹ 15200

40. Expansion of $-8(3a + 5b) = k_1a + k_2b$, then $k_1 + k_2$ is

(a) 54 (b) 64
(c) – 64 (d) 80

Section 2 (2 Marks)

41. If seven slips of paper are labelled as 1, 2, 3, 4, 6, 7, 8 and one is drawn out of it, then

(i) What is the probability that it is a 3?

(ii) What is the probability that it is greater than 5?

(iii) What is the probability that it is an even number?

	(i)	(ii)	(iii)
(a)	$\frac{1}{7}$	$\frac{3}{7}$	$\frac{4}{7}$
(b)	$\frac{1}{7}$	$\frac{4}{7}$	$\frac{3}{7}$
(c)	$\frac{1}{7}$	$\frac{2}{7}$	$\frac{5}{7}$
(d)	$\frac{1}{7}$	$\frac{5}{7}$	$\frac{2}{7}$

42. How many non-square numbers lie between 112 and 122?

(a) 9 (b) 10 (c) 8 (d) 11

43. What is the area of the largest triangle that can be fitted into a rectangle of length l units and width w units?

(a) $\frac{lw}{2}$ (b) $\frac{lw}{3}$ (c) $\frac{lw}{6}$ (d) $\frac{lw}{4}$

44. Match the following

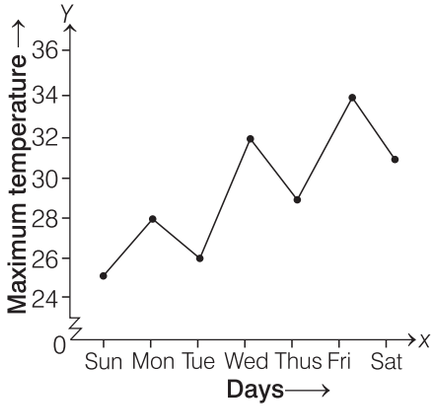
	Column I	Column II	
P.	A cylindrical roller is of length 2 m and diameter 84 cm, the number of revolutions it has to make to cover an area of 7920 sq m is	(i)	17600
Q.	The circumference of the base of a right circular cylinder is 176 cm. If the height of the cylinder is 1 m. The lateral surface area (in sq cm) of the cylinder is	(ii)	1500
R.	The dimensions of a cuboid are in the ratio 5 : 2 : 1. Its volume is 1250 m^3. Its total surface area (in sq m) is	(iii)	9
S.	If the total surface area of a cubical tank is 486 sq m, then the length (in m) of one side is	(iv)	850

	P	Q	R	S
(a)	(ii)	(i)	(iv)	(iii)
(b)	(i)	(ii)	(iii)	(iv)
(c)	(iv)	(iii)	(ii)	(i)
(d)	(iii)	(iv)	(i)	(ii)

45. A man bought a rectangular field of length 144 m and width 64 m. In exchange for this field, he wanted to buy a square field of the same area. What would be the side of the square field?

(a) 96 m (b) 208 m (c) 104 m (d) 416 m

46. Look at the graph and answer the following questions



I. One which day was the temperature 31°C?

II. On which day was the temperature the least?

III. Which was the hottest day, respectively?

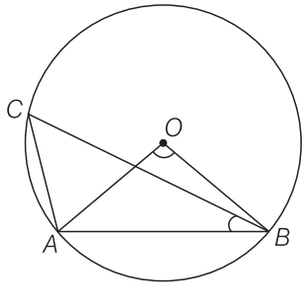
(a) Saturday, Sunday, Friday

(b) Sunday, Monday, Tuesday

(c) Monday, Sunday, Friday

(d) Wednesday, Saturday, Wednesday

47. In the following figure, $\angle AOB = 90°$ and $\angle ABC = 30°$. Then, the value of $\angle CAO$ is



(a) 30° (b) 45° (c) 60° (d) 90°

48. Statement type question.

Statement I If we divide $(y^2 + 6y - 16)(y + 2)$ by $(y^2 - 4)$, then we get $(y + 8)$.

Statement II One of the factors of $81a^4 + (x - 2a)(x - 5a)(x - 8a)(x - 11a)$ is $31a^2 + x^2 - 13ax$.

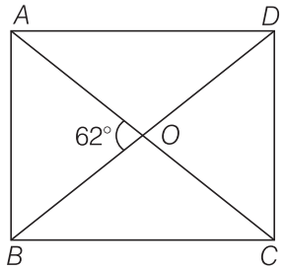
(a) Statement I is true, Statement II is false.

(b) Statement I is false, Statement II is true.

(c) Both Statement I and Statement II are true.

(d) Both Statement I and Statement II are false.

49. In a rectangle $ABCD$, the diagonals intersects at O. If $\angle AOB = 62°$, then $\angle ODC$ is ?



(a) 59°

(b) 60°

(c) 65°

(d) 45°

50. Which statement(s) is true?

P. Descending order of magnitude of $\sqrt[3]{2}, \sqrt[6]{5}, \sqrt[4]{6}$ are $\sqrt[4]{6} > \sqrt[6]{5} > \sqrt[3]{2}$.

Q. If $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, $b^z = ac$, then the value of $\left(\frac{x+z}{y}\right)^5$ is 32.

(a) P-true, Q-false

(b) P-false, Q-true

(c) P-true, Q-true

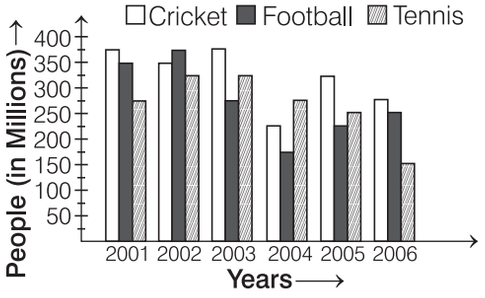
(d) P-false, Q-false

Tie-Breaking Section

Instructions

1. This section consists of 5 questions.
2. The score achieved in this section will not be included in the total marks.
3. If overall marks of two or more students are same, winner will be decided based on the score in this section.
4. Participation in this section is optional, and students may choose to attempt it or not.

1. Study the bar graph given below. Preferences of people in playing difference games over the yr.



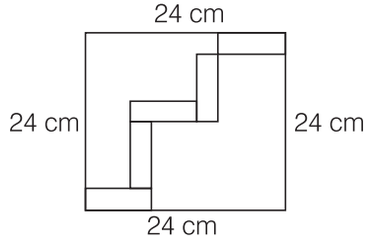
What is the ratio of the number people preferring to play cricket to the number of people preferring to play tennis in the year 2003?

(a) 14 :15 (b) 15 :13 (c) 15 :17 (d) 13 :15

2. A school has 8 tables of dimensions 1 m by 1 m, 26 tables of dimensions x m by 1 m and 15 tables of dimensions x m by x m. All the tables are of equal height. Based on this information answer the question given below. If the tables are placed together to form a large rectangular table, then the dimension of the table formed is

(a) $(3x + 4)(5x + 2)$ (b) $(3x - 4)(5x - 4)$
(c) $(5x - 4)(4x - 4)$ (d) $(5x - 4)(5x + 4)$

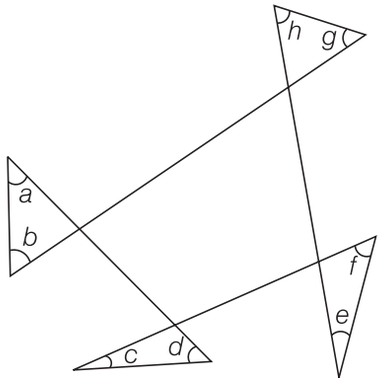
3.



Five identical rectangles are placed inside a square with side 24 cm as shown in the diagram. What is the area of one rectangle?

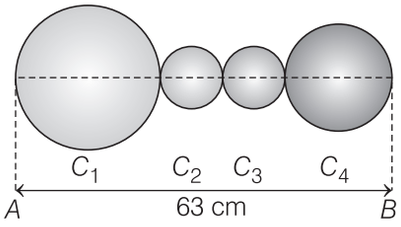
(a) 12 cm^2 (b) 16 cm^2
(c) 24 cm^2 (d) 32 cm^2

4. The sum of a, b, c, d, e, f, g and h is



(a) 720° (b) 360°
(c) 540° (d) 180°

5. The figure drawn below is not to scale. Line AB is 63 cm and it cuts through the centre of all circles. Then, the perimeter (in cm) of the given figure is



(a) 198 cm (b) 206 cm
(c) 189 cm (d) 178 cm