Please check the examination details below before entering your candidate information

Candidate Name	Class	Section

BLOOM Mathematics Olympiad (BMO)

Question Paper 2023-24

Class 7

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

M7

BLOOM CAP
Founded by | arihant

Bloom Mathematics Olympiad Class 7

Section 1 (1 Mark)

1. Which of the following statements is incorrect?

(a) The multiplicative identity for integers is 1

(b) Subtractions does not obey commutative law in integers.

(c) Multiplication of two integers with unlike signs is always positive

(d) None of the above

2. Which pair of numbers does not have a product equal to 36?

(a) $\{-4, -9\}$ (b) $\{-3, -12\}$

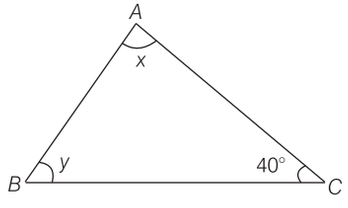
(c) $\{-1, -72\}$ (d) $\{1, 36\}$

3. In a test, 4 marks are given for every correct answer and (-2) marks for every incorrect answer. Payal answered all the questions and scored 26 marks through she got 9 correct answers. Soukat also answered all the questions and scored 2 marks through he got 5 correct answers. How many questions did each answer incorrectly?

(a) 10, 8 (b) 9, 18

(c) 5, 9 (d) 4, 10

4. One angle of ΔABC is 40° in the figure below. If the difference between the other two angles is 30°, find the larger of the two angles.



(a) 55° (b) 96°

(c) 89° (d) 85°

5. If a and b are integers and $a \neq b$, then which of the following is incorrect?

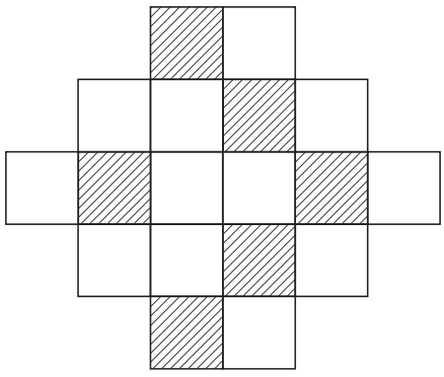
(a) $a + b = b + a$

(b) $a - b = b - a$

(c) $a + 0 = 0 + a = a$

(d) $a - 0 = a \neq 0 - a$

6. How many more unit squares in the figure must be shaded so that the fraction of shaded squares is $\frac{7}{9}$?



(a) 1 (b) 3 (c) 6 (d) 8

7. Evaluate $\dfrac{2\frac{5}{4} - 4\frac{7}{6} + 3\frac{1}{3}}{0.087 + 0.3717 \div 0.9}$

(a) $2\frac{5}{6}$ (b) $\frac{7}{5}$ (c) $\frac{7}{25}$ (d) $2\frac{3}{5}$

8. Which of the following is not equal to $24.675 \times 3.489 \times 0.735$?

(a) $2467.5 \times 34.89 \times 0.000735$

(b) $0.24675 \times 3489 \times 0.0735$

(c) $0.24675 \times 0.3489 \times 735$

(d) $2.4675 \times 3.489 \times 73.5$

9. A farmer has 192 animals, out of which $\frac{7}{16}$ are cattles, $\frac{2}{3}$ of cattles are dairy cows. How many dairy cows he has?

(a) 128 (b) 84 (c) 56 (d) 112

10. Shivam, Subham, Soukat and Soham each took the same spelling test.

- Shivam spelled $\frac{7}{10}$ of the words correctly.
- Subham spelled $\frac{3}{4}$ of the words correctly.
- Soukat spelled $\frac{4}{5}$ of the words correctly.

- Soham spelled $\frac{2}{3}$ of the words correctly.

Who spelled the least number of words correctly.

(a) Soham (b) Subham
(c) Shivam (d) Soukat

11. The numbers 2, 4, 6, 9 and 12 are arranged according to these rules.

(i) The largest is not first but it is in one of the first three places.

(ii) The smallest is not last but it is in one of the last three places.

(iii) The median is not first or last.

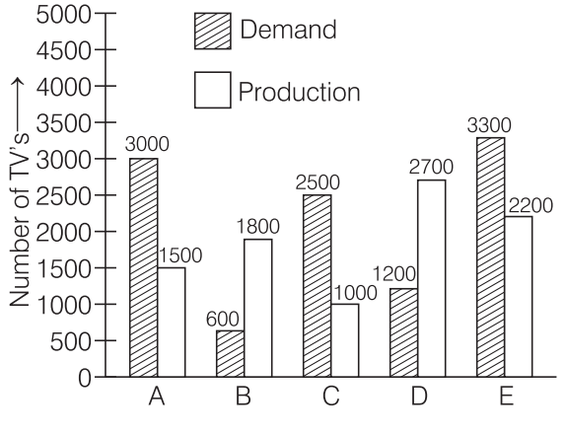
What is the average of the first and last numbers?

(a) 3.5 (b) 5 (c) 6.5 (d) 7.5

12. After Sam takes 20 shots, he has made 55% of his shots. After he takes 5 more shots, he raises his percentage to 56%. How many of the last 5 shots did he make?

(a) 4 (b) 3 (c) 2 (d) 1

13. The given bar graph shows the demand and production of colour TV's of five companies.



What is the difference between average demand and average production of the five companies taken together?

(a) 1400 (b) 400 (c) 280 (d) 1280

14. y is the solution of the equation $10 - 3y = 1$, then y^2 is equal to

(a) 0 (b) 1 (c) 3 (d) 9

15. The value of x in the given equation

$\left\{\left(x - \frac{1}{2}\right) \times 4 + 25\right\} \div 3 = 10$ is

(a) $2\frac{3}{4}$ (b) $1\frac{3}{4}$ (c) $1\frac{1}{3}$ (d) $2\frac{1}{3}$

16. Which of the following equation is not same as $15 + 3x = 3$?

(a) $3x = 3 - 15$ (b) $15 - 3 = -3x$
(c) $15 + \frac{3x}{3} = 3$ (d) $\frac{15}{3} + \frac{3x}{3} = \frac{3}{3}$

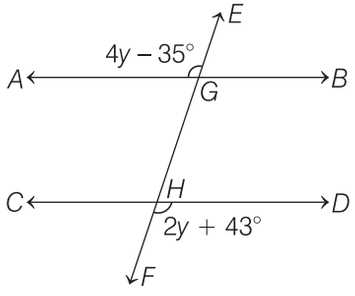
17. There are some lotus flowers in a pond and some bees are hovering around. If one bee lands on each flower, one bee will be left. If two bees land on each flower, one flower will be left. Then, the number of flowers and bees respectively, are

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

18. If two supplementary angles are in the ratio 3 :7, then the difference between them is

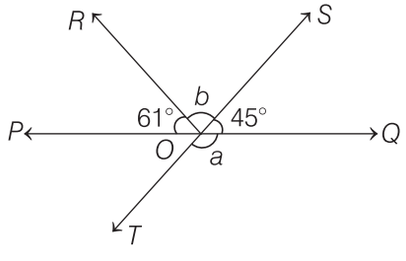
(a) 78° (b) 54° (c) 126° (d) 72°

19. If $AB \| CD$, then the value of y is



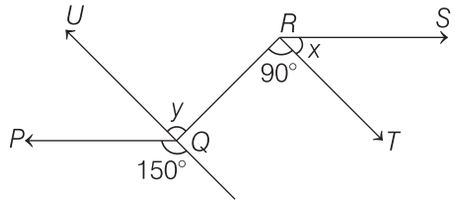
(a) 41° (b) 29° (c) 39° (d) 49°

20. In the given figure, SOT and POQ are straight lines. Then, the value of a and b is



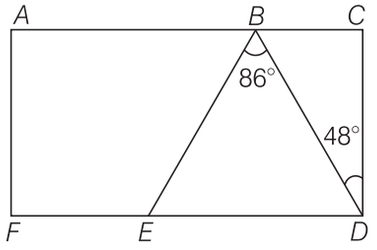
(a) 120°, 62° (b) 145°, 54°
(c) 135°, 74° (d) 115°, 64°

21. If $RS \parallel PQ$ and $RT \parallel UQ$. Then, the value of $8x - 2y$ is



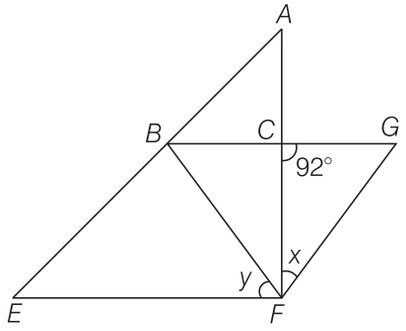
(a) 60° (b) 30° (c) 150° (d) 100°

22. In the given figure, $ACDF$ is a rectangle and BDE is a triangle, then $\angle BED$ is equal to



(a) 42° (b) 52° (c) 128° (d) 134°

23. In the given figure, $\angle EFA$ is a right angles triangle with $\angle EFA = 90°$ and FGB is an equilateral triangle. Then, the value of $y - 2x$ is



(a) 8° (b) 2° (c) 17° (d) 20°

24. 150% of a numbers is 900, what is the number?

(a) 450 (b) 600 (c) 1350 (d) 1800

25. Which of the following is greater than 16.3%?

(a) 163 out of 1000 (b) 113 out of 250
(c) 8 out of 50 (d) 39 out of 750

26. Two number are in the ratio 3 : 5. If 9 is subtracted from each, then the ratio becomes 12 : 23. Then, the smaller number is

(a) 27 (b) 49 (c) 33 (d) 55

27. During a cricket match, 4800 people showed their spirit by wearing home team's colour. If 12000 people attended the game, then what % of crowd wear home team's colour?

(a) 60% (b) 70% (c) 30% (d) 40%

28. For any two rational numbers x and y which of the following is/are correct? If x is positive and y is negative

(i) $x < y$ (ii) $x = y$ (iii) $x > y$

(a) Both (i) and (ii) (b) Both (ii) and (iii)
(c) Only (iii) (d) (i), (ii) and (iii)

29. Select incorrect option

(a) $-\frac{3}{7} > -\frac{3}{5}$ (b) $-9\frac{2}{3} > -9\frac{4}{5}$

(c) $-11\frac{1}{4} < -11\frac{3}{5}$ (d) $-13\frac{1}{3} < -13\frac{1}{5}$

30. Simplify $\dfrac{\left(-18\frac{1}{3} \times 2\frac{8}{11}\right) - \left(4\frac{5}{7} \times 2\frac{1}{3}\right)}{\left|\frac{3}{5} + \left(\frac{-9}{10}\right)\right| + \left|-\left(\frac{-3}{5}\right)\right|}$

(a) $63\frac{4}{81}$ (b) $-67\frac{7}{9}$

(c) $-23\frac{7}{9}$ (d) $12\frac{6}{17}$

31. In a examination, a student was asked to find $\frac{5}{17}$ of a certain number. By mistake he found $\frac{17}{5}$ of that number. If his answer was $\frac{264}{119}$ more than the correct answer, then the number is

(a) $\frac{7}{5}$ (b) $\frac{5}{7}$

(c) $\frac{3}{7}$ (d) $\frac{7}{3}$

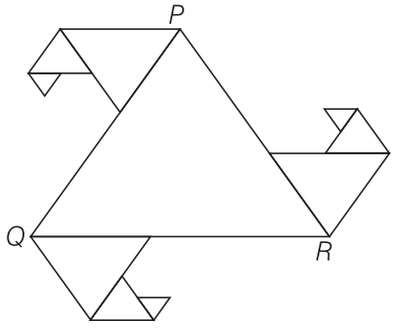
32. A worker is hired for 20 days with the understanding that he will be paid ₹ 280 per day worked and fixed penalty ₹ 60 per day absent. How many days did he miss if he received total of ₹ 2540?

(a) 9 (b) 7 (c) 10 (d) 8

33. The length, breadth and height of a room are in the ratio 3 : 2 : 1. If the breadth and height are halved while the length is doubled, then the total area of four walls of the room will be

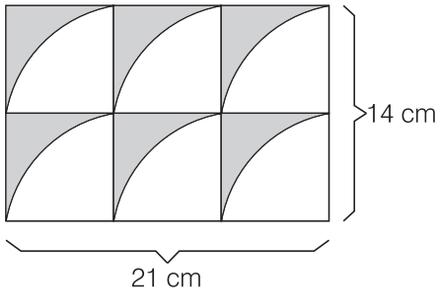
(a) decreased by 13.64%
(b) decreased by 30%
(c) decreased by 15%
(d) remain the same

34. In the given figure, all triangles are equilateral and $PQ = 12$ units. Other triangles have been formed by making the mid point of the sides. What is the perimeter of the figure?



(a) 62.3 units (b) 64.5 units
(c) 67.5 units (d) 65.5 units

35. In the given figure, all 6 quadrants are identical. Then, the shaded area is



(a) 231 cm^2 (b) 42 cm^2
(c) 63 cm^2 (d) 113 cm^2

36. If $P = 3a - 5b$, $Q = 4a + 7b$, $R = -2a + 9b$, then $P - Q + R$ is equal to

(a) $3a - 3b$ (b) $3a + 3b$
(c) $-3a - 3b$ (d) $-3a + 3b$

37. Select the correct option.

(a) $(2x + 3y)(2x - 3y) = 4x^2 - 9y^2$
(b) $(3x + y)^2 = 9x^2 + 6xy + y^2$
(c) $144m^2 - 196n^2 = (12m + 14n)(12m - 14n)$
(d) All of the above

38. $(1 + 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5)^{\frac{3}{2}}$ is equal to

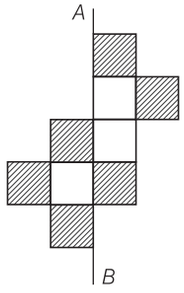
(a) 8 (b) 512 (c) 343 (d) 64

39. Study the following statements and select the correct option.

$(p)\ 3^2 > 2^3$ $(q)\left(-\frac{1}{2}\right)^2 < (-2)^2$

(a) Both p and q are true.
(b) Both p and q are false.
(c) p is true and q is false.
(d) q is true and p is false

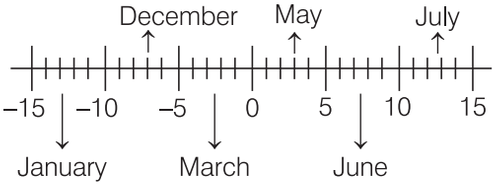
40. What is the least number of squares that must be added, so that the line AB becomes a line of symmetry?



(a) 4 (b) 5
(c) 6 (d) 7

Section 2 (2 Marks)

Directions (Q. Nos. 41-42) The following number line showed the temperature in degree Celsius (°C) of a place on first day of 6 months.



On the basis of above information, answer the following questions.

41. On which date, the temperature was minimum?

(a) 1st December (b) 1st January
(c) 1st March (d) 1st June

42. How much was the increase in temperature from may to July?

(a) 10°C (b) 11°C
(c) 9°C (d) 12°C

43. If $63.9805 = 6A + \frac{3}{B} + 9C + \frac{8}{D} + 5E$, then what is the value of $4A + 7B + 6C + D + 3E$?

(a) 47.603 (b) 4.7603
(c) 147.6003 (d) 47.6003

44. The height's of 10 student's were measured (in cm) and the height's are as follows

147, 139, 135, 136, 149, 166, 152, 163, 155, 144.

(i) What is the range (in cm) of the data?
(ii) What is the mean height (in cm) of the students?
(iii) How many students are there whose height is more than the mean height (in cm)?

	(i)	(ii)	(iii)		(i)	(ii)	(iii)
(a)	30	100.5	3	(b)	31	148.6	5
(c)	32	149	5	(d)	31	148.6	4

45. Study the following statements carefully and select the correct option.

(p) If $3(x + 3) - 2(x - 1) = 5(x - 5)$, then $x = 9$.

(q) If $\frac{y}{2} + \frac{3}{2} = \frac{2y}{5} + 1$, then $y = 5$.

(a) Both p and q are true
(b) Both p and q are false
(c) p is true and q is false
(d) q is true and p is false

46. Select the correct option.

(a) Vertically opposite angles are always complementary angles.
(b) If an angle is 60° more than three times of its supplement, then the smaller angle is of measure 60°.
(c) Sum of two adjacent angle is always greater than a right angle.
(d) The measure of complement of 41° is 49°.

47. **Statement I** In an isosceles triangle if one of its equal angle is 52°, then the greatest angle is of measure 76°.

Statement II If an exterior angle of a triangle is a right angle, than each of its interior opposite angle are acute.

(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 is true.
(d) Both Statement I and Statement II is false.

48. $\frac{3}{20}$ of a delegation are from India, $\frac{1}{4}$ are from Britain, $\frac{3}{10}$ are from Germany and rest are Americans. If there are 1200 members in the delegation, then how many Americans are there?

(a) 460
(b) 400
(c) 360
(d) 300

49. The value of $4xy(x - y) - 6x^2(y - y^2) - 3y^2(2x^2 - x) + 2xy(x - y)$ for $x = 5$ and $y = 13$ is

(a) -195
(b) 2535
(c) -2535
(d) 7605

50. **Assertion** (A) The value of $\frac{(6)^{12} \times (35)^{28} \times (15)^{16}}{(14)^{12} \times (21)^{11} \times (5)^{28}}$ is $3^{17} \times 5^{16} \times 7^5$.

Reason (R) $P^x \times P^y = P^{xy}$ $(P \neq 0)$.

Then,

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are false.
(c) Assertion is true but Reason is false.
(d) Reason is true, but Assertion is 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. State T is True and F is false.

(i) Number 0 has both rational and line of symmetry.

(ii) A regular polygon of n sides has $2n$ lines of symmetry.

(iii) A rectangle has two lines of symmetry and rotational symmetry of order 4.

(iv) A parallelogram has rational symmetry but no line of symmetry.

	(i)	(ii)	(iii)	(iv)
(a)	T	F	F	T
(b)	T	F	T	F
(c)	F	T	F	T
(d)	F	T	T	T

2. Match the Column I and Column II and select the correct option.

	Column-I		Column-II
P.	$\frac{[(-8)^3]^4 \times [(9)^2]^0}{(4^3)^2 \times (8)^2}$	(i)	$\frac{(2)^2}{(7)^2}$
Q.	$\frac{(28)^4 \times (3)^2}{(-7)^4 \times (8)^2}$	(ii)	$\frac{(3)^2}{(7)^2}$
R.	$\frac{[(-4)^2]^3 \times (9)^2 \times (11)^0}{(12)^2 \times (4)^4 \times (7)^2}$	(iii)	$(2)^{18}$
S.	$\frac{(5)^3 \times (9)^2 \times 36}{125 \times 729 \times (7)^2}$	(iv)	$(2)^2 \times (3)^2$

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

3. Read the given statements carefully and select the correct option.

Statement I If Sujata lost 5% on a laptop which was sold for ₹ 24700, then the cost price of laptop was ₹ 28500.

Statement II 3% of 1 hour = 108 sec.

(a) Both Statement I and Statement II are true.
(b) Both Statement I and Statement II are false.
(c) Statement I is true.
(d) Statement II is true.

4. A parallelogram in the form of rectangular field is 112 m long and 100 m wide. Two roads, each 3m wide are to be constructed at the centre of this field. One is parallel to the length of the field and the other is parallel to the breadth of the field.

(i) Area of the part of the field not covered by the roads.

(ii) Cost of constructing the road at ₹ 17 per m^2.

	(i)	(ii)
(a)	3248 m^2	₹ 2890
(b)	10573 m^2	₹ 10659
(c)	16582 m^2	₹ 20480
(d)	10573 m^2	₹ 1250

5. The mean of the marks in Mathematics of 100 students in a class was 72. The mean of marks for boys was 75 while their number was 70. The mean of marks of girls in the class was

(a) 65 (b) 35 (c) 86 (d) 68