Mindbenz Olympiad of Mathematics (MOM)

Sample Paper

Grade - 6

Maximum Marks: 60 Time Allowed – 55 Minutes

Section: A Fundamental Check (10 Questions × 1 mark = 10 marks)

1. **What is the result of CDLXV + CMXCIX? Express the answer in Roman numerals.**
   (A) MCDLXIV
   (B) MCDLXVI
   (C) MMDLXIV
   (D) MCDLXXIV

2. **Which of the following statements demonstrates a property that holds for the multiplication of integers but NOT for their division?**
   (A) The order of numbers does not change the result. (Commutative Property)
   (B) Grouping of numbers does not change the result. (Associative Property)
   (C) The result of the operation on any two integers is always an integer. (Closure Property)
   (D) An identity element exists for the operation.

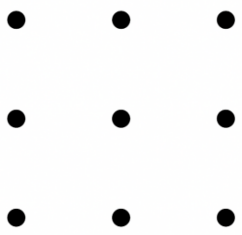
3. **If the 5-digit number 7A53B is divisible by both 3 and 11, what is the value of A^2+B^2?**
   (A) 81
   (B) 20
   (C) 74
   (D) All of the above

4. **On a number line, point P is at -11. Point Q is 17 units to the right of P. Point R is the exact midpoint of the segment PQ. What integer represents point R?**
   (A) 6
   (B) -2.5
   (C) 3
   (D) -2

5. **Which set of fractions is arranged in descending order?**
   (A) -3/5, -7/10, -17/20, -13/15
   (B) -17/20, -13/15, -7/10, -3/5
   (C) -3/5, -17/20, -13/15, -7/10
   (D) -13/15, -3/5, -7/10, -17/20

6. **What is the standard numeral for the value of the expression: $8\times10^{3}+4\times10^{1}+6\times10^{-1}+7\times10^{-3}$?**
   (A) 840.67
   (B) 8040.607
   (C) 804.670
   (D) 8400.067

7. **How many squares can be formed by joining any four vertices of the given 3x3 grid of points?**



   (A) 5
   (B) 6
   (C) 8
   (D) 9

8. **A triangle has two angles measuring 45° each. The length of the side between these angles is 10 cm. What is the most accurate classification for this triangle?**
   (A) Isosceles and Acute
   (B) Scalene and Right-angled
   (C) Isosceles and Right-angled
   (D) Equilateral and Acute

9. **Which of the following English alphabet letters possesses rotational symmetry of order 2 but has no lines of symmetry?**
   (A) H
   (B) X
   (C) O

(D) S

10. What is the result when the successor of the greatest negative integer is subtracted from the predecessor of the smallest positive integer?
(A) -2
(B) -1
(C) 0
(D) 1

Section: B Application Zone (10 Questions × 1 mark = 10 marks)

11. Three bells chime at intervals of 12 seconds, 15 seconds, and 18 seconds, respectively. If they all chime together at 9:00 AM, at what time will they next chime together?
(A) 9:03 AM
(B) 9:06 AM
(C) 9:09 AM
(D) 9:12 AM

12. Consider the expression: 'Subtract the cube of a number 'y' from thrice the square of the same number, then divide the entire result by the sum of 'y' and 1. If 'y' is a positive integer, which of the following algebraic expressions represents this statement?'
(A) $(3y^2-y^3)/(2y+1)$
(B) $(3y^2-y^3)/y+1$
(C) $(3y^2-y^3)/(y+1)$
(D) $3y^2-(y^3/y+1)$

13. A square with a side length of 's' cm has its perimeter equal to the circumference of a circle with radius 'r' cm. If this square is then reshaped to form a regular hexagon, what will be the length of one side of the hexagon in terms of 'r' and π?
(A) πr/6
(B) 2πr/3
(C) πr/3
(D) 4πr/6

14. Ravi, Suresh, and Tarun have money in the ratio 4:7:9. Suresh gives ₹600 to Ravi, and Tarun gives ₹400 to Suresh. If their new ratio of money becomes 6:8:8, what was the initial amount of money Tarun had?
(A) ₹2700
(B) ₹3600

(C) ₹5400
(D) ₹1800

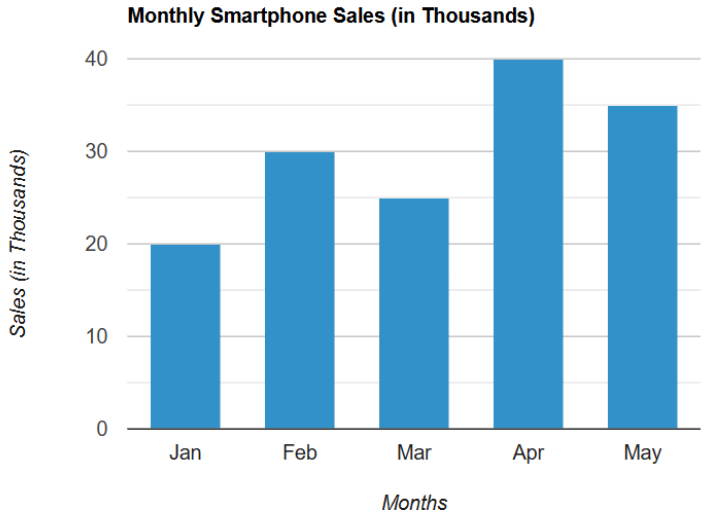
15. **In a triangle ABC, the measure of angle A is twice the measure of angle B. The measure of angle C is 20° more than the measure of angle A. What is the measure of the smallest angle in the triangle?**
    (A) 32°
    (B) 42°
    (C) 52°
    (D) 62°

16. **A baker sells 2/5 of his cakes in the morning. In the afternoon, he sells 1/3 of the remaining cakes and 10 more cakes. If he is then left with 30 cakes, how many cakes did he have initially?**
    (A) 100
    (B) 150
    (C) 180
    (D) 200

17. ***A rectangular field has an area of 1200 m². If its length is 4/3 times its width, what is the length of the diagonal of the field?***

    (A) 45 m
    (B) 50 m
    (C) 55 m
    (D) 40 m

18. **Based on the following data for monthly smartphone sales (in thousands):**
    Jan: 20, Feb: 30, Mar: 25, Apr: 40, May: 35.
    If the sales trend continues such that each month's sales are 1.2 times the average of the previous two months' sales, what would be the projected sales for June (rounded to the nearest thousand)?



(A) 42 thousand
(B) 45 thousand
(C) 48 thousand
(D) 50 thousand

19. Train A travels at a speed of 75 km/h. Train B travels at a speed that is 20% more than Train A's speed. If Train A takes 4 hours to cover a certain distance, how much time will Train B take to cover 1.5 times that distance?
(A) 4 hours
(B) 4.5 hours
(C) 5 hours
(D) 5.5 hours

20. When a number is increased by 20% of itself, the result is 12 more than two-thirds of the original number. What is the sum of the digits of the original number?
(A) 3
(B) 5
(C) 7
(D) 9

Section: C Maths Mastery (20 Questions × 2 mark = 40 marks)

21. A drum is 2/3 full. After 45 litres of oil are drawn from it, it is refilled with 20 litres. Now, the drum is exactly 1/2 full. What is the total capacity of the drum in litres?
(A) 120

(B) 150
(C) 180
(D) 135

22. Find the greatest number that will divide 1305, 4665, and 6905, leaving the same remainder in each case. What is the sum of the digits of this number?
(A) 4
(B) 5
(C) 6
(D) 8

23. The length of a rectangle is 1 cm more than twice its breadth. If the area of the rectangle is 136 cm^2 and its sides are integers, what is its perimeter?
(A) 50 cm
(B) 52 cm
(C) 44 cm
(D) 48 cm

24. The ratio of boys to girls in a school was 5:4. Last year, 40 new boys and 40 new girls joined, and the ratio became 6:5. What was the original number of students in the school?
(A) 360
(B) 450
(C) 540
(D) 270

25. A student spent 1/4 of his pocket money on books. From the money that was left, he spent 2/3 on food. If he was then left with ₹150, what was his total pocket money?
(A) ₹450
(B) ₹500
(C) ₹600
(D) ₹720

26. A polygon has 35 diagonals. A second polygon has 2 fewer sides than the first one. How many diagonals does the second polygon have?
(A) 20
(B) 27
(C) 14
(D) 30

27. A car travels a certain distance at a speed of 60 km/h for the first 2 hours and then at a speed of 80 km/h for the next 3 hours. What is the average speed of the car for the entire journey?

(A) 70 km/h
(B) 72 km/h
(C) 75 km/h
(D) 68 km/h

28. A right-angled triangular plot of land has integer side lengths and the shortest side is one-fourth of the perimeter of the triangle. If the sum of all possible distinct perimeters of such triangles equals the smallest three-digit integer divisible by both 5 and 8, what is the value of the shortest side in meters?
A) 5
B) 6
C) 7
D) 8

29. What is the product of the place value of the digit 5 and the face value of the digit 8 in the number 75,48,312?
(A) 4,000,000
(B) 400,000
(C) 40,000
(D) 40,000,000

30. If x=0.5 and y=0.2, what is the value of the expression $(x^3-y^3)/(x^2+xy+y^2)$?
(A) 0.7
(B) 0.3
(C) 0.03
(D) 0.39

31. The sum of the present ages of a father and his son is 60 years. Six years ago, the father's age was five times the age of the son. What will be the son's age six years from now?
(A) 14 years
(B) 20 years
(C) 22 years
(D) 24 years

32. The cost of fencing a rectangular field, whose length and breadth are in the ratio 5:3, at a rate of ₹12 per metre is ₹5760. What is the cost of leveling the entire field at ₹50 per square metre?
(A) ₹675,000
(B) ₹650,000
(C) ₹725,000
(D) ₹750,000

33. If the sequence continues, where each subsequent figure is a larger equilateral triangle formed by adding a new row of dots to the base of the previous triangle, how many lines will be needed to construct Figure 5?

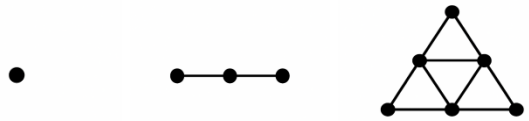


Figure 1 Figure 2 Figure 3

(A) 20 (B) 30 (C) 45 (D) 60

34. In a school, 3/8 of the students are girls. Of the girls, 1/3 are in the primary section, and of the boys, 1/4 are in the primary section. If there are 80 students in the primary section, what is the total number of students in the school?
(A) 248
(B) 284
(C) 320
(D) 352

35. A rectangular garden has a length that is twice its width. A path 2 meters wide runs along the entire inside perimeter of the garden. The path is made up of square tiles, each with a side of 0.5 meters. The total number of tiles used on the path is equal to the smallest three-digit number that is a multiple of both 9 and 12. If the ratio of the length to width of the garden remains the same, what is the width of the garden in meters?

A) 43/9 meters
B) 43/12 meters
C) 43/15 meters
D) 43/18 meters

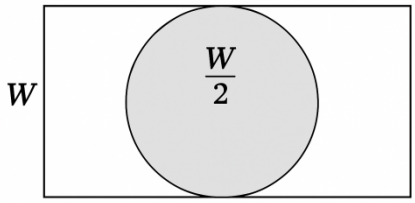
36. The total cost of 3 chairs and 5 tables is ₹8500. If a chair costs ₹500 less than a table, find the total cost of one chair and two tables.
(A) ₹3500
(B) ₹4000
(C) ₹3250
(D) ₹5000

37. Which of the following statements is INCORRECT?
(A) The product of two co-prime numbers is always their LCM.
(B) Every integer can be expressed as a rational number.
(C) The square root of any prime number is an irrational number.

(D) A number divisible by both 3 and 6 is always divisible by 18.

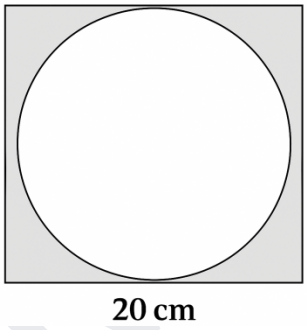
38. A rectangle has length L=12 meters and width W meters. A circle is drawn inside the rectangle such that it touches only the two shorter sides (the width sides). The radius of the circle is equal to half the width W.

If the area of the circle is exactly one-fourth of the area of the rectangle, find the width :



A) 6/ π
B) 8/ π
C) 9/ π
D) 12/ π

39. A circular disc of maximum possible size is cut out from a square sheet of metal of side 20 cm. What is the area of the metal sheet remaining after the disc is cut out? (Use π=3.14)



(A) 86 cm²
(B) 102 cm²
(C) 116 cm²
(D) 124 cm²

40. A group of students was divided into two sections, A and B. The number of students in section A is 30 more than twice the number of students in section B. If 40% of the students in section A and 10% of the students in section B failed a test,

and the total number of students who failed is exactly one-third of the total number of students, how many students are in section A?

(A) 112
(B) 64
(C) 30
(D) 70

Corrected Answer Key

Section A: Fundamentals Check (10 Questions)

1. **(A) MCDLXIV**
2. **(C) The result of the operation on any two integers is always an integer. (Closure Property)**
3. **(A) 81**
4. **(A) -3/5, -7/10, -17/20, -13/15**
5. **(B) 8040.607**
6. **(B) 6**
7. **(C) Isosceles and Right-angled**
8. **(D) S**
9. **(C) 0**

Section B: Application Zone (10 Questions)

11. **(A) 9:03 AM**
12. **(C) (3y^2−y^3)/(y+1)**
13. **(C) πr/3**

14. (C) 5400

15. (A) 32°

16. (A) 100

17. (B) 50 m

18. (B) 45 thousand

19. (C) 5 hours

20. (D) 9

Section C: Maths Mastery (20 Questions)

21. (B) 150

22. (A) 4

23. (A) 50 cm

24. (A) 360

25. (C) ₹600

26. (A) 20

27. (B) 72 km/h

28. (B) 6

29. (A) 4,000,000

30. (B) 0.3

31. (B) 20 years

32. (A) ₹675,000

33. (b) 30

34. (B) 284

35. (B) 43/12 meters

36. (C) ₹3250

37. (D) A number divisible by both 3 and 6 is always divisible by 18.

38. (D) 12/π

39. (A) 86 cm²

40. (D) 70
