



MUMBAI MATH CHAMPIONSHIP-2021

MOCK TEST – Grade 10

Total Marks: 100

Time Duration: 1 hour

Section: Logical Reasoning

Q1. (Number Series)

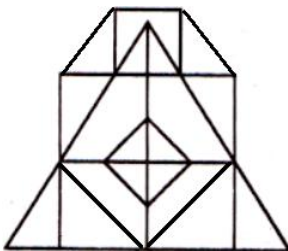
Find the missing number in the series given below: **(1 mark)**

8, 10, 11, ?, 15, 5, 20, 1

- (A) 7
- (B) 13
- (C) 8
- (D) 12

Q2. (Understanding elementary shapes)

Count the number of triangles and squares in the given figure? **(1 mark)**



- (A) 27 triangles, 7 squares
- (B) 27 triangles, 8 squares
- (C) 22 triangles, 8 squares



(D) 22 triangles, 7 squares

Q3. (Symbols)

In the following equation, select correct combination of mathematical signs to replace b and balance the equation. **(1 mark)**

$$16b3b4b2b6b4 = 8$$

(A)

(B)

(C)

(D)

Q4. (Time and Work)

How many days will A alone take to finish a work if A is thrice as good as a workman B and together, they finish the same work in 12 days. **(1 mark)**

(A) 5 days

(B) 7 days

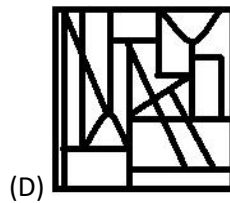
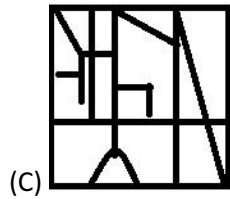
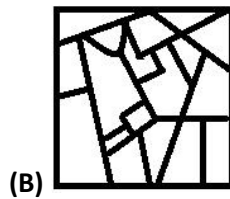
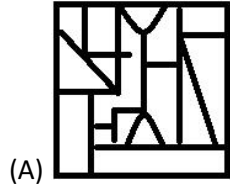
(C) 20 days

(D) 16 days

Q5. (Understanding elementary shapes)

Select a figure from the options in which given figure is exactly embedded as one of its parts. **(1 mark)**





Q6. (Magic Square)

Write the values from A to F in order to complete the given magic square if the total of each side is 90.
(1 mark)

A	28	29	B
23	C	20	26
D	25	24	E
30	F	17	27



(A) 18, 31, 21, 19, 22, 16

(B) 18, 15, 21, 19, 22, 16

(C) 13, 15, 21, 19, 22, 16

(D) 18, 15, 21, 38, 22, 16

Q7. (Number Series)

In a certain code language, " represents '-', '-' represents "", " represents " and '+' represents " What is the answer to the following question? **(1 mark)**

(A) 150

(B) 134

(C) 160

(D) 230

Q8. (Number Series)

Complete the following number series: **(1 mark)**

4, 10, 27, 52, ?

(A) 68

(B) 121

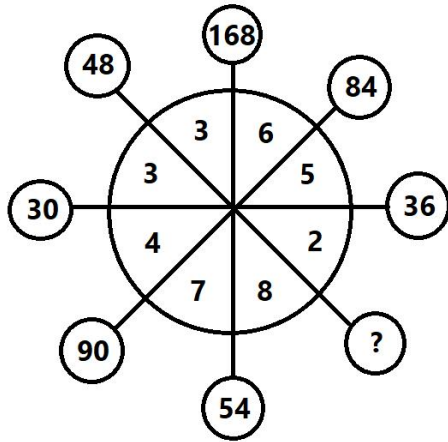
(C) 125

(D) 81



Q9. (Puzzle)

Find the missing number. **(1 mark)**



- (A) 27
- (B) 16
- (C) 48
- (D) 21

Q10. (Number Series)

Find the capacity of a large tank which can be filled by two pipes in 36 and 30 minutes respectively and another pipe can empty 57 gallons of water per minute from that tank. It takes 25 minutes to fill the tank when all three pipes are working together. **(1 mark)**

- (A) 3,600 gallons
- (B) 3,300 gallons
- (C) 4,500 gallons
- (D) 2,700 gallons**



Section: Mental Math

Q11. (Quadratic equations)

Find the roots of the equation by factorization: **(2 marks)**

(A) $x = -3, x =$

(B) $x = -, x = -$

(C) $x = , x = -$

(D) $x = -, x = -7$

Q12. (Arithmetic Progression)

Find the sum of the following AP up to 10 terms: **(2 marks)**

3, 8, 13,

(A) 264

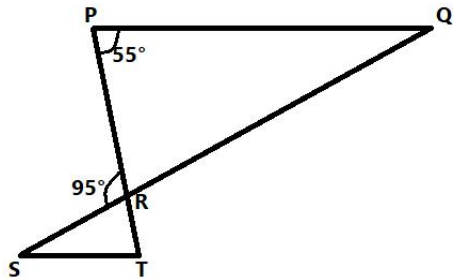
(B) 259

(C) 260

(D) 255

Q13. (Triangles)

In the given figure, if $\triangle PRQ \sim \triangle SRT$, find T **(2 marks)**



- (A) 40°
- (B) 55°
- (C) 30°
- (D) 95°

Q14. (Coordinate Geometry)

Find the coordinates of the point using the section formula which divides the line joining (2, -5) and (-7, 4) in the ratio 1:2. (2 marks)

- (A) (-1, -2)
- (B) (1, -2)
- (C) (1, 2)
- (D) (-1, 2)

Q15. (Trigonometry)

If $5 \sin A = 3$, find $3 \operatorname{cosec} A$. (2 marks)

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



Q16. (Circles)

If PQ and PR are two tangents to a circle with center O such that $\angle QPR = 60^\circ$, then find $\angle QOR$. **(2 marks)**

- (A) 130°
- (B) 80°
- (C) 120°**
- (D) 90°

Q17. (Construction)

When we try drawing tangents from a point outside the circle, we have exactly _____ tangents. **(2 marks)**

- (A) one
- (B) two**
- (C) three
- (D) four

Q18. (Mensuration)

From a solid cylinder whose height is 2 cm and diameter 3 cm, a conical cavity of the same height and same diameter is carved out. Find the curved surface area of the conical cavity. **(2 marks)**

- (A) 13.25 cm
- (B) 12.75 cm
- (C) 13.5 cm
- (D) 11.79 cm**



Q19. (Statistics)

Find the median if $n = 30$, median class is $35 - 45$, $f = 6$ and $h = 7$. **(2 marks)**

- (A) 42
- (B) 39
- (C) 40
- (D) 35

Q20. (Trigonometry)

If $\sin 60^\circ + \sec 30^\circ \tan 60^\circ = x$, find the value of x . **(2 marks)**

- (A) 5.58
- (B) 2.86**
- (C) 3.98
- (D) 7

Q21. (Coordinate Geometry)

Find the coordinates of a point P, where PQ is the diameter of circle whose center is $(-1, 1)$ and Q is $(-4, 5)$. **(2 marks)**

- (A) (2, -3)**
- (B) (3, -3)
- (C) (-2, -3)
- (D) (3, -2)



Q22. (Quadratic Equations)

A jute industry produces a certain number of jute baskets in a day. It was observed that on a particular day, the cost of production of each jute basket (in rupees) was 30 less than the number of baskets produced on that day. Find the number of jute baskets produced, if the total cost of production on that day was Rs.136. **(2 marks)**

(A) 34

(B) 35

(C) 40

(D) 4

Q23. (Quadratic Equations)

Which of the following is an AP?

(A) 5.5, 7.5, 10.5, 14.5,

2.89, 2.57, 2.29, 1.9...

(C) 0.3, 0.33, 0.333, 0.3333

(D) 7.366, 5, 2.634, 0.268

Q24. (Trigonometry)

If α and β are acute angles such that $\alpha + \beta = 90^\circ$, then which of the following is true? **(2 marks)**

(A)

(B)



(C)

(D)

Q25. (Statistics)

If median of a distribution is given by a and the mean of the distribution is given by b . Then, for what values of a and b , the mode will be equal to $3a - 2b$. **(2 marks)**

(A) 1,-3

(B) 1,3

(C) 3,-1

(D) -1,-3

Section: Math

Q26. (Arithmetic Progression)

How many terms of the AP, 8, 15, 22 ... must be taken to give a sum of 855? **(2 marks)**

(A) 10

(B) 12

(C) 15

(D) 20

Q27. (Quadratic Equations)

If one root of the quadratic equation $px^2 - 18x + 16 = 0$ is 8 times the other, find the value of p . **(2 marks)**

(A) 4



(B) 0

(C) 2

(D) 16

Q28. (Coordinate Geometry)

Find the value of p when the area formed by a triangle with vertices $A(5, 7)$, $B(2, 2)$, $C(4p, p)$ is 15 square units. **(2 marks)**

(A) 3

(B) 5

(C) 2

(D) 1

Q29. (Statistics)

The following frequency distribution gives the ages of daily wage earners in a factory. Find the median of the data. **(2 marks)**

Age of workers (in years)	No. of workers
18 – 20	6
20 – 22	4
22 – 24	9
24 – 26	7
26 – 28	5
28 – 30	13
30 – 32	11
32 – 34	5



(A) 146

(B) 29.2

(C) 28

(D) 27.5

Q30. (Quadratic equations)

If α and β are the roots of the quadratic equation $ax^2 + bx + c = 0$, then for what values of a and b , $\alpha^2 + \beta^2$ is a perfect square? **(2 marks)**

(A)

(B)

(C) ,

(D)

Q31. (Mensuration)

A hollow cuboid has inner radius r and its height is ten times its radius. How many solid spheres with radius r can be successfully placed inside the cylinder? **(2 marks)**

(A) 420

(B) 430

(C) 480

(D) 440

Q32. (Quadratic equations)



If α is the sum of the roots and β is the product of the roots of the quadratic equation $ax^2 + bx + c = 0$. Then which of the following is true? **(2 marks)**

- (A) $\alpha = \frac{c}{a}$
- (B) $\alpha = -\frac{b}{a}$
- (C) $\beta = \frac{c}{a}$
- (D) $\beta = -\frac{b}{a}$

Q33. (Arithmetic Progression)

Which term of the A.P. $1, 3, 5, \dots$ is less than the n th term? **(2 marks)**

- (A) $n-1$
- (B) $n-2$
- (C) $n-3$
- (D) $n-4$

Q34. (Trigonometry)

Three towers A, B, and C have their heights in the ratio $1 : 2 : 3$. If the distance between the towers B and C is 100 m and a cable train is to be joined in a straight line connecting the top of the three towers, then what should be the distance between the towers A and B? **(2 marks)**

- (A) 75 m
- (B) 25 m
- (C) 100 m
- (D) 50 m



Q35. (Mensuration)

A right triangular blade with base and height times of the radius is standing on a circular disc, which is connected to a motor. What are the maximum and the minimum volume it occupies, if the disc rotates at a speed of 50 rounds per second? **(2 marks)**

- (A)
- (B)
- (C)
- (D)

Q36. (Coordinate Geometry)

If point A bisects the line joining the points B and C(and D(1, 2) is joined along with B and C in such a way that they form three vertices of a triangle. Find the area of the triangle so formed. **(2 marks)**

- (A) 3 square units
- (B) 5 square units
- (C) 4 square units**
- (D) 9 square units

Q37. (Arithmetic Progression)

Two A.P's have the same common difference. If the difference between their terms is 1234321, then what is the product of the difference between their terms and the reciprocal of the difference between the terms? **(2 marks)**

- (A) 0
- (B) -1
- (C) 1**
- (D) None of these



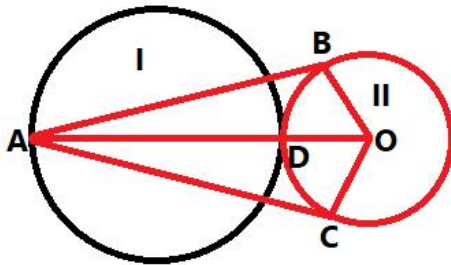
Q38. (Mensuration)

If an open cylinder of diameter d and height h is capped from both the sides by a semi-spherical cups of the same diameter and turned into a capsule. Then which option tells the visible surface area of the capsule formed? **(2 marks)**

- (A)
- (B)
- (C)
- (D)

Q39. (Circles)

In the given figure, the diameter of circle I is k times the diameter of the circle II which is d . If AB and AC are the tangents. Then what is the area of the quadrilateral ABOC. **(2 marks)**



- (A)
- (B)
- (C)
- (D)

Q40. (Quadratic equations)



If the difference between the sum of the roots and the difference of the roots of a quadratic equation is and the product of the roots of the equation is . The which equation tells the given quadratic equation.

(2 marks)

(A)

(B)

(C)

(D)

Section: Achiever's Section

Q41. (Quadratic Equation)

Sam and Meera want to decorate their 30 cm by 40 cm family photo with a nicely carved wood of equal width. The resulting photo and the wood need to be covered by 2 sheet of hard glass. Find the width of the carved wood used. **(3 marks)**

(A) + 5 cm

(B) + 5 cm

(C) - 5 cm

(D) + 3 cm

Q42. (Arithmetic progression)

The sum of and terms of an A.P. is 26.5 and the sum of the and terms is . Find the first three terms of the AP. **(3 marks)**

(A) 15.45, 13.2, 10.95

(B) 20.983, 18.983, 16.983

(C) 14.365, 19.365, 24.365

(D) 20.285, 18.275, 16.265



Q43. (Statistics)

Find the mean of the following data. **(3 marks)**

Class Interval	Frequency
1 – 5	4
5 – 10	7
10 – 15	9
15 – 20	16
20 – 25	12
25 – 30	13
30 – 35	15
35 – 40	6

(A) 20.98

(B) 21

(C) 21.91

(D) 20

Q44. (Coordinate Geometry)

Find the circumradius of a triangle whose vertices are $P(-6, -2)$, $Q(-4, -4)$ and $R(-8, -4)$. **(3 marks)**

(A) 5.44

(B) 3.33

(C) 4.31



(D) 2.31

Q45. (Trigonometry)

Two posts are m apart and the height of one of the post is 4 times the height of the other post. An observer is standing in the middle on the line joining their feet and finds the angular elevations of their tops to be complimentary then, what is the height (in meter) of the shorter post? **(3 marks)**

(A)

(B)

(C)

(D)

Q46. (Arithmetic progression)

If S_n denotes the sum of first n terms in an Arithmetic Progression, and $S_7 = 49$, find the ratio of the first term and the seventh term. **(3 marks)**

(A)

(B)

(C)

(D) 1

Q47. (Statistics)

If the mean of k observations out of n observations is \bar{x} , and the mean of the remaining observations is \bar{y} . What is the mean of all n observations? **(3 marks)**

(A)

(B)

(C)



(D)

Q48. (Quadratic equations)

If α and β are the roots of the equation $ax^2 + bx + c = 0$, then what is the equation formed by the roots $\frac{1}{\alpha}$ and $\frac{1}{\beta}$? (3 marks)

(A)

(B)

(C)

(D)

Q49. (Quadratic equations)

If a positive fraction minus 11 times the reciprocal is $\frac{1}{11}$. Then what will be 11 times the fraction minus reciprocal of the fraction? (3 marks)

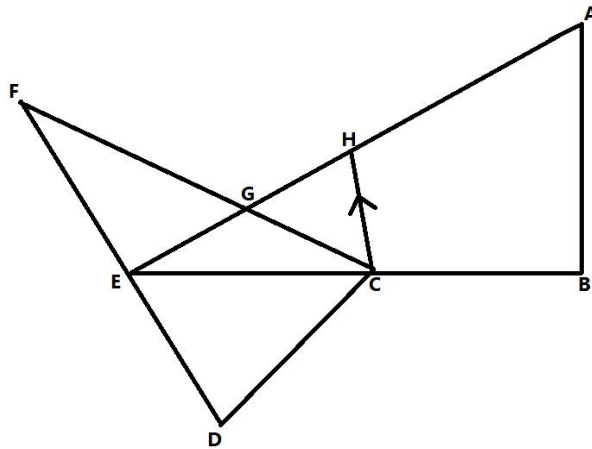
(A)

(B)

(C)

(D)

Q50. (Triangles)



In the given below figure ABCDEFGH

$FE = 87$, $AB = 70$, $HG = 15$ & $GE = 45$. Then find HC . (3 marks)

- (A) 35
- (B) 43.5**
- (C) 29
- (D) 30.5

ANSWERS

Logical Reasoning

1. c
2. a
3. b
4. d
5. b
6. b
7. c



8. c

9. a

10. d

Mental Math

11. b

12. d

13. c

14. a

15. d

16. c

17. b

18. d

19. a

20. b

21. a

22. a

23. d

24. c

25. b

Math

26. c

27. c

28. c

29. b



30. b

31. c

32. a

33. b

34. b

35. a

36. c

37. c

38. a

39. a

40. b

Achiever's Section

41. a

42. d

43. c

44. b

45. b

46. a

47. a

48. c

49. b

50. b

