INTSO EDUCATION

MATHEMATICS TALENT SEARCH OLYMPIAD(MTSO) 2015 - 2016

STAGE - 2 **TIME : 60 min.**

CLASS : IX **Max. Marks : 50**

Instructions:

- ⇨ *Fill the OMR sheet completely and carefully.*
- ⇨ *Each question carries one mark and has only one correct answer. ¼ (one fourth) marks will be deducted for indicating incorrect response of each question.*
- ⇨ *The question paper contains 50 questions to be answered in 60 minutes.*

1. The $\frac{p}{q}$ from of 3.28 is [ ]

   1) $\frac{82}{25}$ 2) $\frac{72}{35}$ 3) $\frac{75}{32}$ 4) $\frac{42}{25}$

2. a and b are rational numbers, and $\frac{\sqrt{5}+\sqrt{3}}{2\sqrt{5}-3\sqrt{3}} = a - b\sqrt{15}$ then the value of (a,b) is [ ]

   1) $\left(\frac{19}{7}, \frac{-5}{7}\right)$ 2) $\left(\frac{-19}{7}, \frac{5}{7}\right)$ 3) (– 19, 5) 4) (19, – 5)

3. The value of $\frac{\sqrt{10}-\sqrt{15}}{2\sqrt{2}}$, Upto 3 decimal places [take $\sqrt{2} = 1.414, \sqrt{5} = 2.236$] [ ]

   1) 0.657 2) 0.357 3) 0.587 4) 0.557

4. The number of zeroes does the product of the firtst 2007 consecutive prime numbers end?
   1) 4 2) 1 3) 2 4) 9 [ ]

5. The number of integers x for which x,10 and 24 are the sides of anacute angled triangle is
   1) 2 2) 3 3) 4 4) 9 [ ]

6. A number when divided by 119 leaves a remainder 19, the remainder when the number is divided by 17 is [ ]
   1) 2 2) 7 3) 14 4) 4

7. Mahadevan's age is 'a' years which is also the sum of the ages of his three children. His age b years ago was twice the sum of their ages then $\left(\frac{a}{b}\right)$ = [ ]

   1) 6 2) 5 3) 4 4) 3

8. The zero of the polynomial p(x) = 3x + 1 is [ ]

   1) 0 2) – 1 3) $\frac{-1}{3}$ 4) $\frac{1}{3}$

9. If the polynomials $ax^3 + 3x^2 - 13$ and $2x^3 - 5x + a$ are divided by x – 2 leaves the same remainder then the value of a is [ ]
   1) 2 2) 4 3) 1 4) 0

10. If $x^2 - 1$ is a factor of $ax^4 + bx^3 + cx^2 + dx + e$ then [ ]
1) $a + c + e = 0$ 2) $b + d = 0$
3) $a + c + e + b + d = 0$ 4) all

11. The number of ordered triples of (x, y, z) such that x, y and z are primes and $x^y + 1 = z$ is [ ]
1) 0 2) 1 3) 2 4) infinitely many

12. If x, y, z are non negative integers so that $x + y + z = 12$, then the maximum value of $xyz + xy + yz + zx$ is [ ]
1) 112 2) 115 3) $\frac{114}{3}$ 4) $\frac{115}{2}$

13. When a polynomial $2x^3 + 3x^2 + ax + b$ is divided by $x - 2$ leaves remainder 2 and $(x + 2)$ leaves remainder -2 then (a, b) is [ ]
1) (12, 7) 2) (7, 12) 3) (– 7, 12) 4) (– 7, – 12)

14. If $x^2 + y^2 = 29$ and $xy = 2$ then the value of $x^4 + y^4 =$ [ ]
1) 833 2) 834 3) 733 4) 734

15. The value of a machine depreciates every year by 10%. What will be its value after two years. If its present value is ₹50000 [ ]
1) ₹40050 2) ₹45000 3) ₹40500 4) ₹40000

16. Samir bought a shirt for ₹336, including 12% VAT[Value Added Tax] and a neck-tie for ₹110 including 10% VAT, then the printed price(with out VAT) of shirt and neck - tie together is
1) ₹500 2) ₹450 3) ₹400 4) ₹425 [ ]

17. Number of diagonals in a decagon is [ ]
1) 45 2) 25 3) 10 4) 35

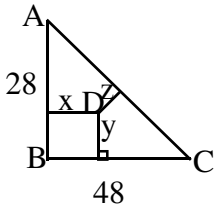
18. The measures of two adjascent angles of a quadrilateral are 125° and 35° and the other two angles are equal then the measure of each of the equal angles is [ ]
1) 80° 2) 90 3) 100° 4) 110°

19. The number of times the interior angle of a regular pentagon is the exterior angle of a regular decagon
1) 4 2) 5 3) 2 4) 3 [ ]

20. In ΔABC, D, E are mid points of sides AB and AC respectively then DE = [ ]
1) $\frac{1}{2}$BC 2) 2BC 3) $\frac{1}{3}$BC 4) $\frac{1}{4}$BC

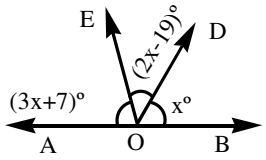
21. If 15, 17, 25 are the lengths (not necessarily in order) of two sides of a triangle and the altitude to the third side, the area of the triangle is [ ]
1) 100 2) 200 3) 210 4) 220

22. The lengths of the sides AB, BC, CA of a triangle ABC are 20, 48 and 52 respectively. The distances to these three sides from an interior point 'D' of ΔABC are x, y, z respectively then $5x + 12y + 13z$ equals to [ ]
1) 140
2) 480
3) 240
4) 960



23. In the adjascent figure $\overleftrightarrow{AB}$ is a straight line then the value of x is [ ]

1) 22°
2) 32°
3) 44°
4) 52°



24. Two complementary angles are in the ratio 4 : 5 then the largest angle is [ ]
1) 40° 2) 60° 3) 45° 4) 50°

25. The points A(6, 1), B(8, 2), C(9, 4) and D(P, 3) are the verties of a parallelogram, taken in order then the value of 'P' is [ ]
1) 6 2) 7 3) 5 4) 9

26. The co - ordinates of the points of trisection of the line segment joining (4, – 1) and (– 2, – 3) are

1) $\left(2,\frac{-5}{3}\right)$ and $\left(0,\ \frac{7}{3}\right)$ 2) $\left(2,\frac{5}{3}\right)$ and $\left(0,\ \frac{-7}{3}\right)$ [ ]

3) $\left(2,\frac{-5}{3}\right)$ and $\left(0,\ \frac{-7}{3}\right)$ 4) $\left(2,\frac{5}{3}\right)$ and $\left(0,\ \frac{7}{3}\right)$

27. The ratio in which the Y - axis divides the line segment joining the points (5, – 6) and (–1, – 4)
1) 2 : 3 2) 3 : 2 3) 5 : 1 4) 1 : 5 [ ]

28. The centroid of the triangle whose vertices are (3, – 5), (– 7, 4), (10, – 2) respectively is
1) (1, 2) 2) (– 1, 2) 3) (2, 1) 4) (2, – 1) [ ]

29. The distance between two points A(4, 2) and B(8, 6) is [ ]
1) 5 units 2) 6 units 3) 4 units 4) 5.5 units

30. The area of the triangle formed by the lines whose equations are 2y – x = 5, y+ 2x = 7 and y – x = 1 is [ ]

1) $\frac{3}{10}$ 2) 10 3) 6 4) $\frac{2}{5}$

31. A rectangular paper of width 14 cm is rolled along its width and a cylinder of radius 20 cm is formed . The volume of the cylinder is [ ]
1) 17000 cm^3 2) 17200 cm^3 3) 17400 cm^3 4) 17600 cm^3

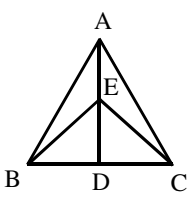
32. The diameter of a metallic sphere is 6 cm it is melted and drawn it a wire having diameter of the cross section as 0.2 cm. The length of the wire is [ ]
1) 36 m 2) 3600 m 3) 30 m 4) 26 m

33. The area of the figure formed by joining the mid points of adjascent sides of a rhombus with diogonals 12 cm and 16 cm is [ ]
1) 48 cm^2 2) 38 cm^2 3) 44 cm^2 4) 96 cm^2

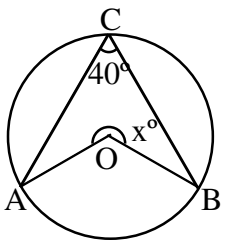
34. In a ΔABC , E is the midpoint of median AD . The area of ΔABE = [ ]

1) $\frac{1}{3}\times$ area of ΔABC 2) $\frac{1}{4}\times$ area of ΔABC

3) $\frac{1}{2}\times$ area of ΔABC 4) $\frac{1}{8}\times$ area of ΔABC



35. The value of x° in the adjasecnt figure is [ ]



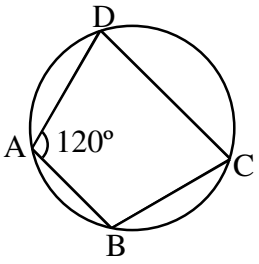
1) 40°

2) 80°

3) 140°

4) 280°

36. In the adjascent figure , $\angle A = 120°$ then $\angle C$ = [ ]



1) 120°

2) 60°

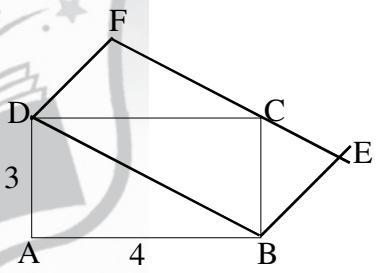
3) 100°

4) 80°

37. A natural number is sed to be a super star number if the number is less than 10 times the product of its digits. The number of super star numbers are there from 10 to 200 is [ ]

1) 100 2) 120 3) 80 4) 90

38. Two rectangles ABCD and DBEF are as shown in the figure. [ ]
The area of rectangle DBEF in square units is



1) 12

2) 10

3) 14

4) 15

39. If the average of 20 different positive integers is 20 then the greatest possible number among these 20 numbers can be [ ]

1) 210 2) 200 3) 190 4) 180

40. If the base of a right prism is an equilateral triangle with side 10 cm and height 12 cm. The volume of right prism is [ ]

1) $100\sqrt{3}$ cm^2 2) $120\sqrt{3}$ cm^2 3) $300\sqrt{3}$ cm^2 4) $200\sqrt{3}$ cm^2

41. The slant height of a cone with radius 5.6 cm and curved surface area 158.4 cm^2 is [ ]

1) 8 cm 2) 7 cm 3) 9 cm 4) 10 cm

42. A number is called a palindrome if it reads the same forward or backward for example 13531 is a palindsome. The difference between the biggest 10 digit palindrome and the smallest 9 digit palindrome is [ ]

1) 976666666 2) 988888888 3) 9899999998 4) 9777777777

43. The irrational number between 3 and 4 is [ ]

1) $2\sqrt{3}$ 2) $\sqrt{17}$ 3) $\sqrt{19}$ 4) $\sqrt{20}$

44. The value of K if $2x - 3$ is a factor of $2x^3 - 9x^2 + x + k$. [ ]

1) 6 2) 12 3) 10 4) 9

45. The angle between two hands of a clock when the time in the clock is 9'O clock [ ]
1) 80º 2) 45º 3) 90º 4) 120º

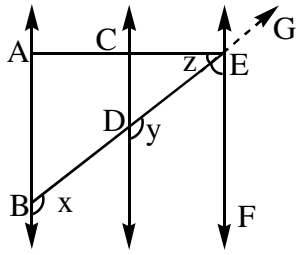
46. In the given figure AB ‖ CD and CD ‖ EF also $EA \perp AB$. If $\angle BEF = 55º$ then Z = [ ]

1) 125º

2) 135º

3) 35º

4) 100º



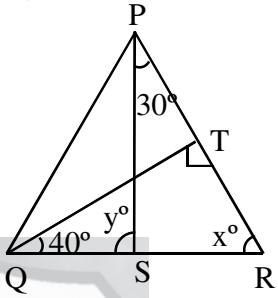
47. In Adjascent figureif $QT \perp PR$, $\angle TQR = 40º$ and $\angle SPR = 30º$ then x = [ ]

1) 80º

2) 50º

3) 70º

4) 60º



48. If (x, y) lies in 3rd Quadrant then (–x, –y) belongs to which Quadrant [ ]
1) I Quadrant 2) II Quadrant 3) III Quadrant 4) IV Quadrant

49. Rain fall of a place in a week is 4 cm, 5 cm, 12 cm, 3 cm, 6 cm, 8 cm, 0.5 cm. The average rain fall for day is [ ]
1) 5 cm 2) 55 cm 3) 6 cm 4) 6.5 cm

50. The total surface area of a cube is 1350 sq. m. then its volume is [ ]
1) 3375 m^3 2) 3300 m^3 3) 900 m^3 4) 1350 m^3