INTSO EDUCATION

MATHEMATICS TALENT SEARCH OLYMPIAD(MTSO) 2016 - 2017

STAGE - 1 **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. No negative marks.*
- *The question paper contains 50 questions to be answered in 60 minutes.*

1. The angles of a quadrilateral measure 56°, 115° and 84°, then the fourth angle is [ ]
   1) 110° 2) 95° 3) 105° 4) 115°

2. If an angle of a parallelogram is four fifths of its adjacent angle, then the angle is [ ]
   1) 110° 2) 120° 3) 90° 4) 80°

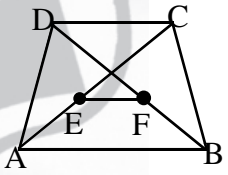
3. The lengths of each side of a rhombus is 10cm and one of its diagonals is of length 16cm. The length of the other diagonal is [ ]
   1) 13cm 2) 12 cm 3) $2\sqrt{39}cm$ 4) 6cm

4. The bisectors of two adjacent angles of a parallelogram intersect at [ ]
   1) 30° 2) 45° 3) 60° 4) 90°

5. In a trapezium ABCD, if E and F be the mid points of the diagonals AC and BD respectively, then the length of EF is [ ]

   1) $\frac{1}{2}AB$ 2) $\frac{1}{2}CD$

   3) $\frac{1}{2}(AB+CD)$ 4) $\frac{1}{2}(AB-CD)$



6. The area of the figure formed by joining the midpoints of the adjacent sides of a rectangle of sides 8cm and 6cm is [ ]
   1) a rectangle of area 24cm^2 2) a rhombus of area 24cm^2
   3) a rectangle of area 16cm^2 4) a rhombus of area 28cm^2

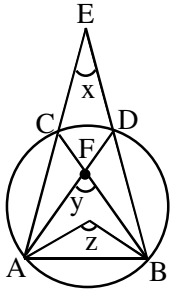
7. In the given figure the relation between $\lfloor x, \lfloor y, \lfloor z$ is [ ]

   1) $\lfloor x + \lfloor z = \lfloor y$

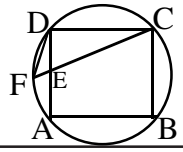
   2) $\lfloor y + \lfloor z = \lfloor x$

   3) $\lfloor z - \lfloor x = \lfloor y$

   4) $\lfloor x - \lfloor y = \lfloor z$



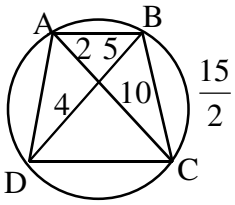
8. E is a point on side $\overline{AD}$ of rectangle ABCD so that DE = 6, DA = 8 and DC = 6. If $\overline{CE}$ is extended meets the circum circle of rectangle at F. Then the length of the chord $\overline{DF}$ is [ ]
   1) 6cm 2) 5 cm
   3) $5\sqrt{2}$ cm 4) $6\sqrt{2}$ cm



9. From the given figure diagonals AC and BD of a quadrilateral ABCD meet at E. If AE = 2, BE = 5, CE = 10, DE = 4 and BC = $\frac{15}{2}$, then the length of AB [ ]

1) $\frac{\sqrt{161}}{2}$ 2) $\frac{\sqrt{171}}{2}$

3) $\frac{\sqrt{151}}{2}$ 4) $\frac{\sqrt{141}}{2}$



10. If $\Delta PQR \cong \Delta BAC$ and AB = (3x – 2) cm and QP = (2x + 3) cm, then x = [ ]
1) 1cm 2) 3cm 3) 5cm 4) 2cm

11. $\sqrt{3}$ is a polynomial of degree [ ]

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

12. If $(x^2 + kx – 3) = (x – 3) (x + 1)$, then k = [ ]
1) 2 2) – 2 3) 3 4) – 1

13. If x + y + z = 9 and xy + yz + zx = 23, then the value of $(x^3 + y^3 + z^3 – 3xyz)$ = [ ]
1) 108 2) 207 3) 669 4) 729

14. The polynomial p(x) satisfies p(–x) = – p(x). If p(x) is divided by x – 3, the remainder is 6. then the remainder when p(x) is divided by $x^2 – 9$ [ ]
1) 2x 2) 3x + 4 3) 2x + 3 4) 5x + 3

15. If x, y, z are three sums of money such that y is the simple interest on x and z is the simple interest on y for the same time and rate then [ ]
1) $x^2 = yz$ 2) $y^2 = zx$ 3) $z^2 = xy$ 4) $x^2 = y^2 + z^2$

16. If a, b, c, d are positive integers such that a = bcd, b = cda, c = dab and d = abc, then the value of $\frac{(a+b+c+d)^4}{(ab+bc+cd+da)}$ is [ ]
1) 14 2) 13 3) 12 4) 16

17. If the polynomial $ax^3 + 4x^2 + 3x – 4$ and $x^3 – 4x + a$ leave the same remainder when divided by x – 3, then the value of 'a' is [ ]
1) 1 2) – 1 3) 2 4) 0

18. The coefficient of x in expansion of $(x + 3)^3$ is [ ]
1) 1 2) 9 3) 18 4) 27

19. If $x = 7 + 4\sqrt{3}$, then the value of $\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$ is [ ]
1) 7 2) 4 3) 6 4) 8

20. The points in which abscissa and ordinate have diffrent signs will lie in [ ]
1) quadrants I and II 2) quadrants I and IV
3) quadrants IV and II 4) quadrant II only

21. The perpendicular distance of the point p(a, b) from the Y - axis is [ ]
1) $|a|$ units 2) $|b|$ units 3) $|a+b|$ units 4) $|a-b|$ units

22. If the height of an equilateral triangle is 6cm, then the area of triangle is [ ]
1) $4\sqrt{3}\ cm^2$ 2) $6\sqrt{3}\ cm^2$ 3) $9\sqrt{3}\ cm^2$ 4) $12\sqrt{3}\ cm^2$

23. The graph of the linear equation 4x + 3y = 12, cuts the x - axis at the point [ ]
1) (4, 0) 2) (0, 4) 3) (0, 3) 4) (3, 0)

24. If each of (– 3, 3) (0, 0) , (3, –3) is a solution of a linear equation in x and y, then the equation is [ ]
1) x – y = 0 2) x + y = 0 3) – 2x + y = 0 4) – x + 2y = 0

25. The perpendicular distance from the point (2, –7) to the line 2x – 5y – 10 = 0 is [ ]
1) $\frac{1}{\sqrt{2}}$ units 2) $\frac{1}{\sqrt{3}}$ units 3) $\frac{1}{\sqrt{5}}$ units 4) $\frac{1}{2\sqrt{2}}$ units

26. The angle between the lines x + y + 1 = 0, x – 5 = 0 in 1st quadrant is [ ]
1) 60° 2) 45° 3) 135° 4) 30°

27. A line L cuts the sides AB, BC of ΔABC in the ratio 3 : 5 : , 7 : 4 respectively then the ratio in which the line L cuts CA is [ ]
1) 7 : 10 2) 3 : 10 3) 10 : 7 4) 4 : 5

28. The distance between the points (– 3, 1) and (3, 2) is [ ]
1) $\sqrt{27}$ units 2) $\sqrt{33}$ units 3) $\sqrt{47}$ units 4) $\sqrt{37}$ units

29. For the equation 5x + 8y = 50. If y = 10, then the value of x is [ ]
1) 6 2) – 6 3) 12 4) – 12

30. How much pure alcohol should be added to 600 ml of a 15% solution to make its strength 32%
1) 50 ml 2) 140 ml 3) 150 ml 4) 75 ml [ ]

31. If one number is thrice the other and their sum is 20, then the greatest number is [ ]
1) 15 2) 12 3) 9 4) 6

32. Two planes starts from a city and fly in opposite directions one average in a speed of 40 km/ hr greater than the other. If they are 3400 km, apart after 5 hours, the average speeds respectively are [ ]
1) 330 kmph , 370 kmph 2) 320 kmph, 360 kmph
3) 250 kmph, 290 kmph 4) 300 kmph, 340 kmph

33. The equation of a line parallel to Y - axis is [ ]
1) y = k 2) x = k 3) y = 0 4) x = 0

34. The value of k if x = 3, y = 1 is a solution of the equation 2x + 5y = k is [ ]
1) 10 2) 9 3) 11 4) 12

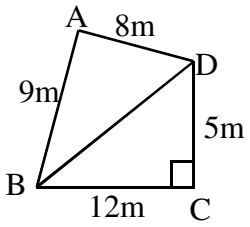
35. The lines 2x + 3y = 9, 4x + 6y = 18 are [ ]
1) Vertical lines 2) coincident lines 3) parallel lines 4) intersecting lines

36. If x + y = 3, x – y = 1, then (x, y) = [ ]
1) (2, 1) 2) (1, 2) 3) (3, 1) 4) (1, 4)

37. If the equations (2a – 1)x + (a – 1) y = 2a + 1, y + 3x – 1 = 0 have no solution, then a =
1) 0 2) 1 3) 2 4) – 1 [ ]

38. The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 150cm. The area of the triangle is [ ]
1) 375 cm^2 2) 750 cm^2 3) 250 cm^2 4) 500 cm^2

39. The park in the shape of a quadrilateral ABCD has AB = 9m, BC = 12m, CD - 5m, AD = 8m and $\angle C = 90°$. The area of the park is [ ]

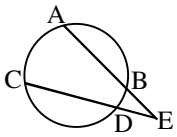


1) 65.4 m^2
2) 55.4m^2
3) 45.4m^2
4) 72.4m^2

40. The radius of a circle is 13cm and the length of one of its chords is 10 cm. The distance of the chord from the centre is [ ]
1) 5cm 2) 7cm 3) 10cm 4) 12cm

41. In the given figure 'O' is the centre of a circle and $\angle AOB = 140°$, then $\angle ACB$ is [ ]
1) 70° 2) 80° 3) 110° 4) 40°

42. Two chords AB and CD of a circle intersect each other at a point E outside the circle. If AB = 11cm, BE = 3cm and DE = 3.5 cm, then the length of CD is [ ]



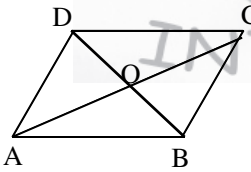
1) 10.5 cm 2) 9.5 cm
3) 8.5 cm 4) 7.5 cm

43. The maximum length of a pencil that can be placed in rectangular box of dimensions (8cm × 6cm × 5cm) [ ]
1) 8cm 2) 9.5 cm 3) 19cm 4) 11.2 cm

44. Two circles of radii 7cm and 4cm touch externally then the distance between the centres is
1) 7cm 2) 3cm 3) 4cm 4) 11cm [ ]

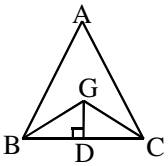
45. The perimeter of a right angled triangle is 144cm and the hypotnuse is 65cm . Its area in square cm is [ ]
1) 506 2) 508 3) 1440 4) 504

46. In figure diagonals AC and BD of a parallelogram ABCD intersect at O. If AB = 10cm and the perpendicular distance between AB and CD is 8cm. The area of ΔAOB is [ ]



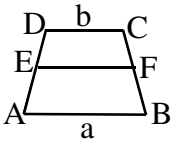
1) 20cm^2
2) 15 cm^2
3) 25cm^2
4) 28 cm^2

47. In figure G is the centroid of ΔABC such that GD = 3cm and BC = 4cm.The area of ΔABC is [ ]



1) 18cm^2
2) 20 cm^2
3) 22cm^2
4) 24 cm^2

48. ABCD is a trapezium with parallel sides AB = a cm and CD = b cm. E and F are the mid points of the non parallel sides the ratio of area ABEF and area of EFCD [ ]



1) a : b
2) (3a + b) : (a + 3b)
3) (a + 3b) : (3a + b)
4) (2a + b) : (3a + b)

49. The angle between two tangents drawn from a point outside of a circle is 100°. Then the angle between radius drawn at point of contact of tangent is [ ]
1) 100° 2) 90° 3) 120° 4) 80°

50. If x < 0 and y > 0 then the point (– x, y) lies in [ ]
1) I quadrant 2) II quadrant 3) III quadrant 4) IV quadrant