INTSO EDUCATION

MATHEMATICS TALENT SEARCH OLYMPIAD(MTSO) 2015 - 2016

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.*

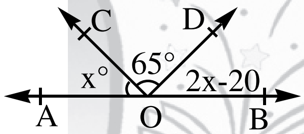
➪ *The question paper contains 50 questions to be answered in 60 minutes.*

1. Euclid belongs to which country [ ]
   1) India   2) Greece   3) Egypt   4) Babylonia

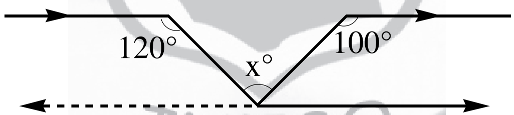
2. Which of the following needs a proof [ ]
   1) an axiom   2) a definition   3) a postulate   4) a Theorem

3. The measure of an angle which is 32° less than its supplement is [ ]
   1) 74°   2) 80°   3) 148°   4) 106°

4. In the adjoining figure $\overline{AOB}$ is a stright line then $\angle AOC$ and $\angle BOD$ [ ]
   1) 40,80
   2) 45, 70
   3) 50,60
   4) 55,65



5. In the given figure $AB \parallel CD$, then the value of x ? [ ]
   1) 40°
   2) 50°
   3) 60°
   4) 75°



6. The angles of a triangle are in the ratio 2 : 3 : 7 . Then the Measure of least angle is [ ]
   1) 30°   2) 60°   3) 15°   4) 45°

7. In ΔABC $\angle A + \angle B = 65°$ and $\angle B + \angle C = 140°$ then $\angle B =$ [ ]
   1) 40°   2) 25°   3) 115°   4) 100°

8. In a square the angle between diagonals is [ ]
   1) 70°   2) 80°   3) 90°   4) 65°

9. In a triangle the centroid divides the median in the ratio from vertex [ ]
   1) 1 : 2   2) 2 : 1   3) 3 : 2   4) 2 : 3

10. Which of the following are always similar [ ]
    1) two circles   2) two squares
    3) two equilateral triangles   4) all the above

11. The zero of the polynomial ax + b is [ ]
    1) $\frac{b}{a}$ 2) $\frac{-b}{a}$ 3) 0   4) –1

12. The factor of the polynomial $f(x) = aox^n + a_1x^{n-1}$ + ------ + a_n when $a_0 + a_2 + a_4$ + ---------- = $a_1 + a_3 + a_5$ ----- = [ ]

1) x – 1 2) x +1 3) x + 2 4) x – 2

13. If the roots of the equation $x^5+px^4+qx^3+rx^2+sx+t = 0$, be in A.P then [ ]

1) $4p^5-25qp^3-125rp^2+625sp-3125t= 0$ 2) $4p^5-25qp^3+125rp^2-625sp+3125t= 0$

3) $4p^5+25qp^3+125rp^2+625sp-3125t= 0$ 4) $4p^5+25qp^3-125rp^2-625sp-3125t= 0$

14. For what value of K if the polynomial $f(x) = 2x^4 +3x^3 + 2kx^2 +3x +6$ is exactly divisible by (x + 2)

1) 1 2) 2 3) –1 4) –2 [ ]

15. The factors of $a^2 + b - ab - a$ are [ ]

1) a – 1 , a + b 2) a + 1, a – b 3) a –1, a – b 4) a +1 , a+b

16. If α,β,γ are the roots of $x^3+px^2+qx+r = 0$ then $\sum \alpha^2\beta$ [ ]

1) 3 – pqr 2) 3p – rq 3) 3r – pq 4) 3pq – r

17. The value of $(369)^2 - (368)^2$ [ ]

1) 1^2 2) 81 3) 37 4) 737

18. The G.C.D of two polynomials $(x^3 -2x^2-x+2)$, $(x^3-3x^2 -x+3)$ is [ ]

1) x +1 2) x – 1 3) $x^2 - 1$ 4) $x^2 +1$

19. If f (x) is a polynomial of degree n, with rational coefficients and 1+ i , $3 - \sqrt{2}$, and 7 are three roots of f(x) = 0 then least value of 'n' is [ ]

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

20. If x+y+z = 1; $x^2+y^2+z^2 = 2$; $x^3+y^3+z^3 =3$ then $x^5+y^5+z^5$ = ____ [ ]

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

21. The point at which the co- ordinate axes Meet is called . [ ]

1) the abscissa 2) the ordinate 3) the origin 4) the quadrant

22. If x > 0 and y < 0 then the point (x, – y) lies in [ ]

1) quadrant – 1 2) quadrant - II 3) quadrant – III 4) quadrant – IV

23. Which of the following points does not lies on the line y = 3x + 4 [ ]

1) (1,7) 2) (2,10) 3) (–1,1) 4) (4,12)

24. The perpendicular distance of the point P(4,3) from the y - axis is [ ]

1) 3 units 2) 4 units 3) 5 units 4) 7 units

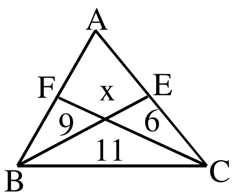
25. Each side of an equilateral triangle measures 8cm the area of triangle is [ ]

1) $8\sqrt{3}cm^2$ 2) $16\sqrt{3}cm^2$ 3) $32\sqrt{3}cm^2$ 4) $48cm^2$

26. ΔABC is divided into four regions with areas as shown in the diagram. Find x [ ]

1) $\frac{1998}{67}$ 2) 1998

3) $\frac{1998}{57}$ 4) 1968



27. The mirror image of the point (–x,–y) in x - axis [ ]

1) (x,y) 2) (–x,y) 3) (x,–y) 4) (–x,–y)

28. The line y = Mx +c cuts the x - axis at [ ]

1) $\left(\frac{C}{M},0\right)$ 2) (O,C) 3) $\left(\frac{-C}{M},0\right)$ 4) $\left(0,\frac{C}{M}\right)$

29. The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 150m. Then the area of the triangle is [ ]

1) $700M^2$ 2) $750M^2$ 3) $650M^2$ 4) $800M^2$

30. The base of an issosceles triangle is 80cm and its area is $360CM^2$ then the perimeter of the triangle is [ ]

1) 160CM 2) 162CM 3) 170CM 4) 150CM

31. The equation ax +by + c = 0 has how many solutions [ ]

1) 1 2) 2 3) Infinite 4) 4

32. The point of the form (a,a) where $a \neq 0$ lies on [ ]

1) xm - axis 2) y - axis 3) the line y = x 4) the line x + y = 0

33. A linear equation in two variables x and y is of the form ax+ by + c = 0 where. [ ]

1) $a \neq 0, b \neq 0$ 2) $a \neq 0, b = 0$ 3) a = 0, $b \neq 0$ 4) a = 0 , c= 0

34. How many linear equations in x and y can be satisfied by x = 2 , y = 3 . [ ]

1) only one 2) only two 3) infinitely many 4) none

35. The area of the triangle formed by the line x + 3y = 12 and the co-ordinate axes is [ ]

1) 12 sq units 2) 18 sq.units 3) 24 sq.units 4) 30 sq units

36. System of equations $a_1x+ b_1 y + c_1 = 0$, $a_2x + b_2 y + c_2 = 0$ has no solution then [ ]

1) $\frac{a_1}{a_2} = \frac{b_1}{b_2}$ 2) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ 3) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ 4) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

37. The number of natural number pairs (x,y) in which x> y and $\frac{5}{x}+\frac{6}{y}=1$ is [ ]

1) 1 2) 2 3) 3 4) 4

38. The number of zeroes does 100! end with [ ]

1) 20 2) 25 3) 30 4) 24

39. The larger of two supplementary angles exceeds the smaller by 18 then the angles are [ ]

1) 98°, 80° 2) 99°, 81° 3) 96°, 84° 4) 95°, 85°

40. 5 pencils and 7 pens together cost is Rs. 50 where as 7 pencils and 5 pens together cost is Rs 46 then the cost of one pencil and one pen [ ]

1) Rs 3, Rs 5 2) Rs 3, Rs 4 3) Rs 4, Rs 5 4) Rs 6, Rs 7

41. Each side of an equilateral triangle is 8cm, then its altitude is [ ]

1) $2\sqrt{2}$ cm 2) $2\sqrt{3}$ cm 3) $4\sqrt{3}$ cm 4) $2\sqrt{6}$ cm

42. Let A be the area of a square inscribed in a circle of radius r. Let 'B' be the area of a regular hexagon inscribed in the same circle then $\frac{B}{A}$ [ ]

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

43. The area of a sector of a circle with radius 4cm and of angle at centre is 30° [ ]

1) 4.39cm^2 2) 4.35cm^2 3) 4.19cm^2 4) 5cm^2

44. The length of the minute hand of a clock is 14cm. Then the Area swept by the minute hand in 5 minutes [ ]

1) $\frac{152}{3}$ cm^2 2) $\frac{154}{3}$ cm^2 3) $\frac{148}{3}$ cm^2 4) $\frac{136}{3}$ cm^2

45. The Area of the circle with radius 7cm is [ ]

1) 154cm^2 2) 172cm^2 3) 168cm^2 4) 162cm^2

46. The total surface Area of a cube with side 4cm [ ]

1) 64cm^2 2) 96cm^2 3) 80cm^2 4) 90cm^2

47. Curved surface area of the sphere with radius r cm is [ ]

1) $2\pi r^2$ sq.units 2) $6\pi r^2$ sq.units 3) $4\pi r^2$ sq.units 4) $3\pi r^2$ sq.units

48. The volume of the cone of height 24cm and radius of base is 7cm [ ]

1) 1232cm^3 2) 2164cm^3 3) 2464cm^3 4) 1576cm^3

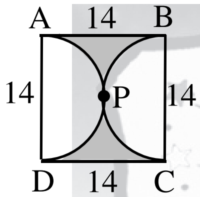
49. Find the Area of shaded region if ABCD is a square of side 14cm and APD, BPC are semicircles [ ]

1) 44cm^2

2) 42cm^2

3) 41cm^2

4) 40cm^2



50. The area of rectangle with length 20cm and perimeter 64cm [ ]

1) 36cm^2 2) 120cm^2 3) 240cm^2 4) 250cm^2