



MATHEMATICS TALENT HUNT 2024

Organised By

The Pi Group of Mathematics (TPGM), Coochbehar

Registraton No - SO031696 of 2022-23

Class – IX

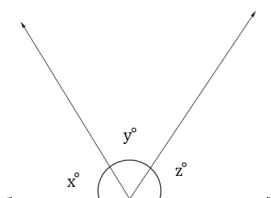
Full Mark : 100

Time : 1 hr 30 min

INSTRUCTIONS

1. Candidates must write their Name, Class, Roll No. allotted for the exam and Name of their School correctly in the specific places of the answer sheet.
2. There are 50 questions of 2 marks each. Four possible options of answer are given for each question.
3. Candidates should choose the correct option and completely darken the circle with that option written in it in the answer sheet (OMR). For example, say the correct option for Question Number 10 is (c), then the candidate should darken the circle completely with 'c' written in it against the number 10 of the answer sheet. Use black ball pen or pencil for darkening.
4. There is no negative marking.

1. Two buses start from the opposite points of a main road, 150km apart. The first bus runs for 25 Km and takes a right turn and runs for 15km. It then turns left and runs for another 25km and takes the direction back to reach the main road. in the meantime, due to minor breakdown, the other bus has run only 35km along the main road. What would be the distance between the two buses at this point?
a) 65km b) 75km c) 80km d) 85km
2. If $9 \times 8 \times 7 = 876$, $6 \times 4 \times 2 = 531$, then $8 \times 5 \times 3$ is equal to:
a) 572 b) 647 c) 741 d) 742
3. $(3x - 1)^7 = a_7x^7 + a_6x^6 + a_5x^5 + \dots + a_1x + a_0$ then $a_7 + a_6 + a_5 + \dots + a_1 + a_0 = ?$
a) 0 b) 1 c) 128 d) 64
4. If $\sqrt{13 - a\sqrt{10}} = \sqrt{8} + \sqrt{5}$ then $a = ?$
a) -5 b) -6 c) -4 d) -2
5. If $a^{\frac{1}{3}} + b^{\frac{1}{3}} + c^{\frac{1}{3}} = 0$ then
a) $a + b + c = 0$ b) $(a + b + c)^3 = 27abc$ c) $a + b + c = 3abc$ d) $a^3 + b^3 + c^3 = 0$
6. The value of $\frac{(2.3)^3 - 0.027}{(2.3)^2 + 0.69 + 0.09}$ is
a) 2 b) 3 c) 2.327 d) 2.273
7. If $\frac{y}{x} = 5$ and $\frac{z}{x} = 4$, then the value of x is



a) 8°

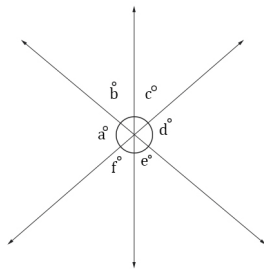
b) 18°

c) 12°

d) 15°

8. Which of the following statements must be true?

(i) $a + b = d + c$ (ii) $a + b + e = 180^\circ$ (iii) $b + f = c + e$



a) (i) only

b) (ii) only

c) (iii) only

d) (ii) and (iii) only

9. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $12\sqrt{2}cm$ then the area of the triangle is:

a) $24\sqrt{2}cm^2$

b) $24\sqrt{3}cm^2$

c) $48\sqrt{3}cm^2$

d) $64\sqrt{3}cm^2$

10. If the diagonals of a rhombus are 18 cm and 24 cm respectively, then its side is equal to:

a) $16cm$

b) $15cm$

c) $20cm$

d) $17cm$

11. The area of the figure formed by joining the midpoint of the adjacent sides of a rhombus with diagonals 16cm and 12 cm is:

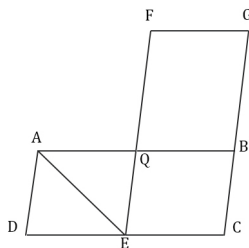
a) $28cm^2$

b) $48cm^2$

c) $96cm^2$

d) $24cm^2$

12. ABCD and FECD are parallelograms equal in area. If ar $\triangle AQE = 12cm^2$ then ar $Parallelogram FGBQ = ?$



a) $12cm^2$

b) $20cm^2$

c) $24cm^2$

d) $36cm^2$

13. ABCD is a trapezium in which $AB \parallel DC$ if Ar $(\triangle ABD) = 24cm^2$ and $AB = 8cm$ then height of $\triangle ABC$ is:

a) $3cm$

b) $4cm$

c) $6cm$

d) $8cm$

14. PQRS is a parallelogram if X and Y midpoints of PQ and SR respectively and diagonals SQ is joined the ratio area of the $(parallelogram XQRY) : (\triangle QSR) = ?$

a) $1 : 4$

b) $2 : 1$

c) $1 : 2$

d) $1 : 1$

15. the chord of a circle is equal to its radius. The angle subtended by this chord at the minor arc of the circle is:

a) 60°

b) 75°

c) 120°

d) 150°

16. In the year 1996 the Republic Day was celebrated in Friday. On which day was Independence Day celebrated in the year 2000?
- a) Tuesday b) Monday c) Friday d) Saturday
17. In a family mother's age is twice that of daughter's age. Father is 10 years older than mother. Brother is 20 years younger than his mother and 5 year older than his sister. What is the age of the father?
- a) 62 years b) 60 years c) 58 years d) 55 years
18. Ramesh is taller than Vinay who is not as tall as Karan. Sanjay is taller than Anupam but shorter than Vinay. Who among them is the tallest?
- a) Ramesh b) Karan c) Vinay d) Cannot be determined
19. If $x^2 - |15x - 31| - x < 2$, then which one of the option is correct?
- a) $x > 3 + 2\sqrt{2}$ b) $x < 3 + 2\sqrt{2}$ c) $x > -5$ d) $-5 < x < 3 + 2\sqrt{2}$
20. If $\frac{a}{x} + \frac{y}{b} = 1$ and $\frac{b}{y} + \frac{z}{c} = 1$, then $(\frac{x}{a} + \frac{c}{z})$ is equal to:
- a) 0 b) $\frac{b}{y}$ c) 1 d) $\frac{y}{b}$
21. The solution of the equation $\frac{p}{x} + \frac{q}{y} = m$ and $\frac{q}{x} + \frac{p}{y} = n$ is
- a) $x = \frac{q^2 - p^2}{mp - nq}, y = \frac{p^2 - q^2}{np - mq}$ b) $x = \frac{p^2 - q^2}{mp - nq}, y = \frac{q^2 - p^2}{np - mq}$ c) $x = \frac{p^2 - q^2}{mp - nq}, y = \frac{p^2 - q^2}{np - mq}$ d) $x = \frac{q^2 - p^2}{mp - nq}, y = \frac{q^2 - p^2}{np - mq}$
22. The simplified form of $\frac{1}{x-1} - \frac{1}{x+1} - \frac{2}{x^2+1} - \frac{4}{x^4+1}$ is
- a) $\frac{8}{1-x^8}$ b) $\frac{8}{x^8-1}$ c) $\frac{6}{x^6-1}$ d) $\frac{6}{1-x^6}$
23. if $\frac{2}{3}x - \frac{2}{3x} = 6, x \neq 0$, then the value of $x^4 + \frac{1}{x^4}$ is
- a) 6889 b) 6888 c) 6887 d) 6886
24. A, B, and C walk 1 km in 5 min, 8 min and 10 min respectively. C starts walking from a point, at a certain time B starts from the same point 1 min later and A starts from the same point 2 min later than c. Then A meet B and C at times
- a) 2min, 3min b) $\frac{4}{3}$ min, 3min c) 2min, $\frac{5}{3}$ min d) 1min, 2min
25. AB and CD are two parallel chords of a circle with centre O such that AB=6cm and CD= 12cm. the chords are on the same side of the centre and the distance between them is 3cm. the radius of the circle is:
- a) 6cm b) $5\sqrt{2}$ cm c) 7cm d) $3\sqrt{5}$ cm
26. A cube whose volume is $\frac{1}{8}$ cubic centimeter is placed on an top of a cube whose volume is 1cm^3 . The two cubes are then placed on top of a third cube whose volume is 8cm^3 . the height of the stacked cubes is:
- a) 3.5 cm b) 3cm c) 7cm d) None of these
27. The altitude of a circular cylinder is increased six times and the base area is decreased one-ninth of the value. the factor by which the lateral surface of the cylinder is increased is
- a) $\frac{2}{3}$ b) $\frac{1}{2}$ c) $\frac{3}{2}$ d) 2
28. Which one of the following cannot be the probability of an event?

- a) $\frac{1}{3}$ b) $\frac{3}{5}$ c) $\frac{5}{3}$ d) 1

29. The sides of a triangle are 11cm, 15cm, and 16cm. The attitude of the largest side is:

- a) $30\sqrt{7}$ b) $\frac{15\sqrt{7}}{2}$ c) $\frac{15\sqrt{7}}{4}$ d) 30cm

30. The area of the triangle formed by the points $P(0, 1)$, $Q(0, 5)$ and $R(3, 4)$ is:

- a) 16 sq. units b) 8 sq. units c) 4 sq. units d) 6 sq. units

31. The vertices of a triangle are $(0, 0)$, $(5, 3)$ and $(3, 5)$ respectively. Find the circumradius of the triangle.

- a) $\frac{17\sqrt{2}}{8}unit$ b) 20unit c) 21unit d) $\frac{18\sqrt{2}}{8}unit$

32. The curved surface and the total surface area of a cylinder are in the ratio 1:2. If the total surface area of the right cylinder is $616cm^2$, then its volume is:

- a) $1632 cm^3$ b) $1078 cm^3$ c) $1232 cm^3$ d) $1848 cm^3$

33. 1 man, 3 women and 4 boys can do a piece of work in 96 hours, 2 men and 8 boys can do it in 80 hours, 2 men and 3 women can do it in 120 hours, then 5 men and 12 boys can do it in:

- a) $39\frac{1}{11}$ hours b) $42\frac{7}{11}$ hours c) $43\frac{7}{11}$ hours d) 44 hours

34. The population of a town is 12000. If the male population is increased by 6% every year and that of female by 8% then the total population at the end of the year becomes 12800. Find the number of males in the town:

- a) 8000 b) 7500 c) 7200 d) 6500

35. If $\frac{2^{m+n}}{2^{m-n}} = 16$ and $a = 2^{\frac{1}{10}}$ then $\frac{2^{2m+n-p}}{(a^{m-2n+2p})^{-1}} = ?$

- a) 2 b) $\frac{1}{4}$ c) 9 d) $\frac{1}{8}$

36. If $x^2 + x + 1$ is a factor of the polynomial $3x^3 + 8x^2 + 8x + 3 + 5k$, then the value of k is:

- a) 0 b) $\frac{2}{5}$ c) $\frac{5}{2}$ d) -1

37. A bag contains 50 coins and each coin is marked from 51 to 100. One coin is picked at random. The probability that the number on the coin is not a prime number, is

- a) $\frac{1}{5}$ b) $\frac{3}{5}$ c) $\frac{2}{5}$ d) $\frac{4}{5}$

38. The median of the following data: 0, 2, 2, 2 - 3, 5, -1, 5, 5, -3, 6, 6, 5, 6 is

- a) 0 b) -1.5 c) 2 d) 3.5

39. In a frequency ditribution, ogives are graphical represntation of:

- a) Frequency b) Relative Frequency c) Cumulative frequency d) Raw Data

40. A cone, a hemisphere and a cyllinder stand on equal bases and have the same height. The ratio of their volumes is:

- a) 1 : 2 : 3 b) 2 : 1 : 3 c) 2 : 3 : 1 d) 3 : 2 : 1

41. Choose the missing term from the given alternatives: BZA, DYC, FXE, - , JVI

a) HWG

b) HUG

c) UHG

d) WHG

42. Choose the correct alternative that continue the given pattern- 0.5,0.55,0.65,0.8,-

a) 1

b) 0.95

c) 0.9

d) 0.82

43. If $4^{44} + 4^{44} + 4^{44} + 4^{44} = 4^x$ then $x = ?$

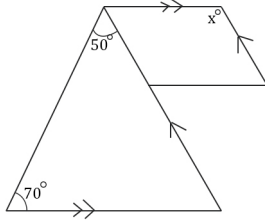
a) 45

b) 44

c) 176

d) 11

44. Find x in the following figure

a) 60° b) 145° c) 120° d) 90°

45. If $\sqrt[3]{\frac{-a^6 \times b^3 \times c^{21}}{c^9 \times a^{12}}} = \frac{-bc^k}{a^{\frac{k}{2}}}$ then $k = ?$

a) 2

b) -4

c) -2

d) 4

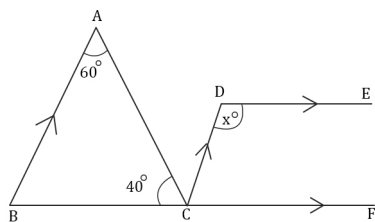
46. Find the value of $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$

a) $\frac{1}{2}$ b) $\frac{3}{2}$ c) $2^{\frac{n-1}{n+1}}$ d) $2^{\frac{n}{n+1}}$

47. The expression $(1 - \frac{1}{3})(1 - \frac{1}{4})(1 - \frac{1}{5}) \dots (1 - \frac{1}{m})$ when simplified yields:

a) $\frac{2}{m}$ b) $\frac{1-m}{m}$ c) $\frac{2}{m(m+1)}$ d) $\frac{2(m-1)}{m}$

48. In the given figure if $AB \parallel CD$ and if $DE \parallel CF$ then the value of x is-

a) 60° b) 110° c) 100° d) 40°

49. The graphs of $2x + 3y - 6 = 0$, $4x - 3y - 6 = 0$, $x = 2$ and $y = \frac{2}{3}$ intersect in

a) 6 points

b) 1 point

c) 2 points

d) Do not intersect

50. If $x(3 - \frac{2}{3}) = \frac{3}{x}$ then find $x^2 + \frac{1}{x^2}$

a) $\frac{22}{7}$ b) $\frac{22}{9}$ c) $\frac{23}{9}$

d) None of these