GG RS LEARNING HUB PVT. LTD.

IMO Class 09

Total Questions: 35 Time: 60 min

1. If x=7−43, what is the value of x+x1?

A) 1 B) 2 C) 23 D) 4

2. If the polynomial f(x)=x4−2x3+3x2−ax+b is divided by (x−1) and (x+1), the remainders are 5 and 19 respectively. What is the remainder when f(x) is divided by (x−2)?

A) 5 B) 10 C) 15 D) 20

3. In a circle with center O, AB is a chord and AOC is a diameter. If the angle ACB is 50°, what is the angle BAT, where AT is the tangent at point A?

A) 40° B) 50°

C) 60° D) 80°

4. The sides of a triangular field are 41 m, 40 m, and 9 m. If the cost of leveling the field is ₹10 per sq. m, what is the total cost of leveling?

A) ₹1,800 B) ₹2,050

C) ₹3,600 D) ₹4,100

5. What is the simplified value of 3−81 −8−71+7−61−6−51+5−21?

A) 1 B) 5 C) 8 D) 0

6. The points A(2, -2), B(14, 10), and C(11, 13) are the vertices of:

A) An equilateral triangle

B) An isosceles triangle

C) A right-angled triangle

D) A scalene triangle

7. The surface area of a sphere is 616 cm2. If it is melted and recast into a cone of height 28 cm, what is the radius of the base of the cone? (Use π=22/7)

A) 7 cm B) 14 cm

C) 21 cm D) 28 cm

8. If x+y+z=9 and xy+yz+zx=23, what is the value of x3+y3+z3−3xyz?

A) 108 B) 207

C) 669 D) 729

9. A bag contains 3 red, 5 black, and 7 white balls. A ball is drawn from the bag at random. What is the probability that the ball drawn is not black?

A) 1/3 B) 1/5

C) 2/3 D) 7/15

10. In the figure, if AB || CD, then what is the value of x?

A) 100° B) 110°

C) 120° D) 130°

11. The graph of the linear equation 2x+3y=6 cuts the y-axis at which point?

A) (2, 0) B) (0, 3)

C) (3, 0) D) (0, 2)

12. The mean of 25 observations is 36. If the mean of the first 13 observations is 32 and that of the last 13 observations is 40, what is the value of the 13th observation?

A) 23 B) 36

C) 38 D) 40

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13. In a cyclic quadrilateral ABCD, if ∠A = 4x, ∠B = 7x, ∠C = 5y, and ∠D = y, what is the ratio of x to y?

A) 3:4 B) 4:3

C) 5:4 D) 4:5

14. A cone and a hemisphere have equal bases and equal volumes. What is the ratio of their heights?

A) 1:1 B) 2:1

C) 1:2 D) 3:1

15. If a=3+23−2 and b=3−23+2, find the value of a2+b2−ab.

A) 99 B) 98

C) 97 D) 100

16. How many cubic meters of earth must be dug out to sink a well which is 20 m deep and has a diameter of 7 m?

A) 770 m^3 B) 880 m^3

C) 990 m^3 D) 1540 m^3

17. If the median of the data, arranged in ascending order, 24, 25, 26, x+2, x+3, 30, 31, 34 is 27.5, what is the value of x?

A) 25 B) 26

C) 27 D) 28

18. The angles of a quadrilateral are in the ratio 3:5:9:13. What is the measure of the smallest angle?

A) 36° B) 60°

C) 108° D) 156°

19. What is the value of the expression (0.6)3+(0.4)3 divided by (0.6)2−0.24+(0.4)2?

A) 0.2 B) 0.24

C) 1 D) 2

20. In a triangle ABC, D, E, and F are the mid-points of sides BC, CA, and AB respectively. What is the ratio of the area of triangle DEF to the area of triangle ABC?

A) 1:2 B) 1:3

C) 1:4 D) 2:3

21. The cost of fencing a circular field at the rate of ₹24 per meter is ₹5280. The field is to be ploughed at the rate of ₹0.50 per m^2. Find the cost of ploughing the field.

A) ₹1,925 B) ₹3,850

C) ₹5,280 D) ₹7,700

22. What is the number of solutions for the equation 32x−y=1 and 16x/y=4?

A) 0 B) 1 C) 2

D) Infinitely many

23. The lengths of the two parallel sides of a trapezium are 28 cm and 40 cm. If the lengths of its non-parallel sides are 12 cm and 10 cm, what is its area?

A) 204 cm^2 B) 306 cm^2

C) 408 cm^2 D) 510 cm^2

24. If a sphere is inscribed in a cube, what is the ratio of the volume of the sphere to the volume of the cube?

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A) π:4 B) π:6

C) 2π:3 D) 3π:4

25. If x1/3+y1/3+z1/3=0, then which of the following is true?

A) x+y+z=0 B) x3+y3+z3=0

C) (x+y+z)3=27xyz D) x+y+z=3(xyz)1/3

26. The bisectors of angles B and C of a triangle ABC intersect at point O. If ∠A = 100°, what is the measure of ∠BOC?

A) 120° B) 130°

C) 140° D) 150°

27. A hollow iron pipe is 21 cm long and its external diameter is 8 cm. If the thickness of the pipe is 1 cm and iron weighs 8 g/cm^3, what is the weight of the pipe?

A) 3.6 kg B) 3.696 kg

C) 36 kg D) 36.96 kg

28. What is the number of lines of symmetry for a scalene triangle?

A) 0 B) 1

C) 2 D) 3

29. The sum of the length, breadth, and depth of a cuboid is 19 cm, and its diagonal is 55 cm. What is its surface area?

A) 125 cm^2 B) 236 cm^2

C) 361 cm^2 D) 486 cm^2

30. If the height of a cylinder is increased by 15% and the radius of its base is decreased by 10%, by what percent will its curved surface area change?

A) 3.5% decrease B) 3.5% increase

C) 5% decrease D) 5% increase

31. In a frequency distribution, the mid-value of a class is 10 and the width of the class is 6. What is the lower limit of the class?

A) 6 B) 7

C) 8 D) 12

32. A right circular cone is divided into two parts by a plane parallel to the base at a height of one-third of the total height from the base. What is the ratio of the volume of the smaller cone to that of the whole cone?

A) 1:3 B) 1:9

C) 8:27 D) 19:27

33. What is the value of x, if two triangles ABC and PQR are congruent, where ∠A = 2x+10, ∠P = 3x-15, and ∠B = 50?

A) 15° B) 25°

C) 30° D) 50°

35. If x = (4 * √15) / (√5 + √3), what is the value of (x + √20) / (x - √20) + (x + √12) / (x - √12)?

A) 1 B) 2

C) √3 + √5 D) √3 - √5

36. The lateral surface area of a cube is 256 m^2. What is the volume of the cube?

A) 256 m^3 B) 512 m^3

C) 1024 m^3

D) 2048 m^3