



UNICUS OLYMPIADS

Sample Paper (2020-21)

Class 7 & 8

Unicus Non-Routine Mathematics Olympiad



Section – Class* <small>*Syllabus covered</small>	Total Questions	Marks per Question	Total Marks
Classic Section – Class 7 & 8	10	3	30
Scholar Section – Class 7 & 8	10	6	60
Grand Total	20		90

Note: There will be negative marking of $1/3^{\text{rd}}$ of the marks allotted for that question if the answer is incorrect.

1. Find the square root of $x^4 - 4x^3 + 10x^2 - 12x + 9$
- a) $x^2 + 2x + 3$
 - b) $x^2 - 2x - 3$
 - c) $x^2 - 2x + 3$
 - d) $x^2 + 2x - 3$

Correct Answer: c

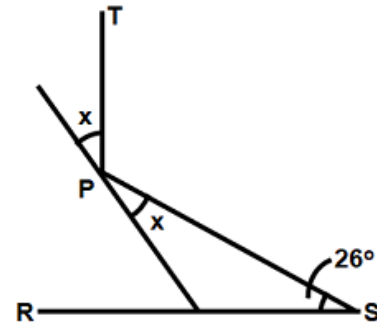
3 Marks

2. When a number is divided by 25, its cube root is x . When it is multiplied with 5, then its cube root is y . If $x + y = 36$ and the number is $5395 + a$ then $a =$ _____.
- a) 5400
 - b) 5100
 - c) 2100
 - d) 2400

Correct Answer: a

3 Marks

3. A beam of light shines from point S, reflects off a reflector at point P, and reaches point T. Such that point is perpendicular to RS. Then $x =$ _____



- a) 32°
- b) 37°
- c) 45°
- d) 38°

Correct Answer: a

3 Marks

4. The ratio of the exterior angle of two regular polygons is 3 : 2 and the ratio of their interior angle is 3 : 4 then the total no. of sides of both the polygons is
- a) 8
 - b) 10
 - c) 12
 - d) 13

Correct Answer: b

3 Marks

5. Three carom board strikers of radius 3.5 cm are so arranged such that each strikers, then the area of the empty space between the strikers is.
- a) 10.5 m^2
 - b) 38.5 m^2
 - c) 1.967 cm^2
 - d) 19.5 cm^2

Correct Answer: c

3 Marks

6. In $\triangle ABC$ with an area $(\sqrt{3} - 1)/2$; $AB = \sqrt{3} - 1$, $AC = 2$, and $\angle CAB$ is acute. What is the measure of $\angle ACB$.
- a) 15°
 - b) 18°
 - c) 20°
 - d) 225°

Correct Answer: a

3 Marks

7. If $(a + b) : (a - b)$ is equal to the duplicate ratio of 3 : 1 then $a : b$ is?
- a) 17 : 11
 - b) 23 : 19
 - c) 5 : 4
 - d) 2 : 5

Correct Answer: c

3 Marks

8. If a commission of 10% is given on the written price of a article the gain is 20% . If the commission is increased to 20% then the gain is.
- a) $6\frac{2}{3}\%$
 - b) $7\frac{1}{4}\%$
 - c) $12\frac{1}{2}\%$
 - d) $13\frac{1}{3}\%$

Correct Answer: d

3 Marks

9. $2010\sqrt{(2\sqrt{7} - 3\sqrt{3})} \cdot 4020\sqrt{(55 + 12\sqrt{21})} =$
- a) -1
 - b) 1
 - c) 0
 - d) 2

Correct Answer: b

3 Marks

10. The simplest form of $\frac{1}{(x+1)^2(x+2)^2} - \frac{1}{(x+1)^2} + \frac{2}{(x+1)} - \frac{2}{(x+2)}$ is _____.
- a) $\frac{1}{(x+2)^2}$
 - b) $\frac{1}{(x+1)^2}$
 - c) $(x+2)^2$
 - d) $(x+1)^2$

Correct Answer: a

3 Marks

11. The simplest form of $1 + \frac{a}{(x-a)} + \frac{bx}{(x-a)(x-b)} + \frac{cx^2}{(x-a)(x-b)(x-c)} + \frac{dx^3}{(x-a)(x-b)(x-c)(x-d)}$
- a) $\frac{x^4}{(x-a)(x-b)(x-c)(x-d)}$
 - b) $\frac{x^4}{(x-a)(x+b)(x+c)(x-d)}$
 - c) $\frac{x^4}{(x-a)(x-b)(x+c)(x+d)}$
 - d) None of these

Correct Answer: a

6 Marks

12. If $1/(2^{1/3} + 2^{-1/3}) = c/d (2^{2/3} + 2^{-2/3} - 1)$ then the value of $d/c =$ _____
- a) $2/5$
 - b) $5/2$
 - c) $3/5$
 - d) None of these

Correct Answer: b

6 Marks

13. A, B and C started the business with 6000/-, 8000/-, 4000/- respectively. After 4 months A withdraws Rs. 1000/- where as B and C added 1000/- each to their investment. At the end of the year they get a profit of 11,200/- then share of B is
- a) 5,600/-
 - b) 5,000/-
 - c) 5,200/-
 - d) 5,800/-

Correct Answer: c

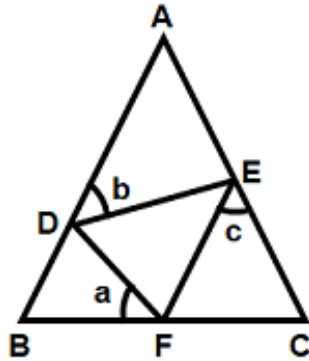
6 Marks

14. If the ratio of $(1 + x + x^2) : (1 - x + x^2)$ is $13(1 + x) : 14(1 - x)$ then the value of $x =$ _____
- a) $1/3$
 - b) 3
 - c) $2/3$
 - d) $3/2$

Correct Answer: a

6 Marks

15. In $\triangle ABC$ AB and AC are the equal sides of an isosceles triangle. ABC. In which an equilateral triangle DEF is inscribed. Designate $\angle BFD = a$; $\angle ADE = b$, $\angle FEC = c$. then the solution between a, b and c is



- a) $b = (a + c)/2$
- b) $b = (a - c)/2$
- c) $a = (b - c)/2$
- d) $a = (b + c)/2$

Correct Answer: d

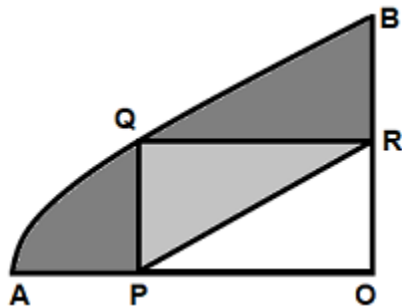
6 Marks

16. If the number of square centimeters on the surface of a sphere is equal to the number of cubic centimeters in its volume, what is the diameter of the sphere
- a) 6 cm
 - b) 9 cm
 - c) 12 cm
 - d) 4cm

Correct Answer: a

6 Marks

17. AOB is a quarter circle of radius 10 and PQRO is a rectangle of perimeter 26. The perimeter of the shaded region is



- a) $7 + 5\pi$
- b) $17 + 5\pi$
- c) $13 + 5\pi$
- d) $19 + 5\pi$

Correct Answer: c

6 Marks

18. What is the sum of all the different solutions to the following equation

$$\left[\frac{(x^2 + 1)(x^4 + 1)(x^6 + 1)}{x + 1} \right] + (x - 1) = 0$$

- a) 4
- b) 3
- c) 2
- d) 0

Correct Answer: d

6 Marks

19. The graphs of $2x + 3y - 6 = 0$

$$4x - 3y - 6 = 0, x = 2, y = \frac{2}{3}$$

- a) 6 points
- b) 1 point
- c) 2 points
- d) 0 points

Correct Answer: b

6 Marks

20. The mean of n observations is \bar{x} . If the first term is increased by 1, second by 2 and so on then the new mean is
- a) $\bar{x} + n$
 - b) $\bar{x} + n/2$
 - c) $\bar{x} + n + \frac{1}{2}$
 - d) None of these

Correct Answer: c

6 Marks
