

Sample Paper

Class 7

Unicus Non-Routine Mathematics Olympiad



Section	Total Questions	Marks per Questions	Total Questions	
Classic Section	10	3	30	
Scholar Section	10	6	60	
Grand Total	20		90	

Classic Section (Each Question is 3 Marks)

1. The simplest form of

$$1/(x + 1)^2 (x + 2)^2 - 1/(x + 1)^2 + 2/(x + 1) - 2/(x + 2)$$
 is _____.

a. $1/(x + 2)^2$

b. $1/(x + 1)^2$

c. $(x + 2)^2$

- d. $(x + 1)^2$
- 2. 2010th root of $(2\sqrt{7} 3\sqrt{3})$ times 4020th root of $(55 + 12\sqrt{21}) =$
 - a. -1

b. 1

c. 0

- d. 2
- 3. If a commission of 10% is given on the written price of an article the gain is 20%. If the commission is increased to 20% then find the gain.
 - a. $6^{2}/_{3}$ %

b. 7 ¹/₄ %

c. $12^{1}/_{2}$ %

- d. 13 ¹/₃ %
- 4. 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
- 5. 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°

- $d. 22.5^{\circ}$
- 6. Three carrom board strikers of radius 3.5 cm are so arranged such that each striker, then the area of the empty space between the striker is _____.
 - a. 10.5 m²

b. 38.5 m²

c. 1.967 cm²

- d. 19.5 cm²
- 7. 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 number of sides of both the polygons is _____.
 - a. 8

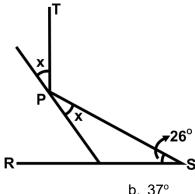
b. 10

c. 12

d. 13

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8. 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. Find x.



- a. 32°
- c. 45°

- b. 37°
- d. 38°
- 9. 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 = 36
 - a. 5400

b. 5100

c. 2100

- d. 2400
- 10. 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. $x^2 + 2x - 3$

Scholar Section (Each Question is 6 Marks)

11. The mean of n observations is \bar{x} . If the first term is increased by 1, the second by 2 and so on then the new mean is.

c.
$$\bar{x} + (n + 1)/2$$

b.
$$\bar{x} + n/2$$

d.
$$\bar{x} + (n - 1)/2$$

- 12. The graphs of 2x + 3y 6 = 0 and 4x 3y 6 = 0, x = 2, y = 2/3 intersect at:
 - a. 6 points

b. 1 point

c. 2 points

- d. No points
- 13. What is the sum of all the different solutions to the following equation? $[(x^2 + 1) (x^4 + 1) (x^6 + 1)/(x + 1)] + (x - 1) = 0$
 - a. 4

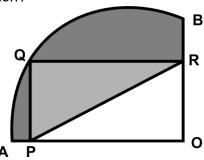
b. 3

c. 2

d. 0

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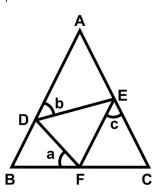
14. AOB is a quarter circle of radius 10 and PQRO is a rectangle of perimeter 26. What is the perimeter of the shaded region?



- a. $7 + 5 \pi$
- c. $13 + 5 \pi$

- b. $17 + 5 \pi$
- d. $19 + 5 \pi$
- 15. If the number of square centimetres on the surface of a sphere is equal to the number of cubic centimetres in its volume, what is the diameter of the sphere?
 - a. 6 cm
 - c. 12 cm

- b. 9 cm
- d. 4 cm
- 16. In \triangle ABC, AB and AC are its equal sides, in which an equilateral triangle DEF is inscribed. \triangle BFD = a; \triangle ADE = b, \triangle FEC = c, then find the relation between a, b and c.



- a. b = (a + c)/2
- c. a = (b c)/2

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

- b. 3
- d. 3/2
- 18. A, B and C started the business with \$6000, \$8000, \$4000 respectively. After 4 months A withdraws \$1000/- whereas B and C added \$1000 each to their investment. If by the end of the year they get a profit of \$11,200 then the share of B is:
 - a. \$5,600

b. \$5,000

c. \$5,200

d. \$5,800

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19. If $1/(2^{1/3} + 2^{-1/3}) = c/d (2^{2/3} + 2^{-2/3} - 1)$ then find the value of d/c.

20. Find the simplest form of the following:

$$1 + a/(x - a) + bx/(x - a) (x - b) + cx^2/(x - a) (x - b) (x - c) + dx^3/(x - a) (x - b) (x - c) (x - d) is:$$

a.
$$x^4/(x - a) (x - b) (x - c) (x - d)$$

b.
$$x^4/(x - a) (x + b) (x + c) (x - d)$$

c.
$$x^4/(x-a)(x-b)(x+c)(x+d)$$

d.
$$x^3/(x-a)(x+b)(x+c)(x-d)$$

Answer Key

1.	а	2.	b	3.	d	4.	С	5.	а	6.	С	7.	b
8.	а	9.	а	10.	С	11.	С	12.	b	13.	d	14.	b
15.	а	16.	d	17.	а	18.	С	19.	b	20.	а		