

# **Sample Paper**

Class 6

## **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)**

 Hulk had a square with the sides measuring 6 cm and a triangle with him. At first, he laid the square on top of the triangle and found that the square could cover only 60% of the area of the triangle. In the second attempt, he laid the triangle on top of the square and found that the triangle could cover up to 2/3<sup>rd</sup> of the area of the square. Using these two observations, find the area of the triangle.

a.	22.8 cm <sup>2</sup>	b.	24 cm <sup>2</sup>
C.	36 cm <sup>2</sup>	d.	40 cm <sup>2</sup>

2. A jar of capacity 56 ml was used to fill a huge container. Terry transferred the liquid using the jar into the container 519 times and was still able to fill only 6/8th of the container. Mike came to help him and started to transfer the liquid into the container using his mug of capacity 12.11 dl. If Terry was resting during Mike's work, find the number of transfers which Mike did to fill the tank completely.

a.	4	b.	6
c.	8	d.	10

3. Aron has numbered a few cards starting from 21 and going up to 29. He decided to multiply the numbers on the card. What would be the last two-digits of the product of the numbers on the card?

a.	50	b.	45
C.	00	d.	20

4. Thomas had some doughnuts and some cookies with him. He counted them before leaving the shop but forgot the number when he came the other day. He just remembered that the ratio of doughnuts to cookies was 4 : 3. He decided to increase the number of existing doughnuts by 10% and the number of existing cookies by 20%. If the total number of doughnuts and cookies becomes 600, find the difference between the number of doughnuts and cookies after the increase.

a. 10	b. 20
c. 60	d. 80

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5. Find the percentage difference between the orange candies and the chocolate candies if the number quoted in orange candies is just 1/4<sup>th</sup> of the actual number of people who like orange candies.



6. The fractions 1/3 and 1/5 are shown on the number line. Teresa wishes to mark a point as 1/4 but is unable to decide which division to choose. Bob helped her with five selective divisions marked from a to e. Which division will hold the value as 1/4?



7. Start simplifying the expression given below and store the expression in a variable T. After which he multiplied the coefficient of x and y and added the product to the least common multiple of the degrees of x and y.  $[(3x^2 \times 7x^7) + (2y^3 \times 9y^{12})] \div 3x^5y^7$ 

a. 24	b. 42
c. 50	d. 80

8. Martin constructed a triangle PQR and drew a line PS from point P to point S which lay on the straight line QR as shown. He used a protractor to measure the ∠QPS and found it to be 12°. His friend Snow asked him to measure the ∠QPR without a protractor. Martin asked for some clues to measure the ∠QPR. Snow gave him the information that side PQ is equal to both side PS and side RS. Now Martin can measure the ∠QPR. Find the value of ∠QPR.



9. Britney purchased some length of ribbon which she wants to wind around the circular clock. She measures the length of ribbon required and finds that will wind up exactly twice around the clock. But later she finds that her brother already winded up the clock with a different ribbon. She decided to utilise the ribbon in decorating her lunch box which was 158.92 cm wide and 102.44 cm long. She found that the entire ribbon got used up in one covering its boundaries once. Find the radius of the clock for which Britney purchased the ribbon. Take  $\pi = 22/7$ .

a.	41.58 cm	b.	83.16 cm
C.	20.79 cm	d.	124.74 cm

10. Robert was an event manager and wanted to organize the birthday party of Mr. Smith. On the other hand, Mr. Smith was ready to give him the event organizing responsibility only if he agreed to some terms and conditions. Mr. Smith decided to throw a small party and let Robert organize the event and collect feedback from his guests who attended the small party. Mr. Smith invited N number of guests to his party, out of which only 0.9N attended the party. The condition was that for every good feedback, Robert would get an additional \$3 and for every bad feedback, Robert would have to pay back \$1. Apart from his normal billing, Robert got \$243 from his feedback. If only 0.7N guests who attended the party gave good feedback to Robert, find the number of guests invited (N).

a.	100	b.	130
c.	150	d.	200

### Scholar Section (Each Question is 6 Marks)

11. Monty measured the side of a square and noted its value in the form of an expression (2xy + 5y). He then calculated the perimeter and area of the square. He wanted to find out the ratio of the difference between the perimeter and each side of the square compared to the area of the square in the simplest form. Find the desired ratio.

a.	6x + 15 : y(4x <sup>2</sup> + 20x + 25)	b.	$6xy + 15y : y(4x^2 + 25x + 25)$
c.	$6x + 15 : y^2(4x^2 + 20x + 20)$	d.	$6x^2 + 15 : y(4x^2 + 25x + 20)$

12. Terence made a large square which he divided into 2009 smaller squares. He divided it in such a way that the side length of each smaller square was a whole number. Find the minimum possible side length of the initial large square which Terence made.

a. 44	b. 45
c. 46	d. 505

13. Monika asked her kid to choose a number N and note down all its factors except for 1 and the number itself. Monika noticed that the largest factor of N was 45 times the smallest factor mentioned by the kid. How many values of N can be possible which will satisfy the above condition?

a. 0	b. 1
c. 2	d. More than 2

14. Andrew constructed a three-dimensional figure as shown. The figure he constructed had 6 triangular faces. On each vertex, a number was written and two of the numbers were already given in the diagram. The sum of the numbers on the corners of each face is the same. Find the sum of all the numbers on the five vertices.



15. Kiley had an equation in which each letter represents a certain digit (the same letter represents the same digit each time). How many different values can the expression T × H × R × E × E have if the equation with Kiley was as follows?

a.	1	b. 2	)
c.	3	d. 4	ŀ

16. Nick drew two triangles and measured all six angles. He named one acute angled triangle as A and named the other obtuse-angled triangle as B. He wrote the values of the angles in the notebook but forgot to write two angles. The angles he wrote were 120°, 80°, 55° and 10°. Which of the following can be the smallest angle in the acute-angled triangle?

a. 5º	b.	10°
c. 45°	d.	55°

17. Alexa, Henry, Robert and Robin wrote four different numbers in their notebooks without showing it to each other. They showed their numbers secretly to Mr. Jeff. Mr. Jeff multiplied all the four numbers and found the product to be 100. And when Mr. Jeff added all the four numbers he found the sum to be X. Find the value of X.

a.	10	b.	12
C.	15	d.	18

18. Nancy was asked to make a regular nonagon by her teacher. She completed her drawing after which her teacher extended two lines from the sides of the nonagon as shown in the figure. The two lines met at a point which Nancy's teacher marked as 'X'. Find the angle subtended at X.



19. Tia, Tom, Daniel and Sam had four expressions which they wished to compare with each other. They decided to select the one with the second highest value among the four. Who got selected if the expressions with them were as follows: Tia:  $\sqrt{1296 + 4/5}$ 

Tom:  $3^7 - 14^{\text{th}}$  multiple of 130 Daniel:  $(4096)^{2/3}$ Sam:  $(0.5)^2 + (6)^3/(8)^{1/3}$ 

a.	Daniel	b.	Tia
C.	Tom	d.	Sam

20. Thomas was given an expression to calculate. He found the answer to be 6. Find the percentage error in his answer.

	0.357 × 5.12	<u> </u>	0.22848 × (11.2 - 9.2)				
	0.64 × 4.821	-	0.77136 × 4				
a. 20%			b. 25%				
c. 50%			d. 75%				

## **Answer Key**

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