UNICUS OLYMPIADS

Sample Paper

## Class 8

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. A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer.
   What would be the central angle (in degrees) for the winter season?
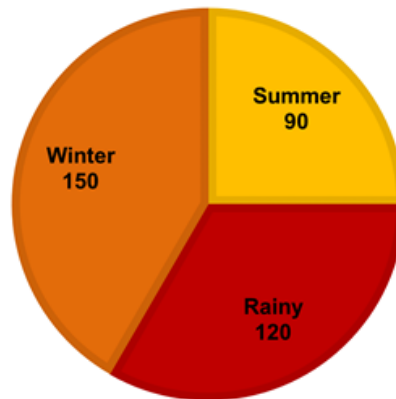
   a. 90   b. 120
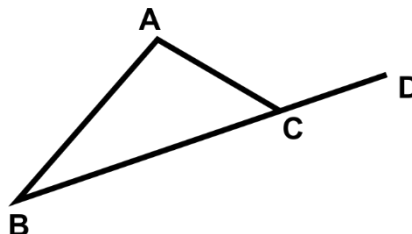   c. 150   d. none

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2. Roh was lost in a town that used a coordinate system for address. On asking about the location of his friend he was told that he would find his friend where $y = x^2 + 2 - 3x$ intersects the x-axis. What is the location of his friend?

   a. 1.0   b. 2.0
   c. Both a and b   d. 4.6

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3. Centerville Public School went on a picnic. ½ of the children were busy having lunch and 3/4th of the remaining children were playing. If 9 of them went to the washroom. How many children were there in the group?

   a. 65   b. 36
   c. 72   d. 74

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4. The side BC of a triangle ABC is produced to D. If ∠ACD =112º and ∠B = 3/4∠A, then find the measure of ∠B.

   a. 24º   b. 36º
   c. 48º   d. 64º

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5. Sarah needs to find two angles that follow supplementary angle property but one of them is 2/7th of the other angle.

    a. 35°, 145°   b. 70°, 110°
    c. 40°, 140°   d. 50°, 130°

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6. Willam asked Neil to mention few rational numbers between -2 and 5. He made four attempts and in every attempt he gave three numbers between -2 and 5. Three out of four times Neil went wrong but was able to give the correct answer once. All his responses are present in the options. Choose the option which has the correct set of rational numbers in the form of p/q between -2 and 5.

    a. 5, 33/4, 3/2   b. 13/4, 3/2, -1/4
    c. 5, 13/4, 13/2   d. 5, 3/4, 13/2

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7. Alexa wrote an expression in her notebook as $8x^3y^2$. Smith wrote a similar expression but the constant was ten more than Alexa's constant value. The power of x was one less than the power of x in Alexa's expression. Find out the least common multiple of Alexa and Smith's expressions.

    a. $144x^3y^6$ b. $72x^3y^2$
    c. $72x^3y^3$ d. $144x^2y^3$

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8. A, B, C, D are playing a power game. In this game, they increase the power of 2 and power of y sequentially. The terms they obtained are 2, ry, $8y^2$ and $16y^3$. What is the product of A, B, C and D?
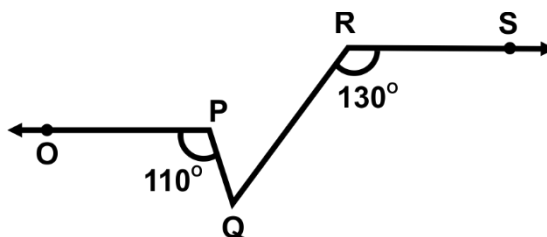
    a. 10246   b. $512\ y^6$
    c. $512y^5$ d. $1024y^6$

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9. Betty drew two parallel lines and named them OP and RS respectively. She further extended her drawing as shown in the figure. Find the ∠PQR.

   a. 40°   b. 50°
    c. 60°   d. 70°

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10. Katy is learning about rational numbers; in the second chapter of multiplication, she was asked to verify if 13/7 x -4/5 = -4//5 x 13/7. To verify it which of the following properties can be used?

    a. Associative property
    c. Distributive property

    b. Commutative property
    d. Identity property

Scholar Section (Each Question is 6 Marks)

11. What is the least number that must be multiplied by 2×3^6 to make it a perfect square?

   a. 2
    c. 6

    b. 3
    d. 9

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12. Rachel wants to find the value of y given in the sides of the triangle shown below. However, she does not have enough information about the triangle to find the value of y. Suddenly, Joseph mentions that two of the sides are parallel to each other and this reminds Rachel that the parallel sides were BC and DE. Now Rachel can calculate the value of y. Find out the value of y.

    A
    y + 7
    2y + 10
    B   C
    3y   2y
    D   E

    a. 1
    c. 5
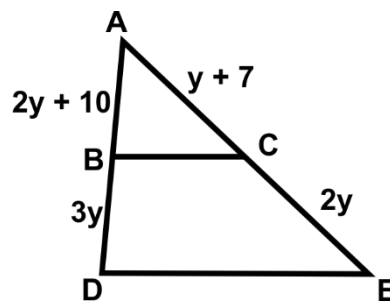
    b. 3
    d. 7

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13. Pauli wants to simplify a mathematical expression into a whole square form and for that she performs some calculations. The expression she wants to convert is $(p + q)^2 - 4pq$. Which of the following options will represent the above expression in the whole square form?

    a. $(p - q)^2$
    c. $(p + 2q)^2$

    b. $4p^2q^2$
    d. $(1 - 2q)^2$

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14. Barry had a triangular wooden piece such that it is named as XYZ, $\angle X = 100°$, $\angle Y = 30°$ and $\angle Z = 50°$ then which among the following is true about the wooden piece?

   a. XY > XZ
    c. YZ < XZ

    b. XY < XZ
    d. XY = YZ

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15. During which time interval, the percentage of the temperature rise or fall was exactly 12.5% compared to the total temperature rise during 9 AM and 3 PM?
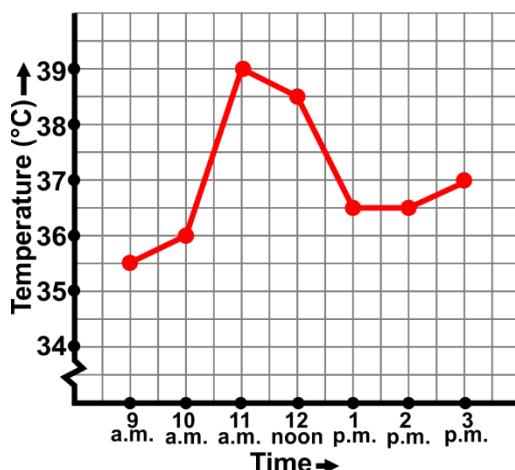
   a. 1 AM and 2 PM   b. 2 PM and 3 PM

   c. 12 noon and 1 PM   d. 9 AM and 10 PM

16. Peter drew three straight lines IJ, KL, MN which intersected each other at point H. Sam came and joined points K and M, points I and L and points J and N. Peter was glad to see that the lines which Sam joined turned the figures into three triangles shown below. Peter calculated the sum of the red highlighted angles to be _____°.
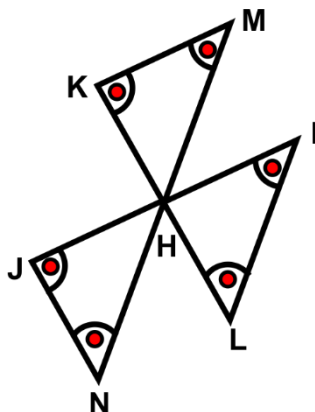
   a. 180°   b. 270°

   c. 360°   d. 540°

17. A well in a place is $1/8^{th}$ full. After 10 tanks of water is poured into it, it got full till $3/4^{th}$. What is the volume of the well in terms of tanks?

   a. 40/3   b. 27/2

   c. 15   d. 16

18. Penny went on a cycle ride. She covered 5 miles from her house to Boston. Carlston is 6 miles from Boston. What could be the distance between her house and Carlston?
    I.   11
    II. 1
    III. 7

    a. I only
    b. II only
    c. I and II
    d. I, II and III

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19. In the given figure, BC, then:
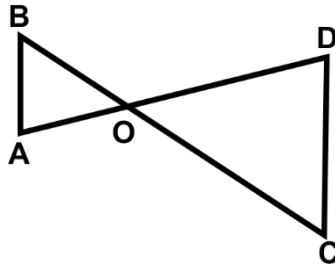
    a. AD > BC
    b. AD = BC
    c. AD < BC
    d. AD = 2BC

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20. Rexi likes to come up with her own mathematical rules to play with, the new rule she came up with is a * b = 1 + ab. What property holds true for Rexi's new formula?

    a. Commutative but not associative
    b. Associative but not commutative
    c. Neither commutative nor associative
    d. Both commutative and associative

Answer Key

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