UNICUS OLYMPIADS

#UnicusIsUnique

Sample Paper

Class 8

Unicus Mathematics Olympiad (UMO)

Time: 60 minutes

Pattern and Marking Scheme			
Section	**Total Questions**	**Marks per Question**	**Total Marks**
Classic Section	40	1	40
Scholar Section	10	2	20
Grand Total	**50**		**60**

Classic Section (Each Question is 1 Mark)

1. Ruhel spent $7x on buying stationary items, $28 in canteen and was left with $14. How much money did he have initially? (Express in terms of x)

a. $(7x + 42)
b. $(7x + 14)
c. $2,744x
d. $(7x + 28)

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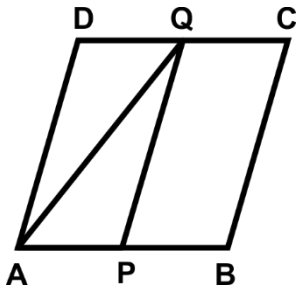
2. The given figure ABCD is a parallelogram. If angle QPB = 84° and angle AQP is one-fourth of angle QPB, find angle AQD:



a. 49°
b. 55°
c. 63°
d. 72°

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3. Which of the following is not a rational number?

a. 4
b. -3
c. $\frac{9}{0}$
d. $-\frac{3}{5}$

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4. Simplify the following:
$2\frac{1}{15} - 3\frac{1}{2} + 7\frac{1}{4}\left(4\frac{1}{3} - \frac{1}{5}\right)$

a. $10\frac{8}{15}$
b. $11\frac{14}{15}$
c. $16\frac{17}{30}$
d. $28\frac{8}{15}$

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5. If Robert buys 1 kg of orange from three different fruit vendors at the price of $60, $75 and $80 per kg respectively, then find the average rate of 1 kg of oranges:

a. $67.67
b. $69.33
c. $71.67
d. $75.33

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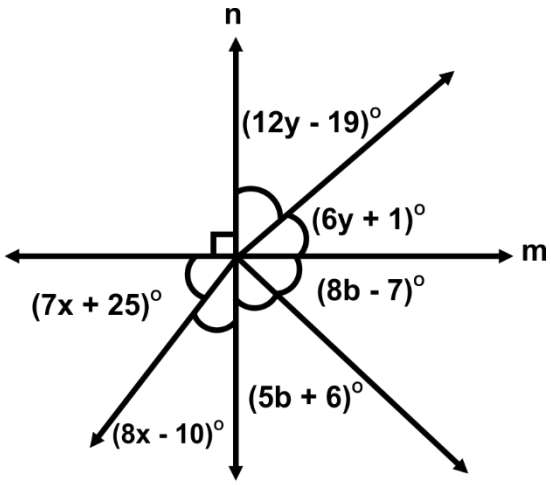
6. Look at the image given below. The lines m and n are perpendicular bisector of each other. Find the values of ∠(12y - 19) and ∠(6y + 1), respectively:



a. 53°, 37°
b. 37°, 53°
c. 64°, 17°
d. 17°, 64°

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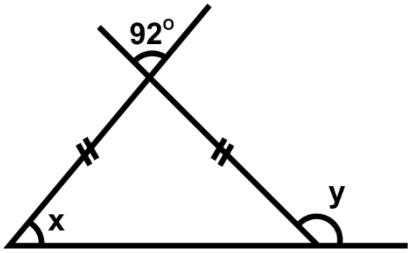
7. Find the value of angles x and y respectively from the figure given below:



a. 44°, 136°
b. 24°, 146°
c. 27°, 141°
d. 32°, 147°

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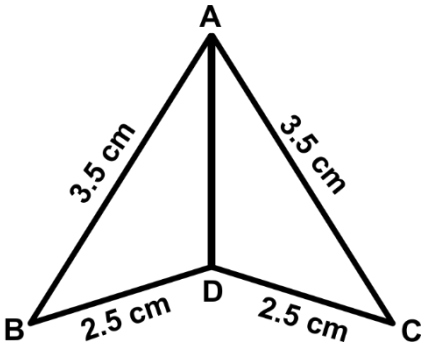
8. Fill in the blank:
Triangles ABD and ACD are congruent because of _____ congruence property.



a. SAS
b. SSS
c. ASA
d. RHS

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9. Simplify the following:
$5^0 + 5^1 + 25^4 \div 5^3$

a. 625
b. 631
c. 3125
d. 3131

---

10. Simplify the following:
$(3 \times 7^2 \times 11^5) / (21 \times 11^2)$

a. 11^3
b. 7×11^3
c. $7^2 \times 11^3$
d. $7^2 \times 11^{10}$

---

11. The value of [-243 + 121 - (-122) + 4 (124 ÷ 12)] is equal to:

a. 80.67
b. 41.33
c. -202.67
d. -41.33

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12. In the following expression, find the value of x:
(x - 3)/4 + (x - 7)/5 - (x - 2)/7 = 7/10

a. $8\frac{15}{43}$
b. $7\frac{16}{43}$
c. $7\frac{22}{43}$
d. $6\frac{39}{43}$

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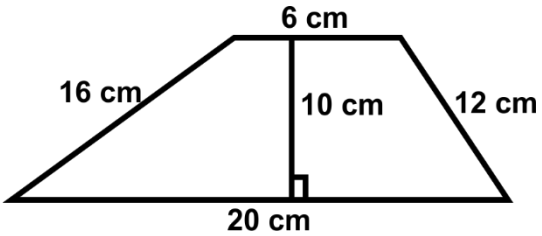
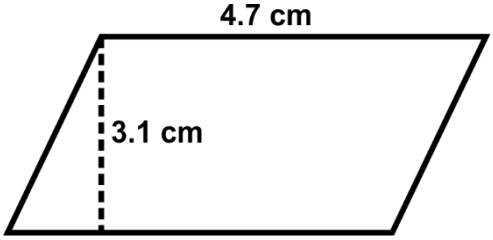
13. Find the area of the trapezium:



a. 130 cm^2
b. 140 cm^2
c. 208 cm^2
d. 156 cm^2

---

14. Find the area of the given parallelogram:



a. 14.57 cm^2
b. 7.285 cm^2
c. 29.14 cm^2
d. 24.47 cm^2

---

15. Arya bowled 7 games in a tournament. The list shows his scores in the 7 games:
149, 160, 180, 155, 160, 137, 158
What is the mode of his scores?

a. 155
b. 158
c. 160
d. 156.5

---

16. Four sheets of 50 cm X 5 cm are to be arranged in such a manner that a square could be formed. What will be the area of inner part of the square so formed?

a. 2000 cm^2
b. 2025 cm^2
c. 1800 cm^2
d. 2500 cm^2

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17. In statistics, a suitable graph for representing the partitioning of total into sub parts is:

a. A bar graph
b. A pictograph
c. A pie chart
d. A line graph

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18. What % of 40 is 16?

a. 100%
b. 60%
c. 40%
d. 50%

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19. Plantation G has q durian trees of grade r, s durian trees of grade t and u durian trees of grade v. The total number of durian trees in plantation G is:

a. p + q + r + s + t + u + v
b. p + r + u + v
c. q + s + u
d. r + t + v

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20. A lends $2,500 to B and a certain sum to C to the same time at 7% p.a. simple interest. If after 4 years, A altogether receives $1,120 as interest from B and C, then the sum lent to C is:

a. $700
b. $1,500
c. $4,000
d. $6,500

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21. A cistern can be filled up by one pipe in 12 hours and by another in 8 hours. Both the pipes are kept open for 2 $^1/_2$ hours. The part of the cistern filled up is:

a. $\frac{25}{48}$
b. $\frac{5}{6}$
c. $\frac{25}{36}$
d. $\frac{12}{25}$

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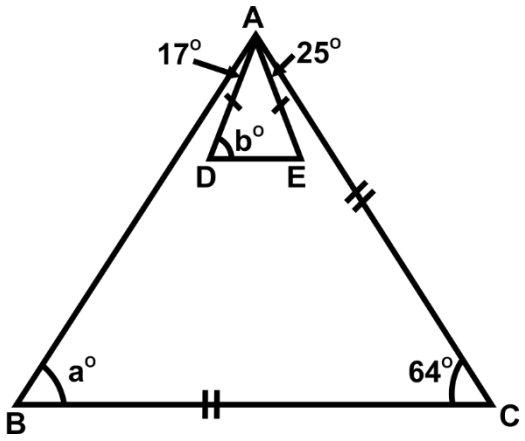
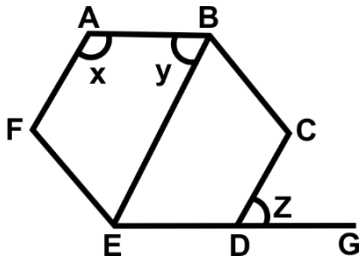
22. The diagram given below shows two isosceles triangles. What is the sum of a and b?



a. 79º
b. 58º
c. 140º
d. 116º

---

23. The image given below shows a regular hexagon. The value of angles x, y and z are respectively:



a. 60º, 120º, 60º
b. 60º, 60º, 120º
c. 120º, 60º, 60º
d. 60º, 60º, 100º

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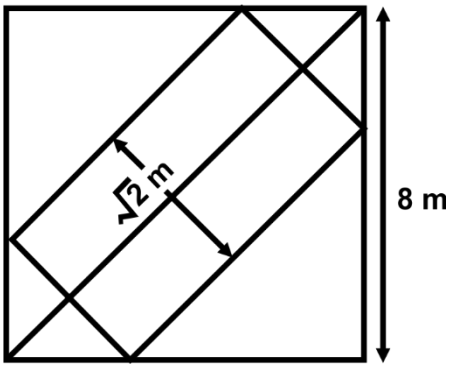
24. A rectangular plank $\sqrt{2}$ m wide is placed symmetrically on the diagonal of a square of side 8 metres as shown. What is the area of the plank?



a. $(16\sqrt{2} - 3)$ m^2
b. $7\sqrt{2}$ m^2
c. 98 m^2
d. 14 m^2

---

25. The diameter of a bullock cart wheel is 14/11 m. This wheel makes 10 complete revolutions per minute. What would be the speed of the cart in km per hour?

a. 4.8
b. 9.6
c. 8.8
d. 2.4

---

26. Each edge of a cube is increased by 50%. The percentage increase in the surface area of the cube is:

a. 50
b. 125
c. 150
d. 225

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27. A box contains 50 coloured stones. What is the total number of orange stones in the box if the probability of selecting an orange stone is 0.4?

a. 20
b. 15
c. 10
d. 40

---

28. From the following frequency table, find out how many students failed if the pass marks are 40:

Mark	0-19	20-39	40-49	50-59	60-89	90-100
Number of students	8	6	15	13	18	7

a. 29
b. 7
c. 8
d. 14

---

29. A man has a hundred dollars. He bought vegetables for $26.75 and fruits for $25.45. How much money he has left?

a. $47.80
b. $52.40
c. $73.25
d. $37.80

---

30. A bag contains 25 cents, 10 cents, and 5 cent coins in the ratio 1 : 2 : 3. If the total value of these is $36, then what is the number of 25 cent coins?

a. 40
b. 45
c. 50
d. 60

---

31. The ratio of land to water for the whole earth is 1 : 2 and 2 : 3 in the northern hemisphere. What is the ratio of land to water in the southern hemisphere?

a. 4: 11
b. 1: 3
c. 1: 4
d. 4: 7

---

32. Two equal sums of money were invested, one at 4% and the other at 4 $^1/_2$%. At the end of 7 years, the simple interest received from the latter exceeded that received from the former by $31.50. The sum of money that was invested is:

a. $1,000
b. $500
c. $750
d. $900

---

33. Peter purchased a new car for $750,000. After 2 years, he sold the car for 20% less than the original price. Find the selling price of the car:

a. $400,000
b. $500,000
c. $600,000
d. $650,000

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34. In a rhombus DEMO, ∠DEO = 70º. What is the measure of ∠EMO?

a. 20º
b. 140º
c. 70º
d. 40º

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35. If x: y = 5 : 3, then find the value of (8x - 5y)/(8x + 5y):

a. 7: 11
b. 11: 13
c. 5: 11
d. 13: 15

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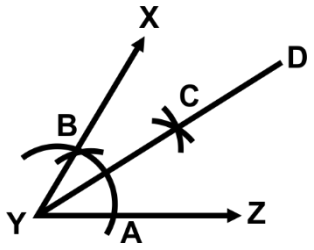
36. Look at the image given below. The measure of ∠XYC is equal to:



a. 45°
b. 30°
c. 60°
d. 80°

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37. Which of the following fractions is less than $\frac{7}{8}$ and greater than $\frac{1}{3}$?

a. $\frac{1}{4}$
b. $\frac{23}{24}$
c. $\frac{11}{12}$
d. $\frac{17}{24}$

---

38. If p = 3/5, q = 7/9 and r = 5/7, then which of the following options is correct?

a. p < q < r
b. q < r < p
c. p < r < q
d. r < q < p

---

39. The selling price of an article is 4/3 times its cost price. The gain per cent is:

a. $20\frac{1}{3}\%$
b. $20\frac{1}{2}\%$
c. $25\frac{1}{4}\%$
d. $33\frac{1}{3}\%$

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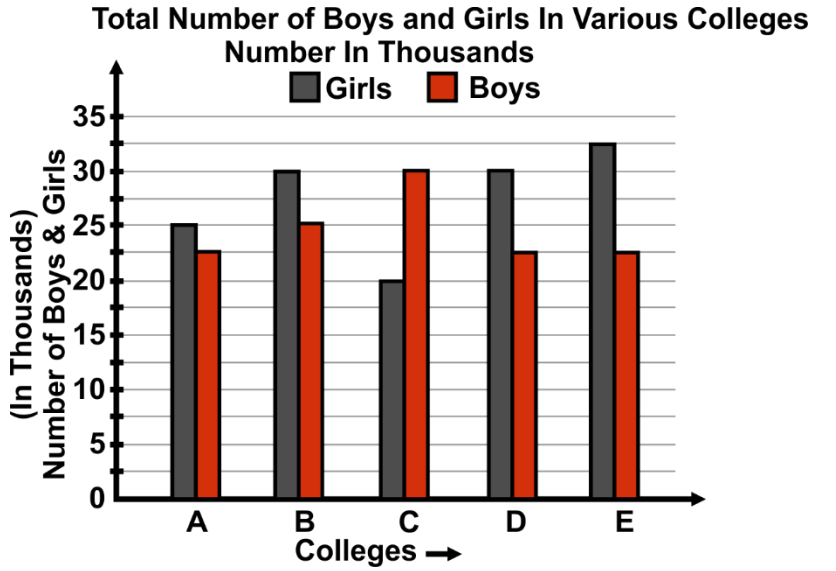
40. The total number of girls from colleges D and E together are approximately what per cent of the total number of girls from colleges A, B and C together?



a. 83%
b. 75%
c. 70%
d. 88%

Scholar Section (Each Question is 2 Marks)

41. Fill in the blank:
If 11 is subtracted from 5 times a number and it becomes the same as 4 subtracted from 7 times the number, then this fact can be represented as _____.

a. 5x - 11 = 4x - 7
b. 5x - 11 = 7x - 4
c. 11x - 5 = 4x - 7
d. 11x - 5 = 7x - 4

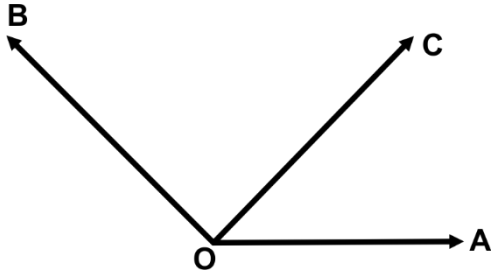
---

42. A rectangular garden is of dimension 60 m × 40 m. There are two roads 5 m wide each running in the middle of the garden, one parallel to the length and the other parallel to its breadth. If the cost of gravelling the road is \$5 per m^2, then find the cost of gravelling both roads:

a. \$1,000
b. \$1,500
c. \$2,500
d. \$2,375

---

43. In the given figure, if ∠BOC = 7x + 20º and ∠COA = 3xº, then the value of x for which AOB becomes a straight line is:



a. 16º
b. 14º
c. 20º
d. 21º

---

44. A number is divided by three and multiplied by the square of a second number. The product is then divided into three. Write the algebraic term for the given statements using p as the first number and q as the second number:

a. $9pq^2$
b. $pq^2/3$
c. $pq^2/9$
d. $3pq^2$

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45. Match Column A with Column B:

Column A		Column B	
a.	x : 5 : : 2 : 3	(p)	6/5
b.	2 : x : : 4 : 3	(q)	15/2
c.	2 : 5 : : x : 3	(r)	10/3
d.	2 : 5 : : 3 : x	(s)	3/2

a. (a) - (p), (b)- (q), (c) - (r), (d) - (s)
b. (a) - (r), (b)- (p), (c) - (s), (d) - (q)
c. (a) - (q), (b)- (s), (c) - (p), (d) - (r)
d. (a) - (r), (b)- (s), (c) - (p), (d) - (q)

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46. Which of the following is true?

A. Triangle is a polygon.
B. An isosceles triangle can be obtuse.
C. All scalene triangles are acute.

a. Only A
b. Only B and C
c. Only A and B
d. A, B and C

---

47. Following are steps while constructing a line segment of length 5 cm using a ruler. Which of the following steps is/are INCORRECT?
Step 1. First mark a point A on paper.
Step 2. Place a ruler in such a way that its zero point coincides with point A.
Step 3. Draw a line from point A of the measures of 4.5 cm on the ruler.
Step 4. Now, name the endpoints as Q.
Step 5. AB is the required line segment.

a. Step 1
b. Step 3
c. Both Steps 3 and 4
d. Both Steps 4 and 5

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48. Rubi decided to donate 16% of her monthly salary to an NGO. On the day of donation, she changed her mind and donated $6567 which was 75% of what she had decided earlier. How much is Rubi's monthly salary?

a. $50,000
b. $54,000
c. $54,725
d. $60,000

---

49. The population of a town increases at a certain rate per cent per annum. The present population of the town is 3600 and in 5 years' time, it will become 4800. How much will it be in 10 years' time?

a. 5000
b. 6000
c. 6400
d. 7000

---

50. The simple interest on a certain sum for 8 months at 4% per annum is $129 less than the simple interest on the same sum for 15 months at 5% per annum. The sum is:

a. $2,530
b. $2,400
c. $2,529
d. $3,600

Answer Key

1.	a	2.	c	3.	c	4.	d	5.	c	6.	a	7.	a
8.	b	9.	d	10.	b	11.	b	12.	a	13.	a	14.	a
15.	c	16.	b	17.	c	18.	c	19.	c	20.	b	21.	a
22.	c	23.	c	24.	d	25.	d	26.	b	27.	a	28.	d
29.	a	30.	d	31.	a	32.	d	33.	c	34.	d	35.	c
36.	b	37.	d	38.	c	39.	d	40.	a	41.	b	42.	d
43.	a	44.	c	45.	d	46.	c	47.	c	48.	c	49.	c
50.	d												