



CREST Mathematics Olympiad (CMO)

Previous Year Paper (2023-24)

Class 8 (Set - A)

Time Allowed: 1 hour

Maximum Marks: 60

- Additional **10 minutes** will be allotted to fill up information on the OMR Sheet, before the start of the exam.
- Fill in all the mandatory fields clearly on the OMR Sheet.
- There are a total of **50 questions** in this booklet comprising **2 sections** namely the **Practical Mathematics & Achievers' Section** consisting of **40 questions (1 mark each) & 10 questions (2 marks each)** respectively.
- There is no negative marking. The use of a calculator is not permitted.
- There is **only ONE correct option** to a given question.
- Use **HB Pencil or Blue / Black ball point pen only** for marking the correct choice of answers on the OMR Sheet.
- Rough work is to be done in the space provided in the test booklet. Extra plain sheet may be provided by the school for the rough work.
- The OMR Sheet is to be handed over to the invigilator at the end of the exam.
- No candidate is allowed to carry any textual material, printed or written, bits of paper, any electronic device, etc. inside the examination hall.
- The use of unfair means may result in the cancellation of the exam. Any such instances may be reported at **+91-98182-94134** or **info@crestolympiads.com**

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

FILL IN THE DETAILS

Candidate Name: _____

Class: _____ Section: _____

CREST ID: _____

Practical Mathematics (Each Question is 1 Mark)

- Plotting the following points, check which are not forming linear graph.
 - L(4, 2), M(4, 3), N(4, 6), O(4, 7)
 - U(2, 5), V(2, 3), W(2, 6), X(2, 7)
 - A(1, 1), B(2, 2), C(3, 3), D(4, 4)
 - R(1, 1), S(2, 4), T(3, 2), U(4, 1)
- A shopkeeper has a certain number of eggs of which 5% are found to be broken. He sells 93% of the remainder and still has 266 eggs left. How many eggs did he originally have?
 - 3800
 - 4000
 - 4200
 - 4800
- Due to an increase of 15% in the price of milk, a family reduces its consumption of milk by 15%. What was the effect on the expenditure of that family on account of milk?
 - 2.50% decrease
 - 2.25% decrease
 - 3% decrease
 - 3.5% decrease
- A $(8 \times 6 \times 4)$ cm³ metallic cuboid is melted. The minimum volume of molten metal which should be added to mould it into a cube whose edge is 'x' where 'x' is an integer, is:
 - 20 cm³
 - 21 cm³
 - 23 cm³
 - 24 cm³
- A variate takes 13 values which are arranged in ascending order of their magnitudes. It is found that 5th, 7th and 8th observations are 4, 6 and 9 respectively. What is the median of the distribution?
 - 4
 - 6
 - 9
 - 19
- A car is moving at an average speed of $3\frac{1}{9}$ km/h. How much distance will it cover in $5\frac{1}{7}$ hours?
 - 16 km
 - 18 km
 - 14 km
 - 20 km
- Jase had \$56. He spent \$x on transport and \$2y on lunch. He used the remaining amount to buy three similar books. Find the cost of each book.
 - \$(56 - x + 2y)
 - \$(56 - x - 2y)
 - \$(56 - x + 2y)/3
 - \$(56 - x - 2y)/3
- If $P = m^2 - n^2$, $Q = n + m$, $R = 2m + 2n + m^2$, then find the value of $P + 2Q - R$:
 - m^2
 - $-m^2$
 - $-n^2$
 - n^2
- Simplify the following:
 $(y^a/y^b)^4 \times (y^b/y^c)^3 \times (y^c/y^a)^2$:
 - 0
 - y
 - 1
 - $y^{(2a - b - c)}$
- Find the value of the following:
 $3^n \times 3^{2n+1}/9^n \times 3^{n-1}$
 - 8
 - 1
 - 3^{2n}
 - 9
- The opposite pairs of sides of a square are increased by 40% and 30% respectively. The area of the resulting rectangle exceeds the area of the square by?
 - 42%
 - 62%
 - 72%
 - 82%
- A square and an equilateral triangle have the same perimeter. If the

diagonal of the square is $12\sqrt{2}$ cm, then the area of the triangle is:

- a. $24\sqrt{3}$ cm² b. $24\sqrt{2}$ cm²
 c. $64\sqrt{3}$ cm² d. $32\sqrt{3}$ cm²

13. A number is divided by three and multiplied by the square of a second number. The product is then divided by 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. $pq^2/9$
 c. $pq^2/3$ d. $3pq^2$

14. Out of the total 390 students studying in a college of Arts and Science, boys and girls are in the ratio of 7: 6 respectively and the number of students studying Arts and Science are in the ratio of 3: 7 respectively. The boys and girls studying Arts are in the ratio of 4: 5 respectively. What is the ratio between the girls studying Arts and Science respectively?

- a. 13: 23 b. 26: 79
 c. 8: 13 d. 23: 36

15. If $a^6 - 729b^6 = (pa^2 + Qb^2)(Ra^4 + Sa^2b^2 + Tb^4)$, then what will be the value of $P + Q + R - S + T$?

- a. 60 b. 74
 c. 55 d. 65

16. Arrange the following steps in correct order to construct a quadrilateral ABCD, in which $AB = 5$ cm, $BC = 4.3$ cm, $CD = 4.5$ cm, $\angle B = 60^\circ$ and $\angle C = 125^\circ$.

Step I: With C as the centre and radius 4.56 cm, draw an arc intersecting CT at D.

Step II: Draw $BC = 4.3$ cm.

Step III: Join A to D.

Step IV: With B as the centre and a radius of 5 cm, draw an arc intersecting

BL at A.

Step V: Draw angles $\angle LBC = 60^\circ$ and $\angle TCB = 125^\circ$ respectively.

- a. V, II, IV, I, III b. II, V, IV, I, III
 c. II, IV, V, I, II d. II, IV, I, V, III

17. Five years ago, the ratio of the age of Oliver to that of Mini was 5: 3. Nikki is 5 years younger than Oliver. Nikki is five years older than Mini. What is Nikki's present age?

- a. 35 years b. 25 years
 c. 20 years d. 10 years

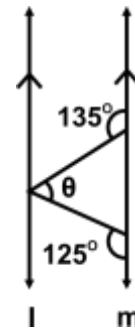
18. B is eighteen years younger than A. The ratio of B's age six years hence to C's present age is 3: 2. If at present A's age is twice the age of C, then what was B's age four years ago?

- a. 24 years b. 28 years
 c. 26 years d. 20 years

19. 18 years ago, a father was three times as old as his son. Now the father is only twice as old as his son. What is the sum of the present ages of the son and the father?

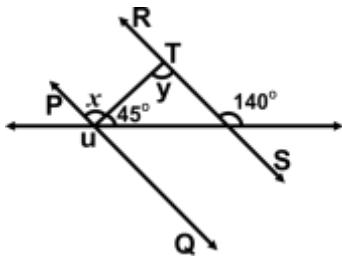
- a. 54 b. 105
 c. 72 d. 108

20. In the given figure $l \parallel m$. Find the measure of θ :



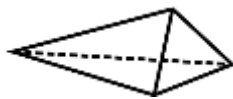
- a. 100° b. 80°
 c. 70° d. 160°




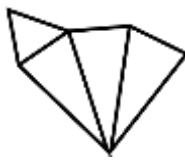
21. In the given figure, $PQ \parallel RS$. Find the values of x and y respectively:



- a. $85^\circ, 85^\circ$ b. $95^\circ, 75^\circ$
 c. $85^\circ, 95^\circ$ d. $95^\circ, 95^\circ$

22. The figure shows a solid. Which of the following is a net of the solid?



- a.  b. 
 c.  d. 

23. Read at the following statements. Which of the following is not true?

- a. A square number is never negative
 b. A square number never ends in 2, 3, 7, or 8
 c. The number of zeros at the end of a perfect square is always even
 d. The square of an even number is odd

24. A trader allows a trade discount of 20% and a cash discount of $6\frac{1}{4}\%$ on the marked price of the goods and gets a net gain of 20% on the cost. By how much above the cost should the goods be marked for sale?

- a. 40% b. 50%
 c. 60% d. 70%

25. Which of the following cannot be true for any polyhedron?

- a. Faces = 4, Vertices = 4, Edges = 6
 b. Faces = 8, Vertices = 6, Edges = 12
 c. Faces = 5, Vertices = 1, Edges = 8
 d. Faces = 20, Vertices = 12, Edges = 30

26. Each member in a political party contributed twice as much dollars as the total number of members and the total collection was \$3,042. Find the number of members present in the party:

- a. 2 b. 32
 c. 40 d. 39

27. Find the roots of the following equation:
 $x^2 - 8x + 15 = 0$

- a. 2, 3 b. 3, 5
 c. 8, 15 d. 6, 5

28. If Sia had purchased 11 articles for \$10 and sold all the articles at the rate of \$11 for 10, the profit per cent would have been:

- a. 10% b. 11%
 c. 21% d. 100%

29. A batsman has a certain average of runs for 16 innings. In the 17th inning, he makes a score of 85 runs, thereby increasing the average by 3. What is the average of 17 innings?

- a. 38 b. 37
 c. 36 d. 35

30. Which of the following options is equal to the equation of the y-axis?

- a. $x = 0$ b. $y = 0$
 c. $x = a$ d. $y = a$

31. In parallelogram ABCD, $\angle A = 3$ times $\angle B$. if $AB = 5x - 7$ and $CD = 3x + 1$; find the length of CD.
- a. 18 units b. 16 units
c. 13 units d. 12 units
32. The sum of the interior angles of a polygon is three times the sum of its exterior angles. Determine the number of sides of the polygon.
- a. 3 b. 6
c. 9 d. 8
33. Renston has set up 30 circular plates, each with a radius of 14 cm and a thickness of 3 cm, which are stacked one on top of the other to make a cylindrical solid as part of a competition being hosted at the Avengers Club House. Calculate the total surface area.
- a. 9112 cm^2 b. 9512 cm^2
c. 9125 cm^2 d. 9152 cm^2
34. Louisan is a builder, and his crew was given a contract to erect a house. They bought some cement blocks, which each had the following dimensions: 30 cm long, 23 cm wide, and 1 cm high. Calculate one cement block's volume in cm^3 .
- a. 600 cm^3 b. 690 cm^3
c. 609 cm^3 d. 700 cm^3
35. Andrea drew a special quadrilateral with a diagonal length of 6 cm and perpendicular lengths from the vertices of 3 cm and 4 cm. Determine the area of the special quadrilateral.
- a. 21 cm^2 b. 18 cm^2
c. 15 cm^2 d. 12 cm^2
36. The area of a trapezium is 34 cm^2 and the length of one of the parallel sides is 10 cm and its height is 4 cm Find the length of the other parallel side.
- a. 9 cm b. 8 cm
c. 7 cm d. 6 cm
37. Lucy and Adam are colleagues if Lucy can complete a task in 15 days and Adam in 20 days. If they work on it together for four days, the fraction of the work that remains is:
- a. $1/15$ b. $5/15$
c. $8/15$ d. $11/15$
38. Angel bought a carpet from the shopping mall. The area of a rectangular carpet is 66 square ft, and the length of the carpet is 5 ft longer than the width. What is the width of the carpet?
- a. 6 ft b. 8 ft
c. 10 ft d. 12 ft
39. Anna came up with a number and asked her father to guess it by giving him the following clue: Assume that four times the square of a number equals 20 times that number. What was Anna's number?
- a. 3 b. 4
c. 5 d. 7
40. How many numbers can be formed using digits 0, 1, 2,..., 9 which is more than or equal to 6000 and less than 7000 and is divisible by 5, whereas any number can be repeated as many times?
- a. 100 b. 109
c. 112 d. 115

Achievers' Section (Each Question is 2 Marks)

41. A water tank is $\frac{2}{5}$ th full. Pipe A can fill the tank in 10 minutes and pipe B can empty it in 6 minutes. If both the pipes are open, how long will it take to empty or fill the tank completely?

- a. 6 minutes to empty
- b. 6 minutes to fill
- c. 9 minutes to empty
- d. 9 minutes to fill

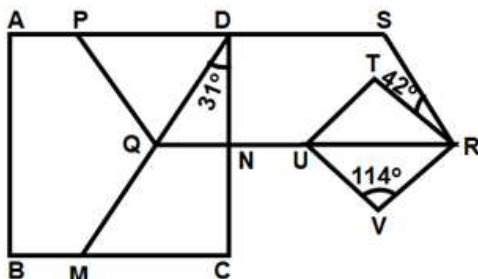
42. A person made 165 telephone calls in the month of May in a year. It was Friday on 1st May of the year. The average of telephone calls made on Sundays of the month was 7. What was the average of the telephone calls per day on the rest days of the month?

- a. 165/31
- b. 5
- c. 7
- d. 145/27

43. The ratio of sides of a triangle is 3: 4: 5 and the area of the triangle is 72 square units. Then the area of an equilateral triangle whose perimeter is the same as that of the previous triangle is:

- a. $32\sqrt{3}$ square unit
- b. $48\sqrt{3}$ square unit
- c. $24\sqrt{3}$ square unit
- d. $64\sqrt{3}$ square unit

44. In the figure below, ABCD is a rectangle, PQRS is a parallelogram and TUVR is a rhombus. DQM is a straight line.



Find the values of the following angles:
(i) $\angle QPS$, (ii) $\angle PQD$ and (iii) $\angle MQN$

- a. (i) 45° , (ii) 98° , (iii) 105°
- b. (i) 36° , (ii) 42° , (iii) 121°
- c. (i) 75° , (ii) 46° , (iii) 121°
- d. (i) 70° , (ii) 43° , (iii) 105°

45. Robertson runs a new business. He used to manufacture carton boxes in a cuboid shape. Calculate the volume of a cuboidal box if $x = 2$ by measuring the volume of a cuboidal box with the dimensions $5x$, $3x^2$, $7x^4$.

- a. 13404 cubic units.
- b. 13440 cubic units.
- c. 14340 cubic units.
- d. 13430 cubic units.

46. A worker was paid \$1,700 during a period of 30 days. During this period he was absent for 4 days and was fined \$15 per day for the absence. He was paid the full salary only for 18 days as he came late on the other days. Those who came late were given only half the salary for that day. Find the total salary paid per month to a worker who came on time every day and was never absent:

- a. \$2400
- b. \$3000
- c. \$2700
- d. \$2250

47. Sam is a rice trader; he combines 26 kg of rice at \$20 per kg with 30 kg of rice of a different variety at \$36 per kg and sells the resulting mixture at \$30 per kg. His profit margin is:

- a. 15%
- b. 10%
- c. 9%
- d. 5%

48. Ben intended to construct a movie theatre with measurements of 100, 50, and 18 metres. If each person needs

150m³ of air, how many people can sit in the hall?

- a. 600 b. 700
c. 800 d. 900

49. If the total amount spent on sports during the year was \$2000, the amount spent on Cricket and Hockey together was:



- a. 200 b. 400
c. 800 d. 1000

50. Which of the following statements are correct?

- i. Factorisation is a method of writing numbers as the product of their factors or divisors.
- ii. The expression $abc + xyc$ is equivalent to $ab + xy$.
- iii. $n^3 - n$ is not divisible by 3.

- a. i and ii b. ii and iii
c. i and iii d. i only

Answer Key

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