



CREST Mental Maths Olympiad (CMMO)

Sample Paper

Pattern and Marking Scheme

Grade	Topic/Section	No. of Questions	Marks per Question	Total Marks
Grade 11	Basique	80	3	240
	Avance	20	6	120
Grand Total		100		360

The total duration of the exam is 60 minutes.

Note: For every incorrect answer, there's a penalty of $\frac{1}{3}$ rd of the total marks allotted to that question.

Syllabus

Number System

- Integers and rational numbers
- Simplification

Algebra

- Polynomials
- Quadratic equations

Comparing Quantities

- a. Time and distance
- b. Simple interest
- c. Compound interest
- d. Profit and loss
- e. Problems on ages
- f. Time and work
- g. Boats and streams
- h. Average and Percentage
- i. Partnership
- j. Ratio and proportion

Geometry

- a. Lines and angles

Mensuration

- a. Surface area of cube
- b. Surface area of cuboid
- c. Surface area of cylinder
- d. Surface area of cone, etc.
- e. Volume of cube
- f. Volume of cuboid
- g. Volume of cylinder
- h. Volume of cone, etc.
- i. Heights and distance
- j. Area of a quadrilateral, Area of triangle & Area related to circles

Playing with Numbers

- a. Number series
- b. Alphanumeric series
- c. Tests of divisibility
- d. Exponents
- e. Factorisation

Data Handling

- a. Statistics
- b. Probability
- c. Data interpretation

For more details, visit <https://www.crestolympiads.com/mental-maths-mmo>

Basique (Each Question is 3 Marks)

- Divide:
 $\sqrt{162}$ by $\sqrt{2}$
 - 7
 - 9
 - 8
 - 6
- If $(\sqrt[4]{49}) = x^{1/2}$, what is the value of x ?
 - 4
 - 6
 - 7
 - 9
- Mt. Everest, the highest elevation in Asia, is 25278 feet above sea level. The Dead Sea, the lowest elevation, is 1,647 feet below sea level. What is the difference between these two elevations?
 - 23631
 - 23456
 - 23654
 - 23142
- The product of 2 numbers is 368 and the difference between these two numbers is 7. Find the numbers.
 - 23, 16
 - 28, 11
 - 26, 14
 - 25, 7
- Express 2.6666..... in the form of $\frac{p}{q}$.
 - $\frac{13563}{10000}$
 - $\frac{1333}{1000}$
 - $\frac{233}{100}$
 - $\frac{13333}{5000}$
- Express $\frac{2}{11}$ as a decimal fraction.
 - 0.181818
 - 0.18
 - 0.282828
 - 0.28
- The mean of 20 numbers is 18. If 2 is added to each number, what is the new mean?
 - 20
 - 22
 - 24
 - 26
- The mean of 5 observations 3, 5, 7, x and 11 is 7, find the value of x .
 - 9
 - 10
 - 11
 - 12

9. Find the mode in the data given below:

1, 1, 7, 9, 5, 4, 5, 9, 5, 6, 7, 2, 3, 2, 4

- a. 1
b. 2
c. 3
d. 5

10. Which of the numbers 3, 2, -2, 1 are zeros of the polynomial $x^2 - 4$?

- a. 1, -2
b. 3, -2
c. 2, -2
d. 2, -1

11. What should be subtracted from the polynomial $x^2 - 16x + 30$ so that $x = 15$ is a zero of the polynomials?

- a. 12
b. 15
c. 13
d. 17

12. If $P(y) = y^2 - y + 1$ then, what is the value of $P(3)$?

- a. 3
b. 5
c. 7
d. 9

13. What is the value of x in $\frac{(x+3)}{x} = 4x$?

- a. 1, $\frac{-3}{4}$
b. 2, $\frac{-2}{5}$
c. 1, 1
d. 2, $\frac{1}{3}$

14. What is the remainder when $p(x) = x^3 - ax^2 + 6x - a$ is divided by $x - a$?

- a. 5a
b. 6a
c. 2a
d. 8a

15. Find the roots of the equation:

$$3x^2 + 15x + 18 = 0$$

- a. -1, 2
b. 2, -2
c. -3, -2
d. 3, -3

16. Solve:

$$(3^6 \div 3^3) \times 3^0$$

- a. 15
b. 19
c. 23
d. 27

17. Solve:

$$36 \times 6^1 + 10 - 5^2$$

- a. 185
c. 220
- b. 201
d. 243

18. Evaluate:

$$(6 + 6^2 - 36 + 4^3)$$

- a. 50
c. 70
- b. 60
d. 80

19. A car travel for 7 hours. If it travels the first half at 30 km/h and the second half at 40 km/h. Find the total distance covered by the car.

- a. 240 km
c. 210 km
- b. 230 km
d. 220 km

20. Two persons cover the same distance at speeds of 25 km/h and 30 km/h respectively. Find the distance travelled if one person takes 25 minutes more than the other.

- a. 64.25 km
c. 62.5 km
- b. 66.3 km
d. 60.5 km

21. A boy goes to school at a speed of 6 km/h and returns to his house at a speed of 4 km/h. If he takes 5 hrs in all, what is the distance between his house and the school?

- a. 15 km
c. 24 km
- b. 14 km
d. 12 km

22. The simple interest of a sum of money is $\frac{1}{9}$ of the principal, and the number of years is equal to the rate per cent per annum. Find the rate per cent.

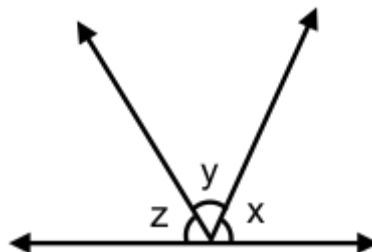
- a. 3
c. $\frac{10}{3}$
- b. $\frac{2}{5}$
d. 7

23. Sam invested an amount of \$8000 at a compound interest rate of 8% per annum for a period of three years. How much amount will Sam get after 2 years?

- a. \$3,535.45
c. \$8,765.43
- b. \$9,331.20
d. \$5,477.57

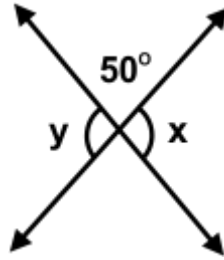
24. A dishonest dealer professes to sell his goods at the cost price, but he uses a weight of 950 g for 1 kg. Find his gain %.
- a. 43%
b. $3\frac{37}{7}\%$
c. $4\frac{13}{19}\%$
d. $5\frac{5}{19}\%$
25. By selling goods for \$1400, a trader loses 20%. Find the cost price.
- a. \$1,750
b. \$1,460
c. \$1,728
d. \$1,547
26. The average age of 20 teachers is 45 years which is decreased by $\frac{6}{7}$ years when a student joins this group. Then what is the age of that student?
- a. 27
b. 15
c. 28
d. 18
27. At present, the age of a father is three times that of his son. Five years hence, the father's age would be two times that of his son. Find the present age of the son.
- a. 9
b. 5
c. 8
d. 7
28. The product of Samuel's age (in years) five years ago and his age (in years) nine years later is 15. Determine Samuel's present age.
- a. 4
b. 6
c. 7
d. 3
29. A and B together can do a piece of work in 6 days and A alone can do it in 9 days. In how many days can B alone do it?
- a. 15
b. 14
c. 18
d. 11
30. Pipe A can fill the tank in 80 minutes and pipe B in 120 minutes. Then after how much time both pipes can together fill the tank?
- a. 32 minutes
b. 48 minutes
c. 45 minutes
d. 35 minutes
31. A boat goes 8 km upstream in 48 minutes. The speed of the stream is 4 km/h. What is the speed of a boat in still water?
- a. 14 km/h
b. 15 km/h
c. 13 km/h
d. 10 km/h

32. The speed of a boat in still water is 7 km/h. If its speed downstream is 10 km/h. Find the speed of the stream.
- a. 6 km/h
b. 10 km/h
c. 3 km/h
d. 7 km/h
33. Over the summer Jason grew from 70 inches to 73.5 inches. What per cent has Jason's height increased?
- a. 4%
b. 3%
c. 6%
d. 5%
34. The average salary of 15 persons is \$5,500. If the salary of one person is added, the average increase to \$5,700. What is the salary of this one person?
- a. 8410
b. 8560
c. 8700
d. 8430
35. Three partners A, B, and C invest \$2200, \$2800, and \$3200 respectively in a business. How should they divide the profit of \$2624?
- a. \$704, \$896, \$1024
b. \$356, \$578, \$798
c. \$983, \$970, \$986
d. \$574, \$667, \$865
36. How should a profit of \$450 be divided between two partners, one of whom has contributed \$1200 for 5 months and the other \$750 for 4 months?
- a. \$110, \$90
b. \$300, \$150
c. \$200, \$250
d. \$200, 350
37. Find the present worth of \$1341 due, 4 years at 9% per annum.
- a. \$660
b. \$760
c. \$870
d. \$950
38. If three angles x , y , and z are angles as shown in the figure. Find the value of $\frac{1}{2z}$ if $x = 58^\circ$ and $y = 42^\circ$.



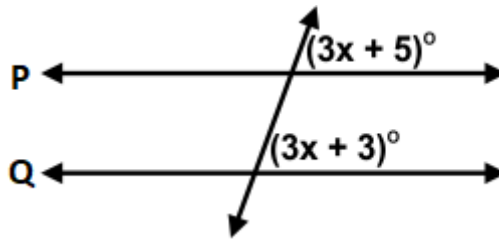
- a. 45°
b. 40°
c. 50°
d. 55°

39. In the figure, find the value of $x + y$.



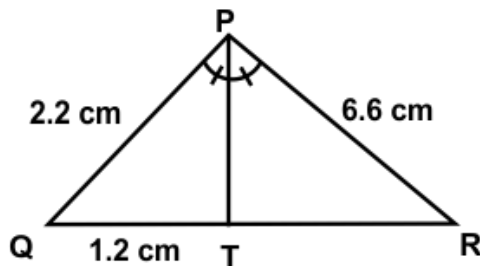
- a. 210°
- b. 240°
- c. 230°
- d. 260°

40. In the given figure, $P \parallel Q$, what is the value of x ?



- a. -2
- b. -3
- c. -1
- d. -4

41. In figure, PT is bisector of $\angle QPR$, find TR .

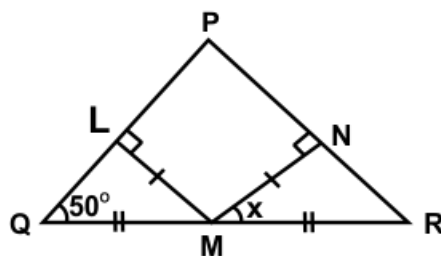


- a. 3.2 cm
- b. 3.1 cm
- c. 3.6 cm
- d. 3.9 cm

42. ABC is an isosceles triangle in which $\angle C = 90^\circ$. If $AC = 6\text{cm}$, find AB^2 .

- a. 72 cm
- b. 77 cm
- c. 71 cm
- d. 75 cm

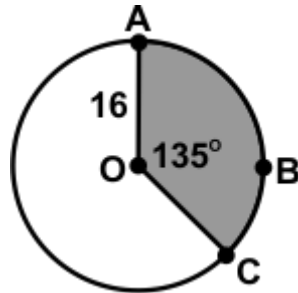
43. In the figure $LM = MN$, $QM = MR$, $LM \perp PQ$, $MN \perp PR$, $Q = 50^\circ$. Find x



- a. 35°
- b. 40°
- c. 55°
- d. 60°

49. The sides of a triangle are in the ratio 2 : 3 : 5. If the perimeter of triangle is 50 cm. Find the three sides.
- a. 8 cm, 9 cm, 210 cm
b. 5 cm, 8 cm, 12 cm
c. 9 cm, 12 cm, 15 cm
d. 10 cm, 15 cm, 25 cm
50. If s is the semi-perimeter and a, b, c are the sides of the triangle, $s - a = 12$ cm, $s - b = 9$ cm, $s - c = 4$ cm, then what is the value of s ?
- a. 25 cm
b. 23 cm
c. 27 cm
d. 26 cm
51. Find the perimeter of the protractor if its diameter is 14 cm. ($\pi = \frac{22}{7}$)
- a. 36 cm
b. 26 cm
c. 20 cm
d. 30 cm

52. In the given figure, what is the area of the shaded sector in circle?



- a. 75π
b. 68π
c. 59π
d. 96π
53. Find the area of a circle whose diameter is 16 cm.
- a. 142.23 cm^2
b. 113.3 cm^2
c. 200.96 cm^2
d. 336.24 cm^2
54. Three cubes of the same metal, whose edges are 6, 8, and 10 cm are melted and formed into a single cube. Find the diagonal of the single cube.
- a. $8\sqrt{3}$ cm
b. $7\sqrt{2}$ cm
c. $5\sqrt{2}$ cm
d. $12\sqrt{3}$ cm
55. The Volume of the right circular cylinder is 792 cm^3 , height of the cylinder is 7 cm. Find the radius.
- a. 8 cm
b. 12 cm
c. 10 cm
d. 9 cm

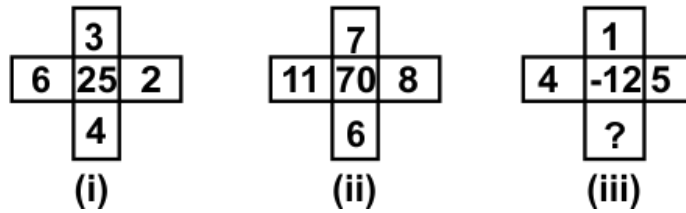
63. Solve:
 $(0.88 \times 880 \div 8) \times 6 = ?$

- a. 580.8
- b. 580
- c. 588
- d. 568.53

64. Fill in the blank with the appropriate choice:
1, 5, 9, 13, _____

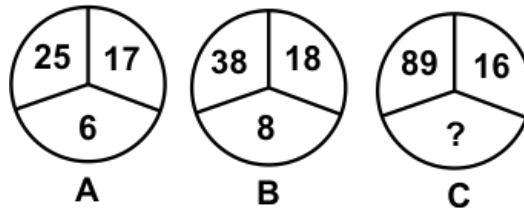
- a. 11
- b. 17
- c. 15
- d. 18

65. Find the missing number:



- a. 1
- b. 3
- c. 2
- d. 4

66. Find the missing number:



- a. 11
- b. 12
- c. 13
- d. 15

67. If x stands for -, / stands for +, + stands for / and - stands for x, which one of the following equations is correct?

- a. -114
- b. -89
- c. 132
- d. 123

68. Which number is divisible by 17?
25435, 643753, 109276, 156446

- a. 25435
- b. 109276
- c. 156446
- d. 643753

69. Which number is divisible by 2 and 8?
15562, 36992, 53266, 658782

- a. 658782
- b. 53266
- c. 36992
- d. 15562

70. Which number is divisible by 19?

897844, 75624, 14123, 69711

a. 75624

b. 897844

c. 14123

d. 69711

71. Simplify:

$$(x + 3)^2 - 5(x + 3)$$

a. $(2x - 3)(x - 2)$

b. $(x + 3)(x - 2)$

c. $(x + 3)(x + 1)$

d. $(x + 3)(x - 2)$

72. Evaluate:

$$mn - ab(m + n) + a^2b^2$$

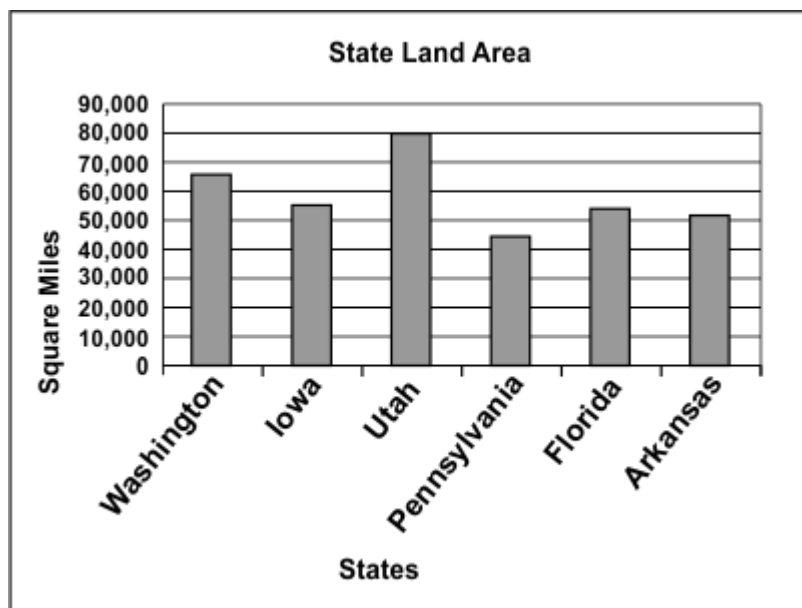
a. $(n - ab)(m - ab)$

b. $(2n - ab)(m - 2ab)$

c. $(3n + ab)(2m + ab)$

d. $(n + ab)(5m - 3ab)$

73. The bar graph below shows the land area, in square miles, for six different states. Which of these states has land area greater than 80,000 square miles?



a. Florida

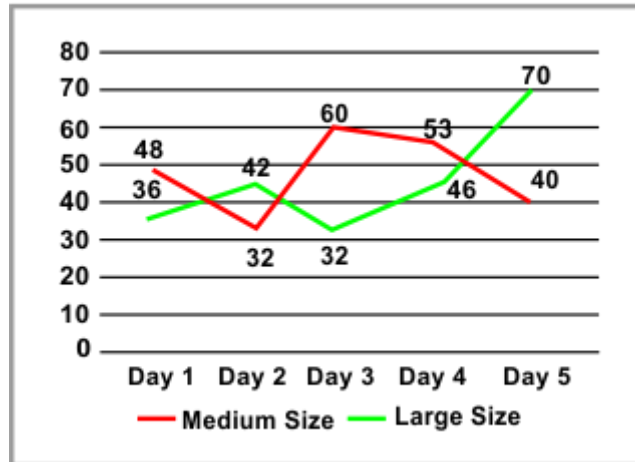
b. Utah

c. Washington

d. Iowa

78. The following line graph shows the sales of boxes of two sizes medium and large on 5 different days by a company ABC. Study the graph carefully and answer the question given below:

How many large size boxes were sold together in all the given days?



- a. 226
b. 232
c. 210
d. 216
79. What will come in place of question mark (?) in the following number series?
2, 6, 14, 30, ?, 126, 254
- a. 61
b. 62
c. 64
d. 67
80. What will come in place of question mark (?) in the following equation? (approx.)
 $2439.97 - 1234.01 + 401.99 = ? + 989.99$
- a. 618
b. 630
c. 650
d. 680

Avance (Each Question is 6 Marks)

81. Solve the question:

$$\frac{-3}{5} + \frac{4}{5} - \frac{4}{5} + \frac{1}{8} - \frac{1}{10}$$

- a. $\frac{-7}{20}$
b. $\frac{7}{20}$
c. $\frac{5}{14}$
d. $\frac{-5}{14}$
82. Find the decimal representation of $\frac{-16}{45}$.
- a. 0.7888.....
b. 0.3555.....
c. 0.78
d. 0.35

Answer Key

1.	b	2.	c	3.	a	4.	a	5.	d	6.	a	7.	a
8.	a	9.	d	10.	c	11.	b	12.	c	13.	a	14.	a
15.	c	16.	d	17.	b	18.	c	19.	a	20.	c	21.	d
22.	c	23.	b	24.	d	25.	a	26.	a	27.	b	28.	b
29.	c	30.	b	31.	a	32.	c	33.	d	34.	c	35.	a
36.	b	37.	d	38.	b	39.	d	40.	a	41.	c	42.	a
43.	b	44.	c	45.	d	46.	b	47.	a	48.	c	49.	d
50.	a	51.	a	52.	d	53.	c	54.	d	55.	a	56.	c
57.	d	58.	b	59.	c	60.	d	61.	c	62.	d	63.	a
64.	b	65.	c	66.	d	67.	b	68.	b	69.	c	70.	d
71.	d	72.	a	73.	b	74.	b	75.	d	76.	a	77.	d
78.	a	79.	b	80.	a	81.	a	82.	b	83.	d	84.	b
85.	b	86.	c	87.	b	88.	c	89.	b	90.	a	91.	d
92.	c	93.	b	94.	b	95.	c	96.	a	97.	c	98.	c
99.	d	100.	a										