



## CREST EduFund Mental Maths Olympiad (CEMMO)

# 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
<b>Grand Total</b>		<b>100</b>		<b>360</b>

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



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

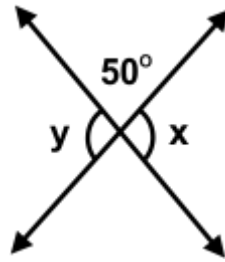
23. Sam invested an amount of \$8000 at a compound interest rate of 8% per annum for a period of three years. How much amount will Sam get after 2 years?

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



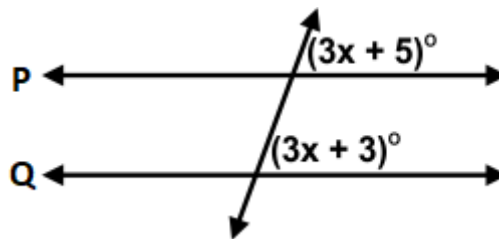


39. In the figure, find the value of  $x + y$ .



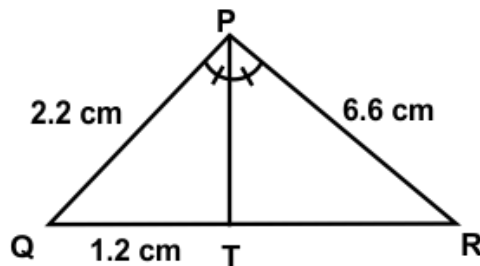
- a.  $210^\circ$
- b.  $240^\circ$
- c.  $230^\circ$
- d.  $260^\circ$

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  $TR$ .

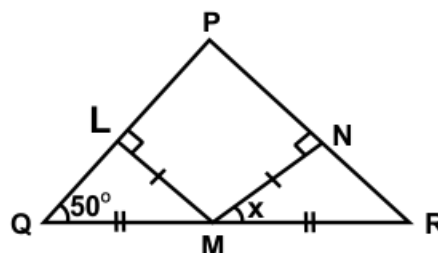


- a. 3.2 cm
- b. 3.1 cm
- c. 3.6 cm
- d. 3.9 cm

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  $x$



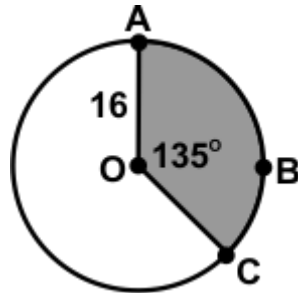
- a.  $35^\circ$
- b.  $40^\circ$
- c.  $55^\circ$
- d.  $60^\circ$





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.  $75\pi$   
b.  $68\pi$   
c.  $59\pi$   
d.  $96\pi$
53. Find the area of a circle whose diameter is 16 cm.
- a.  $142.23 \text{ cm}^2$   
b.  $113.3 \text{ cm}^2$   
c.  $200.96 \text{ cm}^2$   
d.  $336.24 \text{ cm}^2$
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  $792 \text{ cm}^3$ , height of the cylinder is 7 cm. Find the radius.
- a. 8 cm  
b. 12 cm  
c. 10 cm  
d. 9 cm



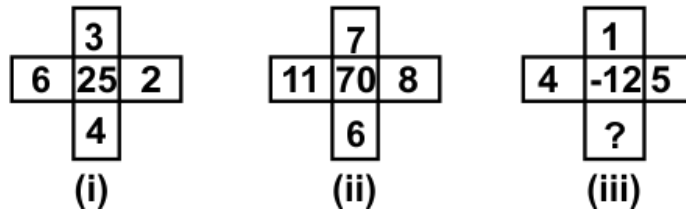
63. Solve:  
 $(0.88 \times 880 \div 8) \times 6 = ?$

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

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

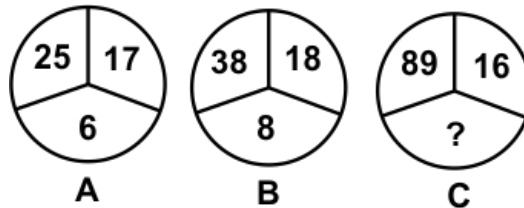
- a. 11  
 b. 17  
 c. 15  
 d. 18

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:

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

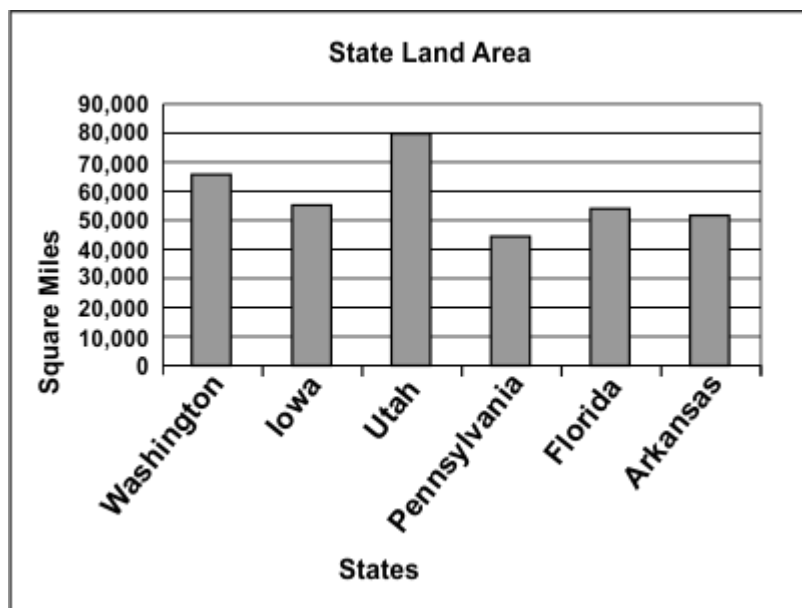
a.  $(n - ab)(m - ab)$

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

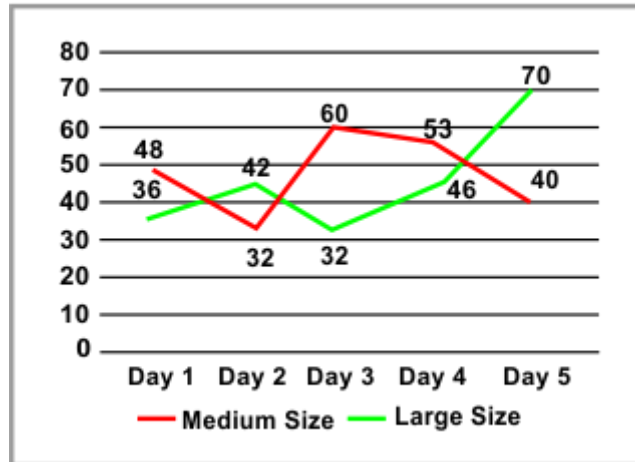
c. Washington

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										