



CREST EduFund Mental Maths Olympiad (CEMMO)

Sample Paper

Pattern and Marking Scheme										
Grade	Topic/Section	No. of Questions	Marks per Question	Total Marks						
Grade 7	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

- a. Integers
- b. Rational number and its properties

Algebra

- a. Algebraic expressions
- b. Simple equations

Square and Square Roots

- a. Square of a number
- b. Square roots
- c. Square roots of decimals

Cube and Cube Roots

- a. Cube of a number
- b. Cube roots

Comparing Quantities

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

Mensuration

- a. Area of Shapes (Trapezium, General quadrilateral & Circle)
- b. Surface area of cube
- c. Surface area of cuboid
- d. Surface area of cylinder
- e. Surface area of cone, etc.
- f. Volume of cube
- g. Volume of cuboid
- h. Volume of cylinder
- i. Volume of cone, etc.

Playing with Numbers

- a. Exponents
- b. Mathematical reasoning
- c. Tests of divisibility
- d. H.C.F and L.C.M
- e. Numbers pattern

Data Handling and Symmetry

- a. Bar graph
- b. Line graph
- c. Symmetry

Geometry

a. Lines and angles

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

Basique (Each Question is 3 Marks)

1.		What is the measurement of the side of a square coffee table that has an area of 196 nches ² ?							
		12 inches 16 inches		14 inches 18 inches					
2.	Wh	nat is the length of one side of a square desl	ktop	with an area of 324 square inches?					
		18 inches 22 inches		20 inches 24 inches					
3.	Wh	nat is the cube root of 729?							
	a. c.		b. d.	8 11					
4.	In a	a certain school, there are 240 boys and 360) gir	ls. What is the ratio of boys to girls?					
		1:3 3:4		2:3 1:2					
5.	After starting to write 24 pages, Ashu completed 25% of his work by evening. How many pages does he still need to write?								
		12 pages 16 pages		14 pages 18 pages					
6.		nat will come in place of question mark (?) in 9, 20, 63, 256, 1285, ?	the	e number series?					
		7345 7716		7456 7834					
7.	Wh	nat is the average of 122, 128, 146, 124, 136	5, 14	42?					
		128 139		133 145					
8.	A c	car is traveling at a speed of 50 km/h. How k	ong	will it take to cover a distance of 400 km?					
		6 hours 8 hours		7 hours 9 hours					

9.	A jeep has wheels of diameter 140 m. How many revolutions can the wheel complete in 40 minutes if the jeep is travelling at a speed of 220 m/s?								
		1200 1400		1300 1500					
10.		wall clock has its minute hand of length 21 cnutes?	m. \	What area will it swept in covering 30					
		678 cm ² 711 cm ²		693 cm ² 727 cm ²					
11.	Sir	mplify: 12 x 12 ² - 3 ²							
	a. c.	136 1687		-1367 1719					
12.	So	lve: $(9 + 4)^2 + 6^5 / 36^2$							
		175 1187		185 1346					
13.	So	lve: 9 ³ x 9 + 11 ⁷ /11 ⁴							
		6860 8142		7892 9273					
14.	14. If the ratio of two numbers A and B is 5 : 6 and their LCM is 480, what is their HCF?								
		12 16		14 18					
15.		he supplement of an angle is equal to three e angle?	time	es its complement, what is the measure o					
		45° 55°		50° 60°					
16.	Fir	nd a rational number between 2/3 and 3/4.							
		87/110 87/120		91/110 91/120					
17.	Fir	nd a rational number between -3/4 and 5/6.							
		6/24 9/29		5/28 2/5					

18. Form an equation:

5 added to twice a number is 135.

a.
$$2x + 135 = 5$$

c.
$$5x + 135 = 2$$

b.
$$2x + 5 = 135$$

d.
$$2x = 5 + 135$$

19. Identify the coefficients of $3x^2$ in the algebraic expression:

$$3x^2 - 2zy$$

b.
$$3x^2$$

20. If x = 3 and y = 5, find $x^2 + y^2$.

21. Find the value of m:

$$24(m + 12) = 144$$

22. John's father's age is 5 years more than three times John's age. Find John's age, if his father is 44 years old.

23. Find: $\sqrt[3]{729}$

24. Solve: (8 x 16)³

c.
$$2^{22}$$

$$c 2^{22}$$

b.
$$2^{23}$$

d.
$$2^{19}$$

25. Solve: (0.3)³

26. Which of the following numbers are not a perfect cube?

27.	So	lve: 11 ³ + (-8 ³)		
		719 619		819 919
28.	Th	e cost of 6 pens is \$72. What would be the o	cost	of 10 such pens?
		\$130 \$140		\$120 \$90
29.		a mixture of 60 L, the ratio of milk and water mixture?	is 7	: 3. How many litres of milk are there in
		20 L 6 L		36 L 42 L
30.	Но	w many boys are there in the class if there a	are 4	40 students and 70% of them are girls?
		12 16		14 10
31.		and B invest in a business in the ratio of 3 : 5 2,000?	5. H	ow much does A invest if B invests
		\$7,550 \$7,000		\$7,200 \$7,050
32.	sha	o people invested \$15000 and \$25000 resp are the profits in the ratio of their investment person get?		· ·
		\$7,500 \$7,600		\$7,550 \$7,450
33.		rain travels a distance of 360 km at a speed ed to travel this distance?	of 6	60 km/h. How much time does the train
		3 hrs 5 hrs		4 hrs 6 hrs
34.	A s	shopkeeper bought a watch for \$40 and sold	it fo	or \$60. What is his profit?
	a. c.	\$62 \$36		\$14 \$20

		\$50 profit \$55 profit		\$10 loss \$40 loss
36.	-	person borrows \$5000 at an interest rate of 7 perest amount?	7 % 1	for 3 years. What would be the simple
		\$1,120 \$1,120		\$1,050 \$1,150
37.	-	rou deposit \$1000 in a savings account that account after 5 years?	pay	s 3% interest per year, how much will be in
		\$1,159.27 \$1,352.20		\$1,623.23 \$1,131.10
38	age	e sum of the present ages of Jack and John es. Four years ago, this ratio was one and a ars.		•
		5 : 4 4 : 5		5:9 9:5
39.		ather is 3 times as old as his son. After 5 ye as his son. Find the present age of the fath		the father will be two and a half times as
		15 45		30 20
40.		amily of 8 persons has food for 26 days. Afterstanding sold last?	er 5	days, 1 person went away. How many
		36 35		24 28
41.		0 persons are needed to excavate a pond in eded if the pond is to be excavated in 20 day		days. How many additional persons are
		50 22		42 34
42.		e average age of 24 men and 1 woman is eccomes 34 years. Find the age of woman who	-	-
		69 59		24 60

35. A shopkeeper bought a book for \$150 and sold it for \$200. What is his profit or loss?

43. Find the missing number in the given pattern:

$$1 + 3 = 31$$

$$4 + 6 = 64$$

$$7 + 9 = 97$$

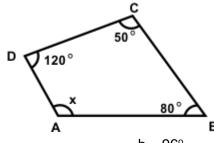
$$10 + 12 = ?$$

44. Find the missing number:

45. If the parallel sides have lengths 5 cm and 9 cm, and the height is 8 cm, the area would be:

46. If the parallel sides have lengths 8 cm and 12 cm, and the height is 5 cm, the area would be:

47. ABCD is a quadrilateral. Find x.



- a. 120°
- c. 120°

- b. 96°
- d. 110°

48. Find the area of an equilateral triangle (approx.) with side length s = 6 cm.

- a. 14 cm²
- c. 16 cm²

- b. 15 cm²
- $d. 18 cm^2$

49. If the surface area of a cube is 150 cm², what is its side length?

- a. 4 cm
- c. 8 cm

- b. 5 cm
- d. 6 cm

- 50. What is the surface area of a cylinder with a height of 7 cm and a diameter of 10 cm?
 - a. 372 cm²

b. 379 cm²

c. 377 cm²

- d. 370 cm²
- 51. What is the surface area of a sphere with a radius of 5 cm (approx.)?
 - a. 312 cm²

b. 318 cm²

c. 314 cm²

- d. 320 cm²
- 52. Find the volume of a hemisphere with a radius of 5 cm (approx.).
 - a. 262 cm³

b. 242 cm³

c. 226 cm³

- d. 224 cm³
- 53. Find the height of the cylinder whose volume is 275 cm³ and base area is 25 cm².
 - a. 15 cm

b. 11 cm

c. 13 cm

- d. 16 cm
- 54. Which two signs should to interchanged to make the equation below true?

$$21 \div 3 \times 2 - 8 + 5 = 8$$

a. - and +

b. x and /

c. / and +

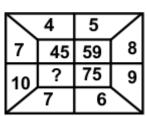
- d. and /
- **55.** If $11 \times 13 \times 15 = 246$, $16 \times 17 \times 18 = 789$, then $22 \times 23 \times 24 = ?$
 - a. 465

b. 432

c. 234

d. 345

56. Find the missing number.



a. 90

b. 91

c. 93

- d. 95
- **57.** Which number is divisible by 11? 82513, 42165, 12547, 34255, 86394
 - a. 12547

b. 86394

c. 82513

- **58.** Which number is divisible by 12? 34452, 32452, 21436, 56596
 - a. 32452

b. 34452

c. 21436

- d. 56596
- **59.** Which of the following pairs are divisible by 8? (3476, 458), (1548, 684), (1656, 456), (2641, 3652)
 - a. (2641, 3652)

b. (1548, 684)

c. (3476, 458)

- d. (1656, 456)
- **60.** At intervals of 2, 4, 6, 8, 10, and 12 seconds, six bells start tolling simultaneously. How many times do they ring in unison in a 30-minute period?
 - a. 13

b. 14

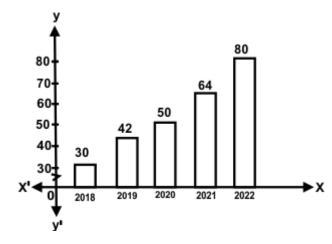
c. 17

- d. 15
- 61. What is the greatest number which divides 639, 1065 and 1491 exactly?
 - a. 214

b. 217

c. 213

- d. 208
- **62.** The bar graph shows the population of a country in various census (in million). In which year there was maximum population?



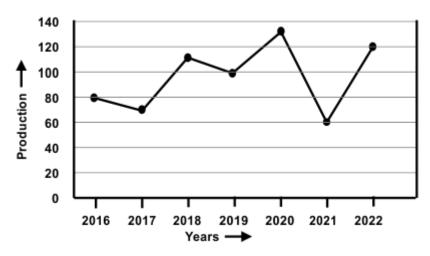
a. 2019

b. 2022

c. 2020

63. The line shows the annual food grain production from 2016 to 2022. Refer to the graph & answer the question based on line graph as given below.

Which year's production, on average, was equivalent to that of 2019 and 2021?



- a. 2016
- c. 2019

- b. 2017
- d. 2018
- **64.** Find the number of lines of symmetry in the given figure.



- a. 2
- c. 4

- b. 3
- d. 1
- **65.** In the given figure, find the order of rotational symmetry.

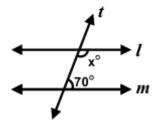


- a. One
- c. Four

- b. Two
- d. Six
- **66.** Two supplementary angles are in the ratio 3 : 7, find the angles.
 - a. 52, 121
 - c. 54, 126

- b. 42, 128
- d. 48, 132

67. I | m and t is a transversal, find x.



- a. 120°
- c. 138°

- b. 124°
- d. 110°

68. Subtract: (-6 x 12 + 13) - (10 x 13 -23)

- a. 166
- c. 107

- b. -166
- d. -59

69. Solve: (-8) * [(-2) + 7] = _____

- a. -16
- c. -20

- b. -72
- d. -40

70. Solve: (-11) * (-47) + (-23) * (-10)

- a. 647
- c. 747

- b. -747
- d. -647

71. Fill in the blank:

- a. -45
- c. 87

- b. 45
- d. -87

72. Solve: 3/7 + (-6/11) + (-8/21) + (5/22)

- a. -135/362
- c. -125/462

- b. 125/362
- d. 135/462

73. Ramsin camera was loaded with a new roll of film. The film can take 36 snaps. During the class picnic, he took 20 pictures. What fraction of the roll can still be used to take snaps?

a. 2/3

b. 5/9

c. 14/5

d. 8/7

74. A designer needs 3/5 th of a metre of cloth to make a fancy dress for children taking part in a dance performance. If 200 children are taking part, how much cloth will the designer need?

a. 180

b. 200

c. 1400

75. Solve:

$$0.3 \times 3\frac{1}{3} =$$

76. Find: (11²) - (9²) + (18²)

77. Find: $(4^2)^2$ - 17*8 + 14²

78. What is the missing digit in $(37)^2 = 136$?

79. Find the square root of 17.64.

80. Find: $\sqrt{1024} - \sqrt{900}$

Avance (Each Question is 6 Marks)

81. The diameter of the driving wheel of a lorry is 95 cm. How many revolution per minute must the wheel make in order to keep a speed of 75 km/h approximately?

82. $(52)^{x-3} = ((5)^3)^{123}$ find value of x.

83. Write the expression for the following:

A man has \$x with him. He gave half to his wife, 1/3rd to his son and rest of \$1500 to his daughter.

a.
$$\frac{x}{3} + \frac{x}{3} + 1500 = \frac{x}{3}$$

b.
$$\frac{x}{3} + \frac{x}{2} + 1500 = \frac{x}{3}$$

c.
$$\frac{x}{2} + \frac{x}{3} + 1500 = x$$

d.
$$\frac{x}{3} + \frac{x}{2} + 1500 = \frac{x}{2}$$

84. What should be added to twice the rational number -7/3 to get 3/7?

a. 21/21

b. 101/21

c. 110/21

d. 107/21

85. Find the cube root of 13824.

a. 22

b. 26

c. 24

d. 23

86. A bicycle travels a distance of 20 km in 1 hour. How long will it take to travel a distance of 80 km at the same speed?

a. 7 hrs

b. 3 hrs

c. 4 hrs

d. 1 hrs

87. If a shirt costs \$30 and is on sale for 20% off, how much does it cost?

a. \$37

b. \$35

c. \$24

d. \$77

88. A book costs \$20 and is on sale for 25% off. How much will the book cost during the sale?

a. \$14

b. \$34

c. \$15

d. \$16

89. What is the compound interest on a principal of \$10,000 at a rate of 8% per annum for 3 years, compounded annually?

a. \$2,199

b. \$2,179.82

c. \$2,590.25

d. \$2,597.12

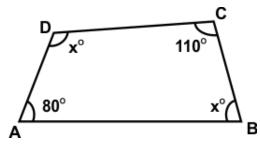
90. The average marks obtained by 125 students in an exam is 29. If the average marks of passed students is 36 and that of failed students is 11. Find the number of failed students.

a. 67

b. 55

c. 96

91. ABCD is a quadrilateral. Find x.



- a. 85°
- c. 105°

- b. 110°
- d. 100°

92. What is the surface area of a cuboid with length 4 cm, width 3 cm, and height 2 cm?

a. 54 cm²

b. 51 cm²

c. 48 cm²

d. 52 cm²

93. A lodge is in the form of a cuboid of measures 60 m x 40 m x 30 m. How many cuboidal boxes can be stored in it if the volume of one box is 0.08 m³?

- a. 60000
- c. 80000

- b. 40000
- d. 90000

94. What would come at the place of "?" in the following figure?

- a. 16
- c. 5

- b. 25
- d. 12

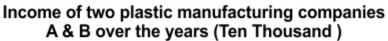
95. What is the least perfect cube, which is divisible by 2, 3, 4 and 6?

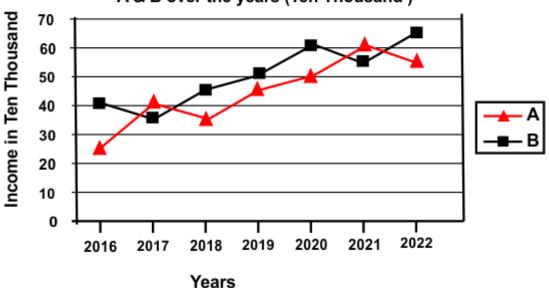
- a. 216
- c. 236

- b. 512
- d. 552

96. Study the graph carefully and answer the question given below (Profit is taken as the % of expenditure.)

What would be the ratio of Company B's 2020 income to that of Company A's 2017 income?





- a. 3:5
- c. 2:3

- b. 4:5
- d. 3:2
- 97. How many lines of symmetry are there in the given figure?
 - a. three

b. two

c. one

- d. none
- 98. Read the histogram and answer the questions.
 - a. What is the number of students in the marks group of 50–60?
 - b. In which group the number of students are maximum?

a.
$$a - 10$$
, $b - 40-50$

b.
$$a - 8$$
, $b - 60-70$

c.
$$a - 8$$
, $b - 10-20$

d.
$$a - 5$$
, $b - 60-70$

- 99. A lift descends into a mine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach -350 m?
 - a. 2 hrs

b. 3 hrs

c. 4 hrs

- d. 1 hr
- **100.** Find the least number that must be subtracted from 5607 so as to get a perfect square.
 - a. 166

b. 156

c. 131

Answer Key

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