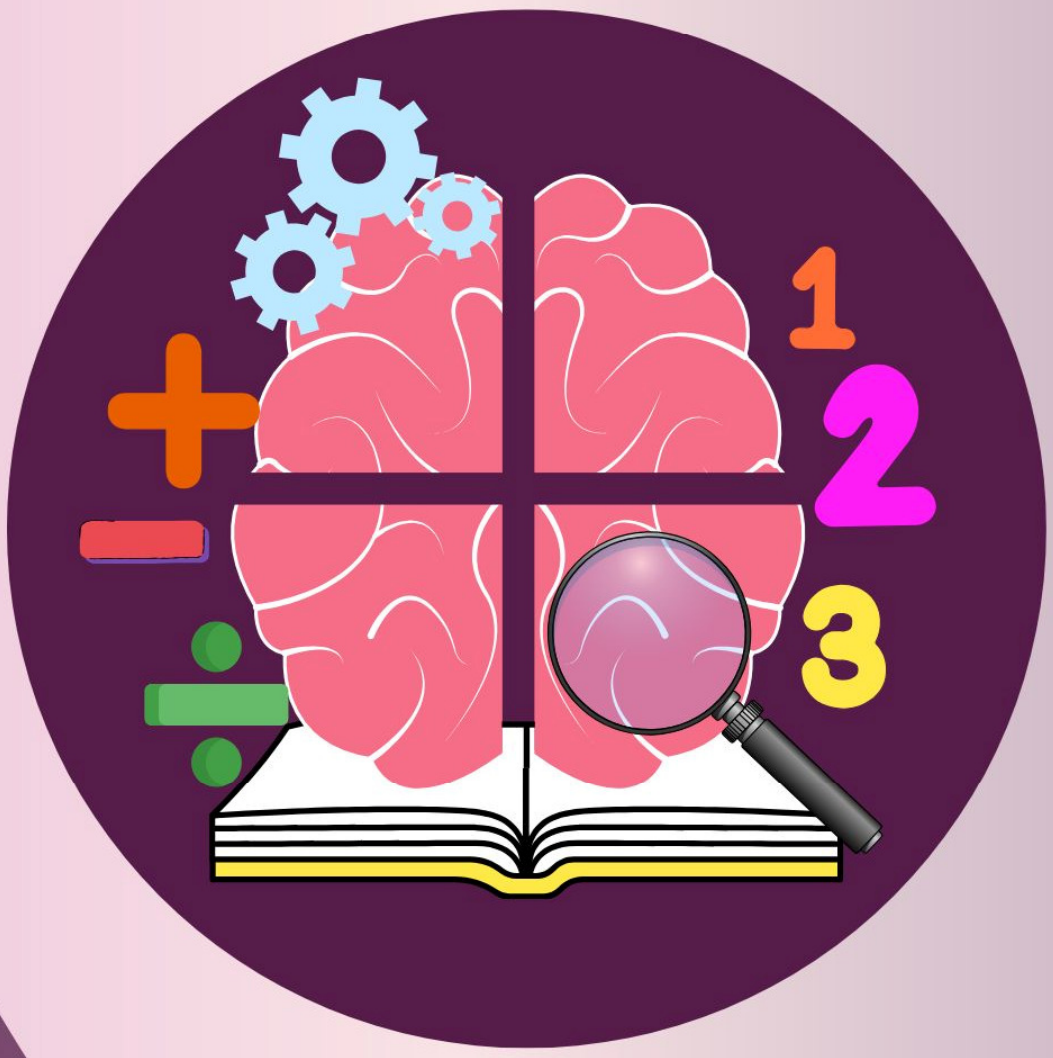
CREST Olympiads

MENTAL MATHS WORKBOOK

7

For the preparation of National & International Competitions



- Chapter-wise practice exercises
- Previous year paper

CREST Mental Maths Olympiad (CMMO)

Mental Maths Competitions

Preparation Book

Grade 7

#CRESTInnovator

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CREST Mental Maths Olympiad (CMMO) Workbook for Grade 7

First Edition

Disclaimer: The information in the Workbook is to give you the path to success but it does not guarantee 100% success as the strategy is completely dependent on its execution.

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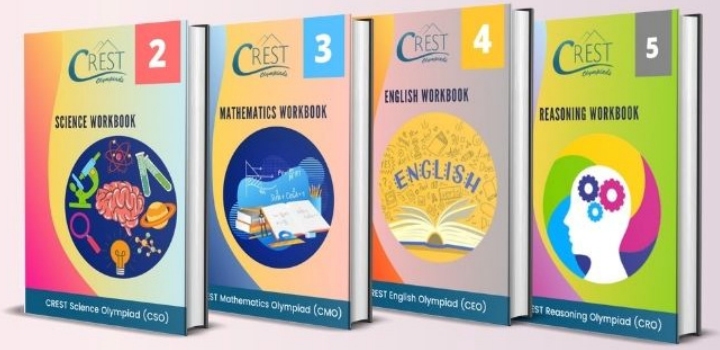

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Preface

We are pleased to launch first edition of this workbook. We welcome feedback from students, teachers, educators and parents. For improvements in the next edition, please send your suggestions at info@crestolympiads.com. Our team will make an effort to work on those suggestions.

CREST Olympiads is one of the largest Olympiad Exams with students from more than 60 countries. The objective of these exams is to build a competitive spirit while evaluating students on conceptual understanding of the concepts.

We strive to provide a superior learning experience, and this workbook is designed to complement the school studies and prepare the students for various competitive exams including the CREST Olympiads. This workbook provides practice questions on the topics. These questions encourage the students to think analytically, to be creative and to come up with solutions of their own. There is a previous year's paper given at the end of this workbook for the students to attempt after completing the syllabus. This paper should be attempted in 1 hour to get an assessment of the student's preparation for the final exam.

Publishers

Chapter 1

Number System

1. A hiker starts a trek at an elevation of 200 m above sea level and climbs up an additional 150 m. After resting, he descends 180 m to explore a cave. What is the hiker's elevation after reaching the cave?

   a. 170 m b. 180 m
   c. 200 m d. 220 m

2. A submarine was navigating at a depth of 300 metres below sea level. It then ascended 120 metres to avoid an obstacle and descended another 150 metres to reach a sunken ship. What was the final depth of the submarine?

   a. 330 metres below sea level
   b. 320 metres below sea level
   c. 310 metres below sea level
   d. 300 metres below sea level

3. In a temperature experiment, the temperature was initially -20°C. It increased by 15°C and then dropped by 5°C. What is the final temperature?

   a. -5°C b. 0°C
   c. -10°C d. 5°C

4. The sum of the digits of a two-digit number is 9. If the digits are reversed, the new number is 27 more than the original number. Find the original number.

   a. 54 b. 45
   c. 63 d. 36

5. If the sum of three consecutive even integers is 30, find the largest of these integers.

   a. 8 b. 12
   c. 14 d. 16

6. Simplify:
   $8 - 2 \times (3 + 1) \div 4$

   a. 2 b. 4
   c. 5 d. 6

7. The sum of two integers is -15. If one of the integers is 8, find the other integer.

   a. -23 b. -20
   c. -18 d. -15

8. Simplify:
   $50 - [5 \times \{6 - 3 \times (2 + 1)\}]$

   a. 50 b. 30
   c. 65 d. 25

9. During a maths contest, a participant earns 5 points for each correct answer and loses 2 points for each incorrect answer. If the participant answered 20 questions correctly and 8 incorrectly, what is the participant's total score?

   a. 70 points b. 76 points
   c. 84 points d. 90 points

10. In a group of 25 students, 18 like to play cricket, 12 like to play football, and 5 like neither. How many students like to play both cricket and football?

    a. 4 b. 6
    c. 8 d. 10

11. You start a game with -100 points, and during the game, you gain 50 points three times. What is your final score?

a. 100 b. -50
c. 0 d. 50

12. The sum of three consecutive numbers is 75. What is the middle number?

a. 20 b. 24
c. 25 d. 26

13. Evaluate: 15725 × 98 + 15725.

a. 15725 x 99 b. 15725 x 100
c. 15724 x 99 d. 15725 x 98

14. A bag contains red and blue marbles, 65 in total. If there are 17 more blue marbles than red ones, how many red marbles are there?

a. 22 b. 24
c. 26 d. 28

15. The difference between the two numbers is 54. Their sum is 70. Find the larger number.

a. 62 b. 65
c. 66 d. 68

16. Multiply the reciprocal of $\frac{1}{3}$ by -9.

a. 27 b. -27
c. 26 d. -26

17. If the total number of wheels in a parking lot (cars and bicycles) is 58 and there are 17 vehicles in total, how many cars are there?

a. 10 b. 5
c. 12 d. 7

18. Three consecutive odd numbers have a sum of 45. What is the smallest number?

a. 16 b. 15
c. 12 d. 13

19. What is the additive inverse of the sum of 20 and -37?

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

20. A number increased by 12 is three times another number decreased by 8. If the sum of the numbers is 40, what are the numbers?

a. 21 and 19 b. 18 and 19
c. 12 and 15 d. 18 and 26

21. Fill in the blank:
(–245) + (123) = (123) + ____.

a. -210 b. 220
c. 250 d. -245

22. Evaluate:
825 × 99 - 825

a. 824 × 98 b. 825 × 98
c. 825 × 99 d. 825 × 100

23. A classroom has 11 more chairs than tables. If there are 27 pieces of furniture (chairs and tables), how many tables are there?

a. 6 tables b. 7 tables
c. 8 tables d. 10 tables

24. Subtract the additive inverse of the product of -7 and 6 from 42.

a. 0 b. 84
c. 48 d. -84

25. The product of three consecutive numbers is 336. Find the numbers.

a. 4, 5, 6 b. 6, 7, 8
c. 5, 6, 7 d. 2, 3, 4

26. The sum of two numbers is 54 and their difference is 6. What are the numbers?

a. 24, 30 b. 28, 22
c. 30, 25 d. 42, 48

27. Fill in the blank:
(55) - (83) = (–83) + ____.

a. 55 b. 138
c. 120 d. 152

28. Multiply the reciprocal of $\frac{2}{7}$ by -14.

a. -20 b. -34
c. -49 d. 44

29. Five consecutive integers add up to 100. What is the smallest integer?

a. 18 b. 19
c. 20 d. 22

30. Evaluate:
1465 × 101 - 1465

a. 1464 × 100 b. 1465 × 100
c. 1465 × 99 d. 1465 × 98

31. There are twice as many chickens as cows on a farm. If there are 72 legs in total, how many cows are there?

a. 9 b. 11
c. 12 d. 14

32. Subtract 3 from a number, then multiply the result by 4. If this equals twice the original number, what is the number?

a. 2 b. 4
c. 5 d. 6

33. Find the additive inverse of the sum of -65 and 18.

a. 42 b. 45
c. 47 d. 58

34. A school has 18 more students than chairs. If there are 312 students, how many chairs are there?

a. 228 b. 229
c. 258 d. 294

35. What is the additive inverse of the product of -9 and 5?

a. 50 b. 55
c. 38 d. 45

36. If a number is increased by 17, it becomes 50. What is the original number?

a. 33 b. 35
c. 38 d. 40

37. Lucy is 24 years younger than Mia. In 4 years, Mia will be twice as old as Lucy will be then. Find Mia's current age.

a. 44 years b. 50 years
c. 54 years d. 58 years

38. Fill in the blank:
370 - 115 = 115 + ____.

a. 130 b. 140
c. 115 d. 155

39. How many more chairs than tables are there if 40 pieces of furniture consist of an equal number of tables and chairs?

a. 0 b. 1
c. 12 d. 15

40. Evaluate: 480 × 99 + 480.

a. 480 x 100 b. 479 x 99
c. 480 x 98 d. 480 x 101

41. Add the additive inverse of 75 to the product of 3 and -8.

a. -101 b. 100
c. -99 d. 95

42. Evaluate:
(15 x 3 - 7) + (22 x 2 + 6)

a. 82 b. 88
c. 85 d. 95

43. Find the sum of the smallest two-digit number and the largest three-digit number.

a. 1009 b. 1001
c. 9910 d. 9999

44. Evaluate:
(9 x 8 - 10) + (14 x 4 + 10)

a. 120 b. 125
c. 128 d. 130

45. Simplify:
(-12 x 3 + 18) + (21 x 3 - 15)

a. 25 b. 30
c. 35 d. 38

46. Calculate the product of the number of days in a week and the highest single-digit number.

a. 24 b. 63
c. 54 d. 100

47. What fraction 20 is of 6.20?

a. $\frac{100}{31}$ b. $\frac{100}{21}$
c. $\frac{52}{33}$ d. $\frac{42}{29}$

48. Simplify:
$\left(\frac{5}{6}+\frac{2}{3}\right)$ x $\left(\frac{4}{9}-\frac{1}{6}\right)$

a. $\frac{5}{12}$ b. $\frac{15}{6}$
c. $\frac{11}{31}$ d. $\frac{1}{15}$

49. What is the rational number between $\frac{2}{7}$ and $\frac{3}{4}$?

a. $\frac{37}{56}$ b. $\frac{33}{37}$
c. $\frac{4}{5}$ d. $\frac{1}{5}$

50. Solve:
$\frac{14}{5}-\frac{3}{7}+\frac{5}{9}$

a. $\frac{922}{315}$ b. $\frac{254}{325}$
c. $\frac{365}{554}$ d. $\frac{645}{225}$

51. What number should be subtracted from 3/4 to get 1/2?

a. $\frac{1}{2}$ b. $\frac{1}{3}$
c. $\frac{1}{4}$ d. $\frac{1}{8}$

52. Solve:
$\left(\frac{7}{12}+\frac{5}{18}\right) \times \left(\frac{2}{3}-\frac{1}{4}\right)$

a. $\frac{125}{658}$ b. $\frac{121}{205}$
c. $\frac{655}{482}$ d. $\frac{155}{432}$

53. What is the additive inverse of $\frac{7}{5}$?

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

54. Divide the sum of $\frac{5}{3}$ and $-\frac{4}{9}$ by the product of $-\frac{3}{4}$ and $-\frac{2}{5}$.

a. $\frac{105}{22}$ b. $\frac{101}{23}$
c. $\frac{110}{27}$ d. $\frac{110}{22}$

55. Simplify: $\frac{4}{9}-\frac{1}{3}+\frac{2}{7}$

a. $\frac{25}{63}$ b. $\frac{22}{61}$
c. $\frac{20}{37}$ d. $\frac{19}{52}$

56. What number should be added to $\frac{2}{3}$ so that we get the rational number $\frac{9}{8}$?

a. $\frac{21}{13}$ b. $\frac{13}{14}$
c. $\frac{11}{24}$ d. $\frac{15}{17}$

57. Solve: $\frac{45}{5}-\frac{28}{7}$

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

58. Which of the following rational numbers lie between $\frac{2}{5}$ and $\frac{3}{4}$?

a. $\frac{13}{20}$ b. $\frac{32}{1}$
c. $\frac{33}{94}$ d. $\frac{35}{41}$

59. What number should be subtracted from $\frac{9}{11}$ to get $\frac{1}{2}$?

a. $\frac{3}{11}$ b. $\frac{4}{15}$
c. $\frac{7}{22}$ d. $\frac{6}{25}$

60. Solve: $\left(\frac{15}{16}+\frac{3}{8}\right) \times \left(\frac{1}{3}+\frac{1}{6}\right)$

a. $\frac{11}{12}$ b. $\frac{13}{15}$
c. $\frac{18}{17}$ d. $\frac{21}{32}$

61. What is the additive inverse of $\frac{45}{12}$?

a. $\frac{45}{12}$ b. $-\frac{45}{12}$
c. $\frac{12}{45}$ d. $-\frac{12}{45}$

62. Solve: $\left(\frac{18}{15}+\frac{1}{3}\right)-\frac{2}{5}$

a. $\frac{17}{15}$ b. $-\frac{15}{21}$
c. $\frac{15}{12}$ d. $-\frac{17}{5}$

63. Find the multiplicative inverse of $\frac{8}{9}$.

a. $\frac{9}{8}$ b. $-\frac{9}{8}$
c. $-\frac{8}{9}$ d. $\frac{8}{9}$

64. Multiply: $\frac{7}{8} \times \frac{1}{14} \times \frac{2}{3}$

a. $\frac{1}{16}$ b. $\frac{1}{24}$
c. $\frac{1}{15}$ d. $\frac{1}{7}$

65. What number should be added to $\frac{5}{6}$ to get 1?

a. $\frac{1}{4}$ b. $\frac{2}{3}$
c. $\frac{1}{6}$ d. $\frac{1}{5}$

66. Solve: $\frac{7}{10}-\left(\frac{2}{5}+\frac{1}{10}\right)$

a. $\frac{2}{5}$ b. $\frac{1}{5}$
c. $\frac{3}{5}$ d. $\frac{4}{7}$

67. A cloth roll of 30 metres is cut into pieces of $\frac{7}{3}$ metres each. How many pieces can be cut and what is the length of the remaining cloth?

a. 12, 2 m
b. 14, 3 m
c. 12, 1 m
d. 14, 2 m

68. An office has $\frac{14}{3}$ boxes of staples, each box weighing $\frac{5}{8}$ kg. What is the total weight of the boxes?

a. 12/25
b. 35/12
c. 18/23
d. 29/12

69. A water tank holds $2\frac{20}{3}$ litres and $\frac{1}{5}$ of it is used. How much water is left?

a. $5\frac{14}{15}$
b. $6\frac{14}{15}$
c. $6\frac{16}{15}$
d. $3\frac{14}{17}$

70. A farmer distributes $\frac{250}{3}$ kg of feed into bags each weighing $\frac{25}{6}$ kg. How many bags were used?

a. 20
b. 25
c. 30
d. 35

71. A group trip costs $6300. If $2\frac{1}{2}$ persons share the cost equally, how much does each person pay?

a. $2500
b. $2520
c. $3250
d. $3458

72. A bookshelf has $\frac{120}{4}$ books, and each book has $\frac{300}{5}$ pages. How many pages are there in total?

a. 1200
b. 1450
c. 1680
d. 1800

73. If a runner completes $\frac{210}{7}$ laps, each lap being $\frac{120}{3}$ m, what is the total distance covered?

a. 800 m
b. 840 m
c. 900 m
d. 1200 m

74. A baker uses $\frac{150}{5}$ kg of flour to make $\frac{60}{2}$ loaves of bread. How much flour is used per loaf?

a. 1 kg
b. 2 kg
c. 1.5 kg
d. 2.5 kg

75. A workshop uses $\frac{160}{8}$ litres of paint to cover $\frac{240}{6}$ square metres. What is the coverage in square metres per litre?

a. 0.5
b. 1
c. 2
d. 2.5

76. If a box contains $\frac{180}{9}$ apples and each apple weighs $\frac{150}{5}$ grams, what is the total weight of the apples?

a. 350 g
b. 480 g
c. 600 g
d. 690 g

77. A baker has 450/6 kg of cake mix. If each cake requires 75/3 kg, how many cakes can be made?

a. 2
b. 4
c. 5
d. 3

78. A cyclist competes in a race of $\frac{420}{7}$ km and finishes in $\frac{140}{2}$ hours. What was his average speed?

a. 1.20 km/h
b. 0.86 km/h
c. 2.351 km/h
d. 3.25 km/h

79. If you buy 3/2 kg of oranges at $4 per kg, how much do you pay?

a. $6 b. $7
c. $7.5 d. $8

80. Divide a rope of $\frac{105}{7}$ metres into pieces each $\frac{15}{5}$ metres long. How many pieces can you make?

a. 3 b. 5
c. 7 d. 8

81. A garden is $\frac{150}{5}$ metres by $\frac{90}{3}$ metres. What is the length of the fence needed to enclose it?

a. 110 m b. 120 m
c. 135 m d. 148 m

82. If a vehicle's tank holds $\frac{80}{2}$ litres and it uses $\frac{15}{3}$ litres per 100 km, how far can it travel on a full tank?

a. 400 km b. 600 km
c. 800 km d. 1000 km

83. Divide the largest four-digit number by the smallest two-digit number and find the remainder.

a. 10 b. 9
c. 1 d. 5

84. If you have $\frac{360}{6}$ dollars and spend $\frac{90}{3}$ dollars on groceries, how much do you have left?

a. $20 b. $25
c. $30 d. $35

85. A field produces $\frac{480}{4}$ bushels of wheat, and each bushel sells for $12. How much revenue is generated?

a. $1100 b. $1250
c. $1350 d. $1440

86. If a tank is filled at a rate of $\frac{150}{5}$ litres per minute and it holds $\frac{900}{3}$ litres, how long will it take to fill?

a. 12 min b. 10 min
c. 15 min d. 16 min

87. A car uses $\frac{20}{3}$ litres of fuel to travel $\frac{120}{2}$ kilometres. What is its fuel efficiency in km per litre?

a. 5 km/L b. 7 km/L
c. 9 km/L d. 10 km/L

88. If a train travels 480 km in 4 hours, what is its average speed?

a. 80 km/h b. 90 km/h
c. 100 km/h d. 120 km/h

89. Sam has $1400. He spends $\frac{1}{5}$ of his money on games and $\frac{1}{1}$ of the remainder on snacks. How much money is left with him?

a. $0 b. $1
c. $5 d. $9

90. The product of two rational numbers is $\frac{25}{4}$. If one of the rational numbers is $\frac{5}{2}$, find the other rational number.

a. $\frac{2}{5}$ b. $\frac{5}{2}$
c. $\frac{6}{7}$ d. $\frac{7}{8}$

91. John had $200. He spent $\frac{1}{5}$ of his money on books and $\frac{1}{4}$ of the remainder on a backpack. How much money is left with him?

a. $80 b. $82
c. $98 d. $120

92. Emily earns $18,000 per month. She spends $\frac{1}{3}$ of her income on rent and $\frac{1}{5}$ of the remainder on utilities. How much money is still left with her?

a. $8450 b. $8960
c. $9600 d. $9820

93. A baker made 240 cakes and each cake sold for $2.50. What was the total revenue?

a. $600 b. $666
c. $845 d. $985

94. Subtract the smallest prime number from the square of the smallest two-digit number.

a. 8 b. 1
c. 94 d. 98

95. Micky has $2100. He spends $\frac{1}{2}$ of his money on games and $\frac{1}{4}$ of the remainder on snacks. How much money is left with him?

a. $485 b. $684
c. $787.50 d. $84.50

96. The product of two rational numbers is $\frac{50}{8}$. If one of the rational numbers is $\frac{5}{2}$, find the other rational number.

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

97. Alex has $4900. He spends $\frac{1}{5}$ of his money on video games and $\frac{1}{4}$ of the remainder on movies. How much money is left with him?

a. $3120 b. $3020
c. $2940 d. $2590

98. Jane has $5200. She spends $\frac{1}{4}$ of her money on clothes and $\frac{1}{3}$ of the remainder on a laptop. How much money is left with her?

a. $2200 b. $2600
c. $2800 d. $3000

99. One litre of petrol costs $\$\frac{250}{5}$. What is the cost of 50 litres of petrol?

a. $2500 b. $2800
c. $3200 d. $3500

100. The product of two rational numbers is $\frac{48}{5}$. If one of the rational numbers is $\frac{66}{7}$, find the other rational number.

a. $\frac{56}{55}$ b. $\frac{52}{57}$
c. $\frac{25}{29}$ d. $\frac{21}{53}$