



CREST Mental Maths Olympiad (CMMO)

Sample Paper

Pattern and Marking Scheme

Grade	Topic/Section	No. of Questions	Marks per Question	Total Marks
Grade 9	Basique	80	1	80
	Avance	20	2	40
Grand Total		100		120

The total duration of the exam is 60 minutes.

Syllabus

Number System

- Integers and rational numbers
- Simplification

Algebra

- Polynomials
- Quadratic equations

Comparing Quantities

- Time and distance
- Simple interest
- Compound interest
- Profit and loss
- Problems on ages
- Time and work
- Boats and streams
- Average and Percentage
- Partnership
- 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 1 Mark)

1. Express 3.14 into mixed fraction.

a. $3\frac{27}{99}$

b. $3\frac{11}{99}$

c. $3\frac{14}{99}$

d. $6\frac{9}{99}$

2. Find the value of $(125)^{2/9}$.

a. $\sqrt[3]{25}$

b. 25

c. $\sqrt{5}$

d. $\sqrt[3]{5}$

3. Find the result of subtracting the sum of all integers between 10 and 20 from the sum of all integers from 10 to 20.

a. 40

b. 46

c. 32

d. 30

4. Express 2.7777..... in the form of p/q.

a. $29/9$

b. $23/9$

c. $25/9$

d. $21/9$

5. Which of the following is a non-terminating decimal?

a. $65/100$

b. $2/9$

c. $32/10$

d. $66/8$

6. What is the decimal representation of $1/3$?

a. 0.3

b. 0.33

c. 0.333

d. $0.\overline{333}$

7. What is the coefficient of x^2 in the polynomial $P(x) = 3x^3 + 10(x - x^2) - 5x^2 - 2$?

a. -14

b. -15

c. -12

d. -19

8. What is the product of Zero's polynomials $(x + 8)(x - 10)$?

a. -80

b. -45

c. -76

d. -95

9. What are the two roots of the equation $(x + 4)(x - 5) = 0$?

a. 4, 5

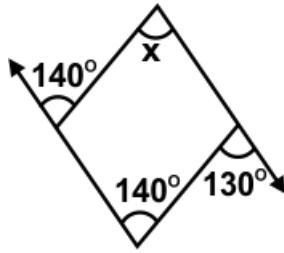
b. 6, 4

c. -4, 5

d. -6, 4

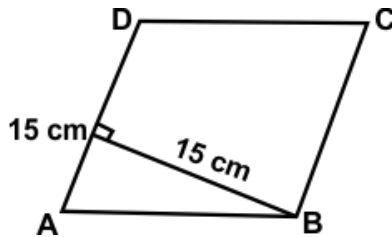
10. Find two values of x which satisfy the quadratic equation $x^2 - 64 = 0$?
- a. 64
c. ± 12
- b. 16
d. ± 8
11. What are the two roots of the equation $(x + 5)^2 - 36 = 0$?
- a. 1, -11
c. -7, 3
- b. 2, 15
d. 8, -9
12. Sum of the two numbers is 273. If first number is $\frac{2}{5}$ of the second number. Find the second number.
- a. 158
c. 187
- b. 195
d. 221
13. A man travelled a certain distance by train at a rate of 15 km/h and walked back at the rate of 12 km/h. The whole journey took 9 hours. Find the distance he travelled.
- a. 60 km
c. 58 km
- b. 40 km
d. 72 km
14. Walking $\frac{4}{5}$ of his usual speed, a man is 16 minutes late. Find the usual time taken by him to cover that distance.
- a. 48 min
c. 64 min
- b. 37 min
d. 84 min
15. A person takes 20 h to travel a certain distance. If his speed is increased by 25%, then what time will he take to travel the same distance?
- a. 20 hrs
c. 11 hrs
- b. 16 hrs
d. 18 hrs
16. A sum of money becomes four times in 20 years at simple interest. Find the rate of interest.
- a. 22%
c. 15%
- b. 23%
d. 8%
17. A sum of \$7700 is lent out in two parts in such a way that the interest on one part at 20% for 5 years is equal to that on another part at 9% for 6 years. Find the second part of the sum.
- a. \$5,000
c. \$5,689
- b. \$2,349
d. \$4,698
18. If the cost price of an article is \$300 and the per cent markup is 30%. What is the marked price?
- a. \$470
c. \$380
- b. \$390
d. \$420

40. Find x in the given figure:



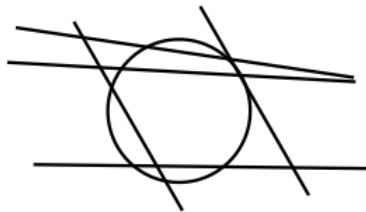
- a. 130°
- b. 135°
- c. 142°
- d. 145°

41. In the figure given below, find the area of the parallelogram.



- a. 245 cm^2
- b. 212 cm^2
- c. 225 cm^2
- d. 255 cm^2

42. How many tangents are there in all in this figure?



- a. 2
- b. 0
- c. 4
- d. 1

43. What is the type of angle formed in a Minor segment of a circle?

- a. Straight angle
- b. Complete angle
- c. Obtuse angle
- d. Right angle

44. If a square is inscribed in a circle, find the ratio of the area of the circle and the square.

- a. $\pi : 2$
- b. $\pi : 1$
- c. $2 : 1$
- d. $2 : 5$

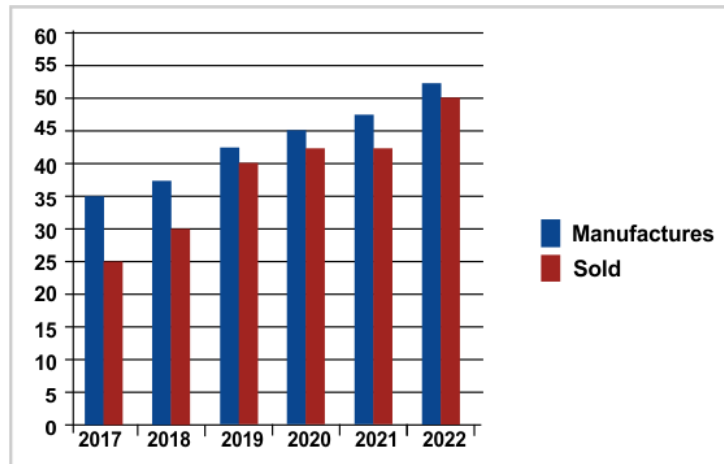
45. If $a = 12\text{ cm}$, $b = 13\text{ cm}$, $c = 15\text{ cm}$, what is the semi-perimeter of the triangle?

- a. 16 cm
- b. 22 cm
- c. 26 cm
- d. 20 cm

69. Study the graph carefully and answer the question.

The bar graph gives the number of products manufactured and sold by a company over the years (in thousands).

What is the difference in the number of products sold by the company in the year 2022 and 2017?

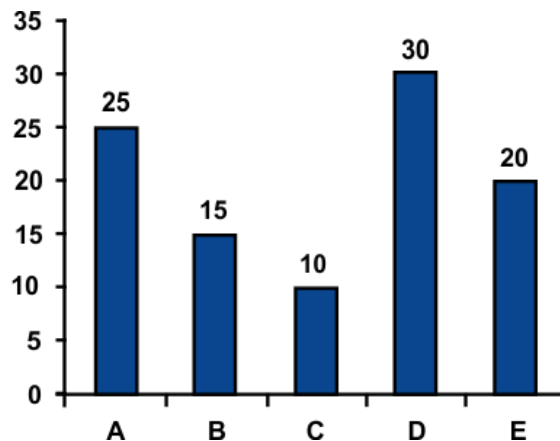


- a. 26000
- c. 35500

- b. 25000
- d. 15000

70. The graph shows the percentage break-up of sales of units of different products in 2018.

Find out the difference between the product A and C together and product B and D together?



- a. 10
- c. 15

- b. 30
- d. 25

a. $45\frac{4}{7}$ marks

b. $37\frac{6}{13}$ marks

c. $63\frac{3}{4}$ marks

d. $83\frac{7}{9}$ marks

79. Solve:

$$(16 \times 64) + 3^3$$

a. 994

b. 1001

c. 1051

d. 1130

80. Factorise:

$$(x^2 - x)^2 - 8(x^2 - x) + 12$$

a. $(x - 1)(x - 2)(x + 1)(x + 2)$

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

c. $(x - 1)(x - 2)(x - 3)(x - 2)$

d. $(x + 1)(x - 2)(x - 3)(x + 2)$

Avance (Each Question is 2 Marks)

81. What is the value of $(625)^{0.24} \times (625)^{0.01}$?

a. 4

b. 5

c. 25

d. 16

82. Write the decimal expansion of the following number which have terminating decimal expansion:

$$\frac{8}{5}$$

a. 1.6

b. 1.2657

c. 1.676767.....

d. 1.868686.....

83. Solve the following equation.

$$x + 2 = \frac{2x-8}{x+5} - \frac{5x+9}{x+5}$$

a. $x^2 + 7x + 10 = 0$

b. $x^2 + 10x + 27 = 0$

c. $x^2 + 7x + 4x + 10 = 0$

d. $3x^2 + 3x + 17 = 0$

84. Robert invested an amount of \$10000 at compound interest rate of 10% per annum for a period of three years. How much amount will Robert get after 3 years?

a. \$12,709

b. \$46,912

c. \$15,498

d. \$13,310

85. The cost of an article including the sales tax is \$616. The rate of sales tax is 10%, if the shopkeeper has made a profit of 12%, then find the cost price of the article.

a. \$128

b. \$400

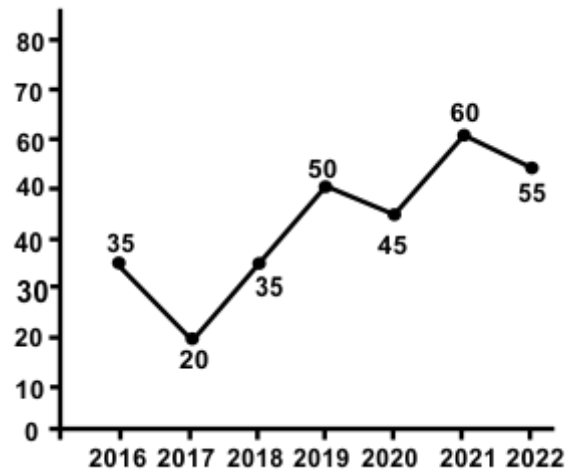
c. \$880

d. \$500

99. The graph shows the percentage net profit of a certain company during the given period.

Study it carefully and answer the question.

During which years the ratio of percentage net profit earned to that in the previous year was the minimum?



- a. 2017
b. 2022
c. 2019
d. 2020

100. Factorise:

$$x^4 - 2x^2y^2 + y^4$$

- a. $(y)(x + y)(x + y)(2x)$
b. $(2x + y)(x - y)(x + y)(2x)$
c. $(2x + y)(x + y)(x - y)(2x - y)$
d. $(x - y)(x + y)(x - y)(x + y)$

Answer Key

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