



CREST EduFund Mental Maths Olympiad (CEMMO)

Sample Paper

Pattern and Marking Scheme

Grade	Topic/Section	No. of Questions	Marks per Question	Total Marks
Grade 10	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

- 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

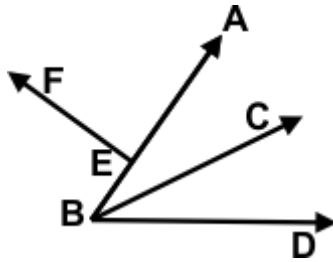
For more details, visit <https://www.crestolympiads.com/mental-maths-mmo>

Basique (Each Question is 3 Marks)

- What is the product of $(\sqrt{7} + \sqrt{5})$ and $(\sqrt{7} - \sqrt{5})$?
 - $\sqrt{5}$
 - $\sqrt{7} - \sqrt{5}$
 - 4
 - 2
- Solve:
 $\sqrt{5} \times \sqrt{7} \times \sqrt{15} \times \sqrt{21}$
 - 110
 - 105
 - 90
 - 80
- What is the product of two consecutive natural numbers?
 - Even number
 - Prime number
 - Divisible by 3
 - Odd number
- Find:
 $16 + \frac{8}{4} - 2 \times 3$
 - 15
 - 13
 - 12
 - 11
- If $\sqrt{3} = 1.732$, what is the value of $\frac{2}{\sqrt{3}}$?
 - 1.441
 - 1.154
 - 4.241
 - 3.532
- Express $\frac{4}{\sqrt{5}-1}$ with a rational denominator.
 - $\sqrt{2} + 1$
 - $\sqrt{3} + 2$
 - $\sqrt{7}$
 - $\sqrt{5} + 1$
- What should be subtracted from $(x + y)^2$ to get $(x^2 + y^2)$?
 - $2xy$
 - $5xy$
 - xy
 - $3xy$
- What is the value of the polynomial $-4x^2 + 7x - 5$, when $x = -3$?
 - 34
 - 41
 - 62
 - 54

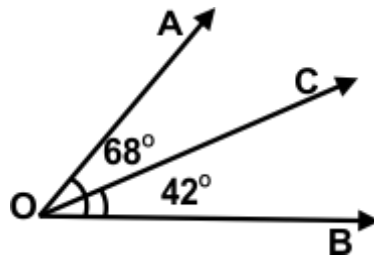
9. What is the degree of the polynomial $(y^3 - 2)(y^2 + 11)$?
- a. 4
b. 9
c. 7
d. 5
10. If father is twice as old as his son and 29 years older than his son. What is the age of father?
- a. 47 years
b. 35 years
c. 58 years
d. 66 years
11. Simplify:
 $(x + 7)^2 - (x - 7)^2$
- a. $16x$
b. $4x^2$
c. $x - 7$
d. $28x$
12. Find the roots of the given equation:
 $x^2 + 5x + 6 = 0$
- a. -5, 6
b. 3, 7
c. -3, -2
d. 5, 2
13. A person covers a certain distance at a speed of 60 km/h and returns to the starting point at a speed of 40 km/h. Find the average speed of the person for the whole journey.
- a. 42 km/h
b. 46 km/h
c. 48 km/h
d. 44 km/h
14. Travelling at $\frac{4}{7}$ of his usual speed, a man gets late by 9 min. What time does he take when he travels at his usual speed?
- a. 8 min
b. 12 min
c. 4 min
d. 10 min
15. A 100 m long train passes a platform which is 200 m long. Find the distance covered by the train in passing the platform.
- a. 350 m
b. 250 m
c. 218 m
d. 300 m
16. A sum of money doubles itself in 10 years at simple interest. What is the rate of interest?
- a. 10%
b. 15%
c. 12%
d. 18%

34. Identify the two pairs of adjacent angles given in the adjoining figure:



- a. $\angle ABC$ and $\angle DBC$; $\angle BEF$ and $\angle AEF$ b. $\angle CBA$ and $\angle DBC$; $\angle BEF$ and $\angle AFB$
 c. $\angle FEC$ and $\angle ABC$; $\angle BEF$ and $\angle CBA$ d. $\angle BCF$ and $\angle DBC$; $\angle BEF$ and $\angle FAD$

35. In the figure, find $\angle AOC$ if $\angle AOB = 68^\circ$ and $\angle BOC = 42^\circ$.

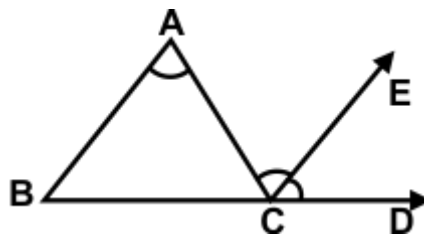


- a. 18° b. 26°
 c. 39° d. 44°

36. The angle between the two blades of scissors is 194° . What type of angle is it?

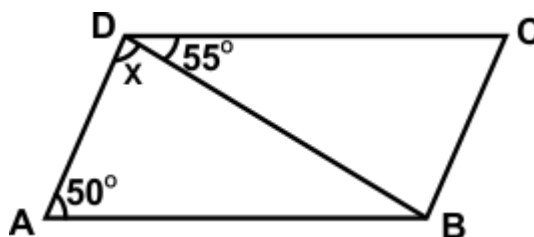
- a. Straight angle b. Reflex angle
 c. Obtuse angle d. Complete angle

37. If CE is the bisector of $\angle ACD$ and $CE \parallel BA$ and $\angle ACD = 130^\circ$. Then find $\angle BAC$.



- a. 55° b. 65°
 c. 75° d. 70°

38. In the figure, find x if $BC = AD$ and $AB = CD$.



- a. 70° b. 55°
 c. 65° d. 75°

74. Find the probability of getting even number between 10 to 25.

a. $\frac{245}{600}$

b. $\frac{183}{100}$

c. $\frac{632}{200}$

d. $\frac{361}{400}$

75. If the probability of winning a game is 0.7, what is the probability of losing it?

a. 0.6

b. 0.3

c. 0.2

d. 0.7

76. In class X total students were 36. Out of which 20 students are boys. Find the probability of girls in the class.

a. $\frac{2}{5}$

b. $\frac{6}{3}$

c. $\frac{4}{9}$

d. $\frac{3}{8}$

77. Solve:

$$(4^2 \times 4^3)^2 \div 2^8$$

a. 4^3

b. 4^4

c. 4^5

d. 4^6

78. Factorise:

$$6x^2 - 5xy - 6y^2$$

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

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

c. $(2x - 3y)(3x + 2y)$

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

79. Study the table graph and answer the question:

The Gross turnover for 2018 - 19 is about what percent of the gross turnover for 2020 - 21?

Financial Statement of a Company Over the Years(million)					
Year	Gross Turnover \$	Profit before interest and depreciation	Interest \$	Depreciation \$	Net Profit \$
2016-17	1380.00	380.92	300.25	69.90	10.67
2017-18	1401.00	404.98	315.40	71.12	18.46
2018-19	1540.00	520.03	390.85	80.02	49.16
2019-20	2112.00	599.01	444.44	88.88	65.69
2020-21	2520.00	811.00	505.42	91.91	212.78
2021-22	2758.99	920.00	600.20	99.00	220.80

a. 163%

b. 61%

c. 0.61%

d. 39%

86. A boat travels a distance of 25 km upstream in 5 h. If the speed of the boat in still water is 6 km/h, then find the speed of stream.

- a. 2 km/h
 b. 1 km/h
 c. 4 km/h
 d. 6 km/h

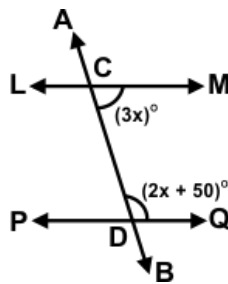
87. A began a business with \$400 and was joined afterwards by B with \$300. When did B join if the profits at the end of the year were divided in the ratio 2 : 1?

- a. 8
 b. 7
 c. 9
 d. 6

88. Jack bought an article with 20% discount on the labelled price. He sold the article with 30% profit on the labelled price. What was his per cent profit on the price he bought?

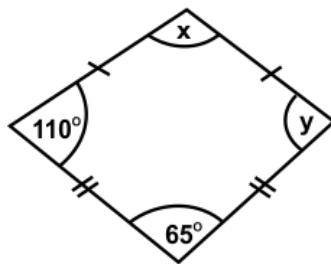
- a. 52.50%
 b. 66.50%
 c. 56.50%
 d. 62.50%

89. In the given figure, LM and PQ are parallel to each other and AB is the transversal. If $\angle MCD = (3x)^\circ$ and $\angle QDC = (2x + 50)^\circ$, then what is the value of x?



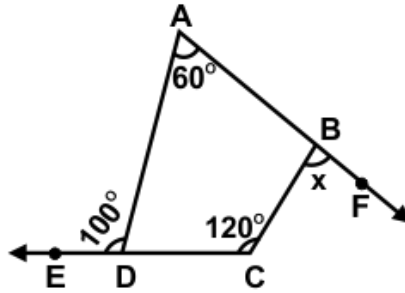
- a. 36
 b. 46
 c. 26
 d. 40

90. In the given figure, find x and y.



- a. $x = 65^\circ, y = 110^\circ$
 b. $x = 75^\circ, y = 110^\circ$
 c. $x = 75^\circ, y = 135^\circ$
 d. $x = 45^\circ, y = 90^\circ$

91. In the given figure, sides AB and CD of the quadrilateral ABCD are produced. Find the value of x.



- a. 80°
b. 120°
c. 60°
d. 90°
92. Find the area of a triangle whose sides are 50 m, 78 m, 112 m respectively.
- a. 1680 m^2
b. 2175 m^2
c. 1587 m^2
d. 2380 m^2
93. Find the weight of a lead pipe 3.5 cm long if the external diameter is 2.4 cm, the thickness of the lead is 2 mm and 1 cm^3 of lead weighs 11.4 g.
- a. 127.32 g
b. 115.36 g
c. 167.34 g
d. 135.2 g
94. Angles of elevation of top and bottom of a flag kept on a flag post at 30 m distance are 45° and 30° respectively. What is the height of the flag?
- a. 11.42 m
b. 8.34 m
c. 14.32 m
d. 12.68 m
95. Which number is divisible by 19?
857676, 19721246, 875879, 4565759
- a. 4565759
b. 857676
c. 875879
d. 19721246
96. What is the mean of first 12 prime numbers?
- a. 14.83
b. 15.63
c. 16.41
d. 17.20
97. Evaluate:
 $(125 \div 625) + 110$
- a. 90
b. 94.3
c. 103.6
d. 110.2

Answer Key

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