CREST Mental Maths Olympiad (CMMO)

Previous Year Paper

Class 9

Time Allowed: 60 minutes **Maximum Marks: 120**

- There are a total of **100 questions** in this booklet comprising **2 sections** namely the **Basique and Avance** consisting of **80 questions (1 mark each) & 20 questions (2 marks each),** respectively.
- There is **only ONE correct option** to a given question.
- No candidate is allowed to carry any textual material, printed or written, bits of paper, any electronic device, etc. inside the examination hall.
- The use of unfair means may result in the cancellation of the exam. Any such instances may be reported at **+91-98182-94134** or **info@crestolympiads.com**

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

FILL IN THE DETAILS

Candidate Name: _____

Class: _____Section: _____

CREST ID:_____

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
b. 16
c. ±12
d. ±8

11. What are the two roots of the equation $(x + 5)^2 - 36 = 0$?

a. 1, -11
b. 2, 15
c. -7, 3
d. 8, -9

12. Sum of the two numbers is 273. If first number is 2/5 of the second number. Find the second number.

a. 158
b. 195
c. 187
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
b. 40 km
c. 58 km
d. 72 km

14. Walking 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
b. 37 min
c. 64 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
b. 16 hrs
c. 11 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%
b. 23%
c. 15%
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
b. $2,349
c. $5,689
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
b. $390
c. $380
d. $420

19. A shopkeeper expects a profit of 50% on his cost price. In a week, his sale was $15000. What was his profit?

a. $5,000
b. $15,000
c. $6,870
d. $9,790

20. Five years ago, the average age of P and Q was 15 years. Now, average age of P, Q and R is 20 years. What would be the age of R after 10 years?

a. 20 years
b. 30 years
c. 15 years
d. 45 years

21. Jack is 15 years elder than Richard. If 5 years ago, Jack was 3 times as old as Richard, then find Jack's present age.

a. 30 years
b. 25 years
c. 20 years
d. 10 years

22. The ratio of the present ages of Peter and Tom is 8 : 7. Five years ago, the ratio of their ages was 3 : 2. Find the present age of Peter.

a. 8 years
b. 9 years
c. 11 years
d. 16 years

23. Two pipes can fill a tank in 18 min and 24 min, respectively. Both are opened simultaneously. After how many minutes should the first pipe be closed so that the tank becomes full in 16 min?

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

24. Either 8 men or 17 women can paint a wall in 33 days. Find the number of days required to paint three such walls by 12 men and 24 women working at the same rate.

a. 21 days
b. 18 days
c. 34 days
d. 27 days

25. A man rows with a speed of 8 km/h in still water. Find the downstream, if the speed of the stream is 4 km/h.

a. 16 km/h
b. 18 km/h
c. 14 km/h
d. 12 km/h

26. A boat can cover 48 km downstream in 3 h. It can cover 40 km upstream in 4 h. What is the speed of the boat in still water (in km/h)?

a. 13 km/h
b. 15 km/h
c. 14 km/h
d. 12 km/h

27. A fruit seller bought a basket containing 2050 oranges out of which 41 oranges were rotten. What percentage of oranges were rotten?

a. 6%
b. 7%
c. 2%
d. 3%

28. The population of the town is 352800. If it increases at the rate of 5% per annum, then what will be its population for 2 years hence? Also, find the population 2 years ago.

a. 336757
b. 388962
c. 367565
d. 347688

29. In a school, the average age of students is 6 years, and the average age of 12 teachers is 40 years. If the average age of the combined group of all the teachers and students is 7 years, then the number of students is:

a. 153
b. 323
c. 214
d. 396

30. Rexon and Sam started a business initially with $14200 and $15600, respectively. If total profits at the end of year are $74500, what is Rexon's share in the profit?

a. $35,500
b. $28,800
c. $21,980
d. $38,920

31. A starts a business with $24,000/- and later B joins him with $48,000. After how many months did B join if the profit is distributed in an equal ratio?

a. 5
b. 4
c. 6
d. 8

32. A shopkeeper marks his goods 20% above C.P. but allows a 30% discount for cash. What is his net loss?

a. 20%
b. 17%
c. 13%
d. 16%

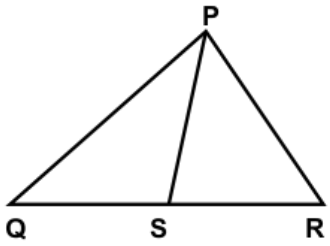
33. A single discount, equivalent to a successive discount of 40% and 30% is:

a. 37%
b. 58%
c. 52%
d. 38%

34. What is the measure of the angle if its supplementary angle measures 98^o?

a. 82^o
b. 78^o
c. 88^o
d. 98^o

35. In a ΔPQR, PS = SR = SQ and ∠PRS = 55°. Find ∠SQP.

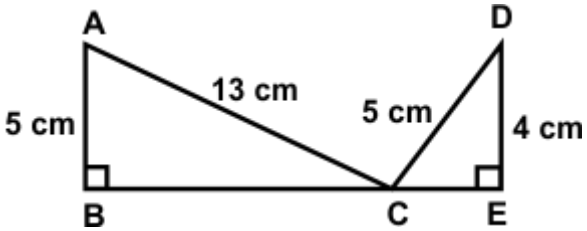


a. 25º
b. 55º
c. 35º
d. 45º

36. Angles of a linear pair are in the ratio 8 : 1. What is the degree of measure of both angles?

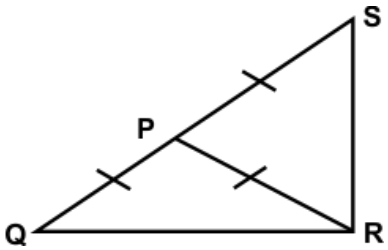
a. 90º and 230º
b. 160º and 20º
c. 80º and 40º
d. 110º and 40º

37. ΔABC and ΔDEC are the right triangles with ∠B = ∠E = 90°, find BE.



a. 20 cm
b. 18 cm
c. 11 cm
d. 15 cm

38. In the given figure, PQ = PR = PS. Find ∠QRS.

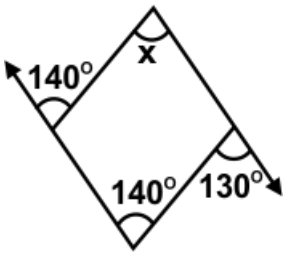


a. 49º
b. 90º
c. 76º
d. 110º

39. An equilateral triangle is cut up into smaller equilateral triangles with sides 1/6 of the original. Find the number of triangles thus formed.

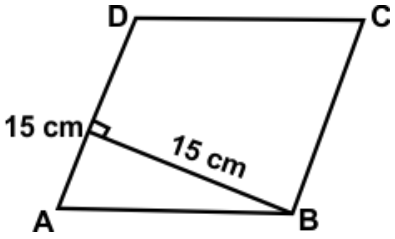
a. 43
b. 29
c. 36
d. 20

40. Find x in the given figure:



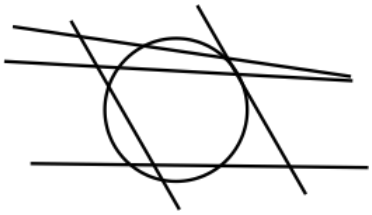
a. 130°
b. 135°
c. 142°
d. 145°

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. π : 2
b. π : 1
c. 2 : 1
d. 2 : 5

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

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

46. Find the area of a triangle whose two sides are 16 cm and 12 cm respectively and the perimeter is 42 cm.

a. $21\sqrt{5}$
b. $7\sqrt{21}$
c. $21\sqrt{15}$
d. $7\sqrt{3}$

47. A bicycle wheel makes 10 revolutions in moving 880 m. Find the diameter of the wheel. ($\pi = 22/7$)

a. 32 cm
b. 36 cm
c. 40 cm
d. 28 cm

48. Two-circle touch internally. The sum of their area is 116π cm^2 and distance between their centre is 6 cm. Then, what are the radii of the circles?

a. 10 cm, 4 cm
b. 15 cm, 6 cm
c. 12 cm, 8 cm
d. 16 cm, 6 cm

49. What will be the area of a circle with a circumference equal to 88 cm?

a. 512 cm^2
b. 622 cm^2
c. 616 cm^2
d. 578 cm^2

50. What will be the volume of tank whose length is 10 m, breadth 8 m and height 6 m?

a. 540 m^3
b. 480 m^3
c. 370 m^3
d. 520 m^3

51. An underground water tank is in the shape of a cube of side 7 m. What will be its volume?

a. 343 m^3
b. 535 m^3
c. 245 m^3
d. 143 m^3

52. What is the number of solid spheres of radius 1/2 cm, which may be formed from a solid sphere of radius 2 cm?

a. 45
b. 56
c. 34
d. 64

53. The base radius of a cylinder is 20 cm and its height is 10 cm. Find its curved surface area in cm^2.

a. 1180 cm^2
b. 1280 cm^2
c. 1260 cm^2
d. 1200 cm^2

54. Find curved and total surface area of a conical flask of radius 6 cm and height 8 cm.

a. 60π, 96π
b. 86π, 66π
c. 47π, 53π
d. 37π, 76π

55. The angle of elevation of the top of a tower from a point on the ground, which is 60 m away from the foot of the tower, is 30°. Find the height of the tower.

a. $10\sqrt{3}$
b. $60\sqrt{3}$
c. $2\sqrt{3}$
d. $20\sqrt{3}$

56. An observer 1.5 m tall is 37.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is 45^{o}. What is the height of the chimney?

a. 39 m
b. 32 m
c. 28 m
d. 31 m

57. Find the next number in the sequence:
1, 1, 2, 3, 5, 8, 13, ?

a. 15
b. 17
c. 19
d. 21

58. Solve: 3/5th of 24% of 500 – 32 = ?

a. 38
b. 40
c. 64
d. 48

59. Solve:
1601 × 198 ÷ 49 – 1399 + 3878 = ?

a. 6000
b. 8700
c. 8900
d. 4700

60. Solve:
2 × 256 × ? = 82 × 102 × 2

a. 25
b. 43
c. 65
d. 37

61. How many such vowels are there in the below arrangement each of which is immediately preceded by a consonant and immediately followed by a number?
P % R 1 5 H * M T E 3 B $ V N 4 K A 8 W I 6 2 G # U H 7 J Q 11 L Y

a. 2
b. 3
c. 1
d. 4

62. Which of the following digit will be sixth to the left of tenth from the right end?
1 1 2 5 4 7 2 8 4 5 7 1 9 6 5 2 4 1 4 5 8 2 4 3 9 7 6 9 4 2 9

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

63. If in each number, first and last digits are interchanged, which of the following will be the highest number?
147 831 389 425 598

a. 425
b. 598
c. 831
d. 389

64. Which number is divisible by 18?
383893, 238768, 926568, 273638

a. 273638
b. 238768
c. 926568
d. 383893

65. If the number 87215X6 is completely divisible by 11, then the smallest whole number in place of X.

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

66. Which number is divisible by 17?
665213, 324256, 648723, 957508

a. 957508
b. 648723
c. 324256
d. 665213

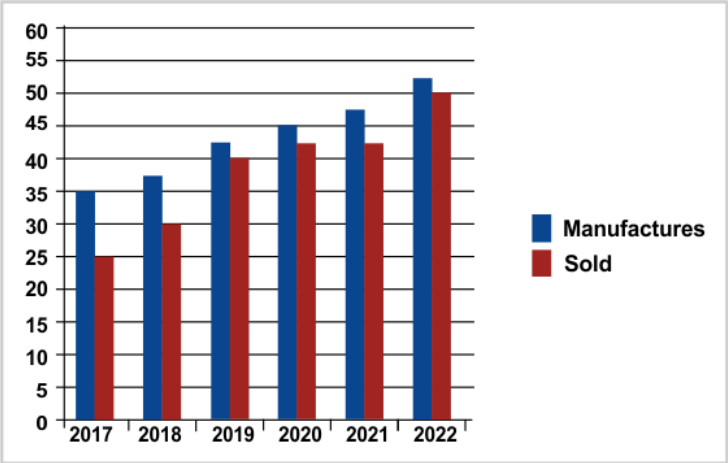
67. What is the mean of the test score for a class of students whose scores are 86, 94, 70, 81, 92, 74, 75, 89, 76 and 97?

a. 83.4
b. 84.6
c. 86
d. 86.4

68. What is the value of x, if the median of the following data is 27.5?
24, 25, 26, x + 2, x + 3, 30, 33, 37

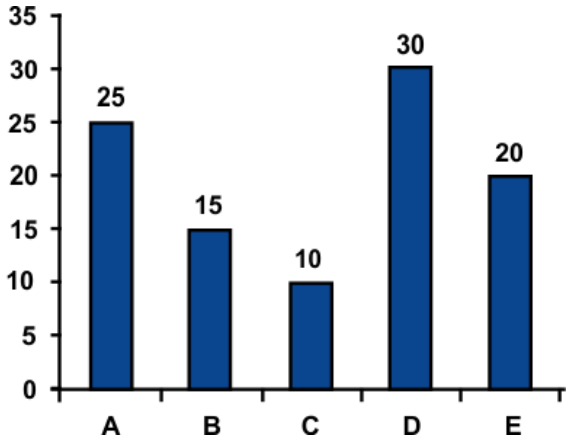
a. 23
b. 25
c. 27
d. 29

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?



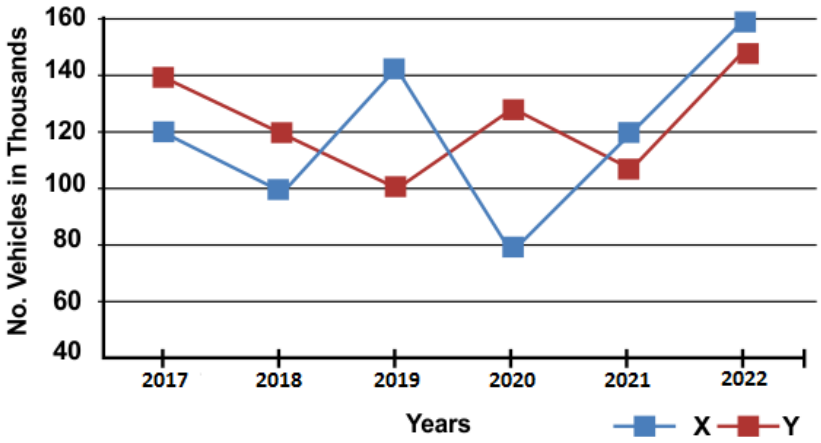
a. 26000
b. 25000
c. 35500
d. 15000

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?



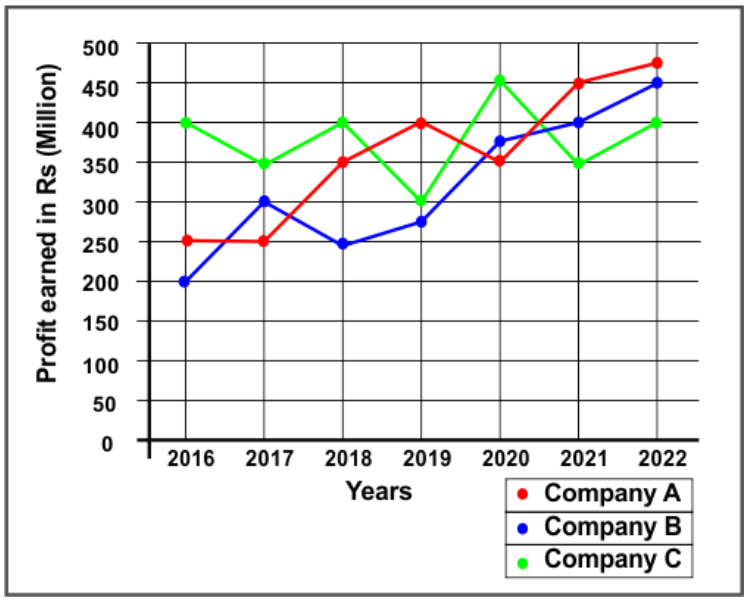
a. 10
b. 30
c. 15
d. 25

71. Study the line graph and find the number of vehicles manufactured by company X in 2022.



a. 120000
b. 140000
c. 160000
d. 100000

72. The graph below shows the profit earned by three companies over the years (in $10 million) What was the average profit earned by all three companies in the year 2021?



a. $4 billion
b. $3 billion
c. $2 billion
d. $8 billion

73. A coin is tossed twice. Find the probability of getting both tails.

a. 1/3
b. 1/2
c. 1/4
d. 3/5

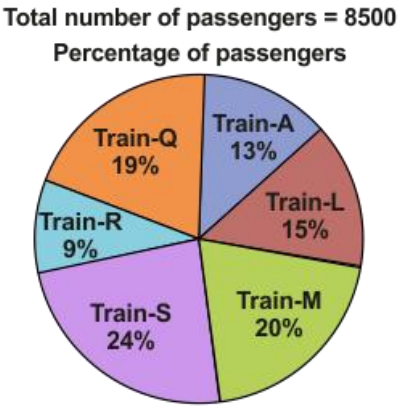
74. A coin is tossed once, find the probability of getting 'Head'.

a. 2/4
b. 4/6
c. 1/4
d. 1/2

75. In a pack of 52 cards, what is the probability of getting a face card?

a. 4/13
b. 4/9
c. 3/13
d. 3/8

76. Study the pie-chart carefully to answer the question:
What was the approximate average number of passengers in Train-S, Train-M and Train-L together?



a. 1467
b. 1671
c. 1355
d. 1456

77. Study the following table to answer the given question?
In City E, a number of Specialist officers is approximately what percent of that officer?

Center/Post	Officer	Clerk	Field Officer	Supervisor	Specialist
City A	2000	5000	50	2050	750
City B	15000	17000	160	11000	750
City C	17000	19500	70	7000	900
City D	3500	20000	300	90000	1150
City E	14900	17650	70	1300	1200
City F	11360	15300	30	1500	650
City G	9000	11000	95	1650	500

a. 8%
b. 7%
c. 4%
d. 2%

78. A class consists of 4 students and the marks obtained by them in Physics, Chemistry, Mathematics are given in the following table.
Study the table carefully and answer the question.
Find the average score in Physics by the students in the class.

Students → Subjects ↓	S_1	S_2	S_3	S_4
Physics	60	50	70	75
Chemistry	70	45	60	80
Mathematics	80	55	55	75

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 $(625)^{0.24}$ X $(625)^{0.01}$?

a. 4
b. 5
c. 25
d. 16

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

86. A man can row 14 km/h in still water. When the stream is running at 2 km/h, it takes him 7 hours to row to a place and to come back. How far is the place?

a. 27 km
b. 48 km
c. 38 km
d. 39 km

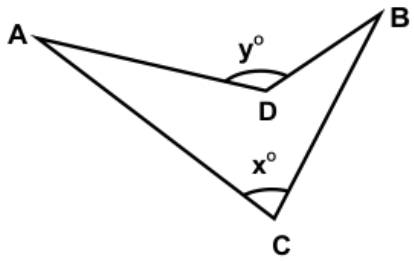
87. A starts a business with $4000 and B joins him after 3 months with $16000. Find the ratio of their profits at the end of year.

a. 1 : 1
b. 3 : 7
c. 2 : 5
d. 1 : 3

88. The marked price on an item was $3000 but the shopkeeper offered a double discount of 30% and 20%. How much did he finally sell the item?

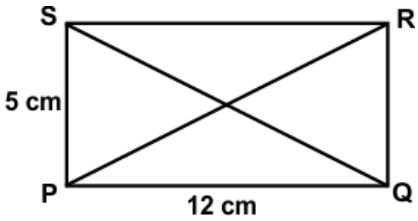
a. $1,680
b. $1,430
c. $1,270
d. $1,580

89. In the given figure, ∠DAC = 30°, ∠CBD = 40°, ∠ADB = y° and ∠ACB = x°. Find the difference between angles y° and x°.



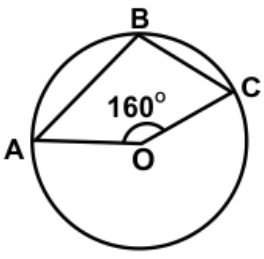
a. 65°
b. 70°
c. 80°
d. 45°

90. In the given figure, PQRS is a rectangle. Find PR + QS.



a. 32 cm
b. 26 cm
c. 44 cm
d. 36 cm

91. In the given figure, 'O' is the centre of the circle and ∠AOC = 160°. What is the measure of ∠ABC?



a. 76^o
b. 80^o
c. 160^o
d. 90^o

92. Find the area of the triangular field of sides 55 m, 60 m and 65 m. Also, find the cost of laying the grass in the triangular field at the rate of \$12 per m^2.

a. 1525.5 m^2, \$15,354
b. 1537.5 m^2, \$18,444
c. 1500.5 m^2, \$17,278
d. 1480.5 m^2, \$18,669

93. Three metal cubes with edges 6 cm, 8 cm and 10 cm respectively are melted together and formed into a single cube. Find the side of the resulting cube.

a. 11 cm
b. 12 cm
c. 15 cm
d. 17 cm

94. From the top of a 5 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.

a. $7(\sqrt{3}+1)$ m
b. $5(\sqrt{2}+1)$ m
c. $7(\sqrt{2}+1)$ m
d. $5(\sqrt{3}+1)$ m

95. If x and y are the two digits of the number 883xy such that this number is divisible by 80, then x + y = ?

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

96. The mean of 11 observations is 50. If the mean of first Six observations is 49 and that of last six observations is 52, then find sixth observation.

a. 56
b. 58
c. 60
d. 62

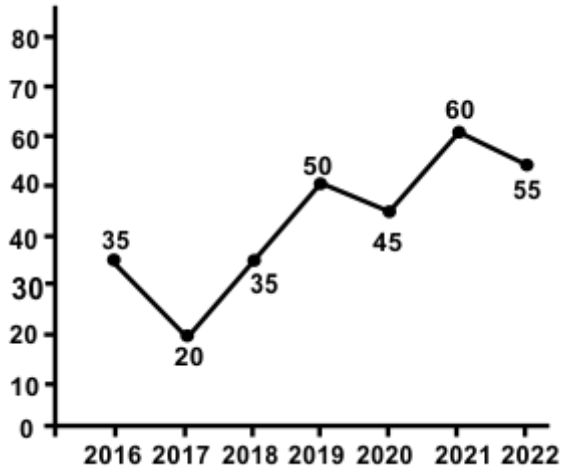
97. Evaluate:
$(2^6 \div 2^3)^{-1/3}$

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

98. Study the information carefully and answer the question given beside.
Out of 200 people who attended an office party 100 had Ice-cream, 120 had cold drink, 80 had cake and 10 had none of these three. 100 people had exactly one of three items.
How many people had exactly two of the three items?

a. 80
b. 90
c. 70
d. 65

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										