



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

CDS-I 2019 Elementary Mathematics (Set-C)

Direction: Consider the following for the next three (03) items :

A cube is inscribed in a sphere. A right circular cylinder is within the cube touching all the vertical faces. A right circular cone is inside the cylinder. Their heights are same and the diameter of the cone is equal to that of the cylinder.

1. What is the ratio of the volume of the sphere to that of cone?

A. 6 : 3
B. 7 : 2
C. 3 : 3
D. 5 : 3

Direction: Consider the following for the next three (03) items :

A cube is inscribed in a sphere. A right circular cylinder is within the cube touching all the vertical faces. A right circular cone is inside the cylinder. Their heights are same and the diameter of the cone is equal to that of the cylinder.

2. What is the ratio of the volume of the cube to that of the cylinder ?

A. 4 : 3
B. 21 : 16
C. 14 : 11
D. 45 : 32

Direction: Consider the following for the next three (03) items :

A cube is inscribed in a sphere. A right circular cylinder is within the cube touching all the vertical faces. A right circular cone is inside the cylinder. Their heights are same and the diameter of the cone is equal to that of the cylinder.

3. Consider the following statements:

1) The surface area of the sphere is 5 Times the curved surface area of the cone.
2) The surface area of the cube is equal to the curved surface area of the cylinder.
Which of the above statements is/are correct?

A. 1 only
B. 2 only
C. Both 1 and 2
D. Neither 1 nor 2

Direction: Consider the following for the next three (03) items:

ABCD is a quadrilateral with AB = 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm and angle ABC is a right – angle

4. What is the area of triangle ADC?

A. 126 CM²
B. 124 CM²
C. 122 CM²
D. 120 CM²

Direction: Consider the following for the next three (03) items:

ABCD is a quadrilateral with AB = 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm and angle ABC is a right – angle

5. What is the area of quadrilateral ABCD?

A. 300 CM²
B. 306 CM²
C. 312 CM²
D. 316 CM²

Direction: Consider the following for the next three (03) items:

ABCD is a quadrilateral with AB = 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm and angle ABC is a right – angle

6. What is the difference between perimeter of triangle ABC and perimeter of triangle ADC?


A. 4 cm
B. 5 cm
C. 6 cm
D. 7 cm

Direction: Consider the following for the next two (02) items:

An equilateral triangle ABC is inscribed in a circle of radius 20 3

7. What is the length of the side of the triangle?

A. 30 cm
B. 40 cm
C. 50 cm
D. 60 cm

CALL US  +91 9936404655



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

Direction: Consider the following for the next two (02) items:

An equilateral triangle ABC is inscribed in a circle of radius $20\sqrt{3}$

8. The centroid of the triangle ABC is at a distance d from the vertex A. What is d equal to ?
- A. 15 cm^2 B. 20 cm^2
C. $20\sqrt{3}\text{ cm}$ D. $30\sqrt{3}$

Direction: Consider the following for the next two (02) items:

The sum of length, breadth and height of a cuboid is 22 cm and the length of its diagonal is 14 cm.

9. What is the surface area of the cuboid?
- A. 288 cm^2 B. 216 cm^2
C. 144 cm^2 D. Cannot be demined due to insufficient data

Direction: Consider the following for the next two (02) items:

The sum of length, breadth and height of a cuboid is 22 cm and the length of its diagonal is 14 cm.

10. If S is sum of the cubes of the dimensions of the cuboid and V is its volume, then what is $(S-3V)$ equal to?
- A. 572 cm^3 B. 728 cm^3
C. 1144 cm^3 D. None of the above

11. A race has three parts. The speed and time required to complete the individual parts for a runner is displayed on the following chart:

	Part I	Part II	Part III
Speed (kmph)	9	8	7.5
Time (minutes)	50	80	100

What is the average speed of this runner?

- A. 8.17 kmph B. 8.00 kmph
C. 7.80 kmph D. 7.77 kmph
12. If $\frac{a}{b+c} = \frac{b}{c+a} = \frac{c}{a+b}$, then which one of the following statements is correct?
- A. Each fraction is equal to 1 or -1. B. Each fraction is equal to $\frac{1}{2}$ or 1.
C. Each fraction is equal to $\frac{1}{2}$ or -1. D. Each fraction is equal to 1.2 only.
13. The number 3^{521} is divided by 8. What is the remainder?
- A. 1 B. 3
C. 7 D. 9
14. A prime number contains the digit X at unit's place. How many such digits of X are possible?
- A. 3 B. 4
C. 5 D. 6
15. If an article is sold at a gain of 6% instead of a loss of 6% the seller gets Rs. 6 more. What is the cost price of the article?
- A. Rs. 18 B. Rs. 36
C. Rs. 42 D. Rs. 50
16. A field can be reaped by 12 men or 18 women in 14 days. In how many days can 8 men and 16 women reap it?
- A. 26 days B. 24 days
C. 9 days D. 8 days

CALL US +91 9936404655



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

17. If $3^x = 4^y = 12^z$, then z is equal to
A. xy B. $x + y$
C. $\frac{xy}{x + y}$ D. $4x + 3y$
18. If $(4a + 7b)(4c - 7d) = (4a - 7b)(4c + 7d)$, then which one of the following is correct ?
A. $\frac{a}{b} = \frac{c}{d}$ B. $\frac{a}{d} = \frac{c}{b}$
C. $\frac{a}{b} = \frac{d}{c}$ D. $\frac{4a}{7b} = \frac{c}{d}$
19. Given that the polynomial $(x^2 + ax + b)$ leaves that same remainder when by $(x - 1)$ or $(x + 1)$ What are the values of a and b respectively?
A. 4 and 0 B. 0 and 3
C. 3 and 0 D. 0 and any interger
20. Tushar takes 6 hours to complete a piece of work, while Amar completes the same work in 10 hours. If both of them work together, then what is the time required to complete the work?
A. 3 hours B. 3 hours 15 minutes
C. 3 hours 30 minutes D. 3 hours 45 minutes
21. What is the value of $2 + 2 + 2 + \dots$?
A. 1 B. 2
C. 3 D. 4
22. In an examination, 52% candidates failed in English and 42% failed in Mathematics. If 17% failed in both the subjects, then what percent passed in both the subjects?
A. 77 B. 58
C. 48 D. 23
23. A man who recently died left a sum of Rs. 3,90,000 to be divided among his wife, five sons and four daughters. He directed that each son should receive 3 times as much as each daughter receives and that each daughter receives and that each daughter should receive twice as much as their mother receives. What was the wife's share?
A. Rs. 14,000 B. Rs. 12,000
C. Rs. 10,000 D. Rs. 9,000
24. What is the least number of complete years in which a sum of money put out at 40% annual compound interest will be more than trebled?
A. 3 B. 4
C. 5 D. 6
25. A person divided a sum of Rs. 17,200 into three parts and invested at 5%, 6% and 9% per annum simple interest. At the end of two years, he got the same interest on each part of money. What is the money invested at 9%?
A. Rs. 3,200 B. Rs. 4,000
C. Rs. 4,800 D. Rs. 5000
26. The corners of a square of side 'a' are cut away so as to form a regular octagon. What is the side of the octagon?
A. $a(2 - 1)$ B. $a(3 - 1)$
C. $\frac{a}{2 + 2}$ D. $a/3$



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

27. Three consecutive integers form the lengths of a right-angled triangle. How many sets of such three consecutive integers is/are possible?
A. Only one
B. Only two
C. Only three
D. Infinitely many
28. Two circles are drawn with the same centre. The circumference of the smaller circle is 44 cm and that of the bigger circle is double the smaller one. What is the area between these two circles?
A. 154 square cm
B. 308 square cm
C. 462 square cm
D. 616 square cm
29. A rectangular red carpet of size 6 ft \times 12 ft has a dark red border 6 inches wide. What is the area of the dark red border?
A. 9 square feet
B. 15 square feet
C. 17 square feet
D. 18 square feet
30. The perimeter of a right-angled triangle is k times the shortest side. If the ratio of the other side to hypotenuse is 4 : 6, then what is the value of k?
A. 2
B. 3
C. 4
D. 5
31. A 12 m long wire is cut into two pieces, one of which is bent into a circle and the other into a square enclosing the circle. What is the radius of the circle?
A. $\frac{12}{\pi + 4}$
B. $\frac{6}{\pi + 4}$
C. $\frac{3}{\pi + 4}$
D. $\frac{6}{\pi + 2}$
32. The angles of a triangle are in the ratio 1 : 1 : 4. If the perimeter of the triangle is k times its largest side, then what is the value of k?
A. $1 + \frac{2}{3}$
B. $1 - \frac{2}{3}$
C. $2 + \frac{2}{3}$
D. 2
33. The hypotenuse of a right-angled triangle 10 cm and its area is 24 cm². If the shorts side is halved and the longer side is double, the new hypotenuse becomes
A. 245 cm
B. 255 cm
C. 265 cm
D. 275 cm
34. In a circle of radius 8 cm, AB and AC are two chords such that AB = AC = 12 cm. What is the length of chord BC?
A. $2\sqrt{6}$ cm
B. $3\sqrt{6}$ cm
C. $3\sqrt{7}$ cm
D. $6\sqrt{7}$ cm
35. Consider the following statements:
1) An isosceles trapezium is always cyclic.
2) Any cyclic parallelogram is a rectangle.
Which of the above statements is/are correct?
A. 1 only
B. 2 only
C. Both 1 and 2
D. Neither 1 nor 2

CALL US  +91 9936404655



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

42. Consider the following frequency distribution:

x	f
8	6
5	4
6	5
10	8
9	9
4	6
7	4

What is the median for the distribution?

- A. 6
B. 7
C. 8
D. 9
43. The average of 50 consecutive natural numbers is x . What will be the average when the next four natural numbers are also included?
A. $x + 1$
B. $x + 2$
C. $x + 4$
D. $x + (x/54)$
44. Consider two-digit numbers which remain the same when the digits interchange their positions. What is the average of such two-digit numbers?
A. 33
B. 44
C. 55
D. 66
45. Diagrammatic representation of data includes which of the following?
1) Bar diagram
2) Pie-diagram
3) Pictogram
Select the correct answer using the code given below:
A. 1 and 2 only
B. 2 and 3 only
C. 1 and 3 only
D. 1, 2 and 3
46. The data collected from which one of the following methods is *not* a primary data?
A. By direct personal interviews
B. By indirect personal interviews
C. By schedules sent through enumerators
D. From published thesis
47. The monthly expenditure of a person is Rs. 6000. The distribution of expenditure on various items is as follows:

Item of expenditure	Amount (in Rs.)
Food	2000
Clothing	660
Fuel and rent	1200
Education	480
Miscellaneous	1660

If the above data is represented by a percentage bar diagram of height 15 cm, then what are the lengths of the two segments of the bar diagram corresponding to education and miscellaneous respectively?

- A. 1.25 cm and 5 cm
B. 1.2 cm and 4.15 cm
C. 1.2 cm and 3.5 cm
D. 4.15 cm and 6 cm

CALL US +91 9936404655



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

67. If $3 \tan \theta = \cot \theta$ where $0 < \theta < \frac{\pi}{2}$, then what is the value of θ ?

- A. $\frac{\pi}{6}$ B. $\frac{\pi}{4}$
C. $\frac{\pi}{3}$ D. $\frac{\pi}{2}$

68. What is the value of $\sin^2 25^\circ + \sin^2 65^\circ$?

- A. 0 B. 1
C. 2 D. 4

69. What is the value of $\sin^6 \theta + \cos^6 \theta + 3 \sin^2 \theta \cos^2 \theta - 1$?

- A. 0 B. 1
C. 2 D. 4

70. Consider the following for real numbers α, β, γ and δ ?

- 1) $\sec \alpha = 1/4$
2) $\tan \beta = 20$
3) $\operatorname{cosec} \gamma = 1/2$
4) $\cos \delta = 2$

How many of the above statements are not possible?

- A. one B. two
C. three D. four

Direction: Consider the following for the next three (03) items:

In a certain town of population size 1,00,000 three types of newspapers (I, II and III) are available. The percentages of the people in the town who read these papers are as follows:

Newspaper	Proportion of readers
I	10%
II	30%
III	5%
Both I and II	8%
Both II and III	4%
Both I and III	2%
All the three (I, II and III)	1%

71. What is the number of people who read only one newspaper?

- A. 20,000 B. 25,000
C. 30,000 D. 35,000

Direction: Consider the following for the next three (03) items:

In a certain town of population size 1,00,000 three types of newspapers (I, II and III) are available. The percentages of the people in the town who read these papers are as follows:

Newspaper	Proportion of readers
I	10%
II	30%
III	5%
Both I and II	8%
Both II and III	4%
Both I and III	2%
All the three (I, II and III)	1%

72. What is the number of people who read at least two newspaper?

- A. 12,000 B. 13,000
C. 14,000 D. 15,000



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

Direction: Consider the following for the next three (03) items:

In a certain town of population size 1,00,000 three types of newspapers (I, II and III) are available. The percentages of the people in the town who read these papers are as follows:

Newspaper	Proportion of readers
I	10%
II	30%
III	5%
Both I and II	8%
Both II and III	4%
Both I and III	2%
All the three (I, II and III)	1%

73. What is the number of people who do not read any of these three newspapers?
A. 62,000 B. 64,000
C. 66,000 D. 68,000
74. What is the unit place digit in the expansion of 7^{73} ?
A. 1 B. 3
C. 7 D. 9
75. Suppose n is a positive integer such that $(n^2 + 48)$ is a perfect square. What is the number of such n ?
A. One B. Two
C. Three D. Four
76. For $x = \frac{4}{2 + \sqrt{3}}$, what is the value of $\frac{x+2}{x-2} + \frac{2}{x-2} + \frac{x+2}{x-2} + \frac{3}{x-2}$?
A. 1 B. 2
C. 3 D. 2
77. x , y and z are three numbers such that x is 30% of z and y is 40% of z . If x is $p\%$ of y , then what is the value of p ?
A. 45 B. 55
C. 65 D. 75
78. A plane is going in circles around an airport. The plane takes 3 minutes to complete one round. The angle of elevation of the plane from a point P on the ground at time t seconds is equal to that at time $(t + 30)$ seconds. At time $(t + x)$ seconds, the plane flies vertically above the point P . What is x equal to?
A. 75 seconds B. 90 seconds
C. 105 seconds D. 135 seconds
79. Consider the following statements in respect of two integers p and q (both > 1) which are relatively prime:
1) Both p and q may be prime numbers.
2) Both p and q may be composite numbers
3) one of p and q may be prime and the other composite.
Which of the above statements are correct?
A. 1 and 2 only B. 2 and 3 only
C. 1 and 3 only D. 1, 2 and 3
80. In a class of 100 students, the average weight is 30 kg. If the average weight of the girls is 24 kg and that of the boys is 32 kg, then what is the number of girls in the class?
A. 25 B. 26
C. 27 D. 28



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

81. For any two real numbers a and b.

$$(a-b)^2 + (b-a)^2 \text{ is}$$

- A. always zero
B. never zero
C. positive only if $a \neq b$
D. positive if an only if $a > b$

82. If $a : b = c : d = 1 : 6$, then what is the value of $\frac{a^2 + c^2}{b^2 + d^2}$?

- A. $\frac{1}{600}$
B. $\frac{1}{60}$
C. $\frac{1}{36}$
D. $\frac{1}{6}$

83. What is $0.53 + 0.53$ equal to ?

- A. 1.068
B. 1.068
C. 1.068
D. 1.068

84. The inequality $3^N > N^3$ holds when

- A. N is any natural number
B. N is natural number greater than 2
C. N is a natural number greater than 3
D. N is a natural number except 3

85. Which one of the following is an irrational number?

- A. 59049
B. $\frac{231}{593}$
C. 0.45454545.....
D. 0.1211221111222111112222.....

86. What is the remainder when $(17^{29} + 19^{29})$ is divided by 18 ?

- A. 6
B. 2
C. 1
D. 0

87. What is the largest value of n such that 10^n divides the product $2^5 \times 3^3 \times 4^8 \times 4^3 \times 6^7 \times 7^6 \times 8^{12} \times 9^9 \times 10^6 \times 15^{12} \times 20^{14} \times 22^{11} \times 25^{15}$?

- A. 65
B. 55
C. 50
D. 45

88. How many pairs (A, B) are possible in the number 479865AB if the number is divisible by 9 and it is given that the last digit of the number is odd?

- A. 5
B. 6
C. 9
D. 11

89. Consider the multiplication $999 \times abc = def132$ in decimal notation, where a, b, c, d, e and f are digits. What are the values of a, b, c, d, e and f respectively?

- A. 6, 6, 8, 6, 8, 7
B. 8, 6, 8, 6, 7, 8
C. 6, 8, 8, 7, 8, 6
D. 8, 6, 8, 8, 6, 7

90. Three cars A, B and C started from a point at 5 pm, 6 pm and 7 pm respectively and travelled at uniform speeds of 60 km/hr, 80 km/hr and x km/hr respectively in the same direction. If all the three met at another point at the same instant during their journey, then what is the value of x?

- A. 120
B. 110
C. 105
D. 100



INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

91. Priya's age was cube of an integral number (different from 1) four years ago and square of an integral number after four years. How long should she wait so that her age becomes square of a number in the previous year and cube of a number in the next year?
- A. 7 years
B. 12 years
C. 14 years
D. 21 years
92. Which of the following statements is *not* true?
- A. The difference of two prime numbers, both greater than 2, is divisible by 2.
B. For two different integers m , n and a prime number p , if p divides the product $m \times n$, then p divides either m or n .
C. If a number is of the form $6n - 1$ (n being a natural number), then it is a prime number.
D. There is only one set of three prime numbers such that there is a gap of 2 between two adjacent prime numbers.
93. For $x > 0$, what is the minimum value of $x + \frac{x+2}{2x}$?
- A. 1
B. 2
C. $2\frac{1}{2}$
D. Cannot be determined
94. If $\frac{1+px}{1-px} = \frac{1-qx}{1+qx}$, then what are the non-zero solutions of x ?
- A. $\pm \frac{1}{p} \frac{2p-q}{q}$, $2p \neq q$
B. $\pm \frac{1}{pq} p-q$, $p \neq q$
C. $\pm \frac{p}{q} p-q$, $p \neq q$
D. $\pm \frac{p}{q} 2p-q$, $2p \neq q$
95. In a hostel the rent per room is increased by 20%. If number of rooms in the hostel is also increased by 20% and the hostel is always full, then what is the percentage change in the total collection at the cash counter?
- A. 30%
B. 40%
C. 44%
D. 48%
96. Radha and Hema are neighbours and study in the same school. Both of them use bicycles to go to the school. Radha's speed is 8 km/hr whereas Hema's speed is 10 km/hr. Hema takes 9 minutes less than Radha to reach the school. How far is the school from the locality of Radha and Hema?
- A. 5 km
B. 5.5 km
C. 6 km
D. 6.5 km
97. Which of the following pair of numbers is the solution of the equation $3^{x+2} + 3^{-x} = 10$?
- A. 0, 2
B. 0, -2
C. 1, -1
D. 1, 2
98. It is given that $\log_{10} 2 = 0.301$ and $\log_{10} 3 = 0.477$. How many digits are there in $(108)^{10}$?
- A. 19
B. 20
C. 21
D. 22

CALL US +91 9936404655




INDUS RANGERS INSTITUTE PVT.LTD.

4th Floor Shakumbhari, Complex, Bhelupur Varanasi (U.P)

99. The sum of three prime numbers is 100. If one of them exceeds another by 36, then one of the numbers is
- A. 17
B. 29
C. 43
D. None of the above

100. If a, b and c are positive integers such that
$$a + \frac{1}{b + \frac{1}{c + \frac{1}{2}}} = \frac{16}{23}$$
, then what is the mean of a, b and c?
- A. 1
B. 2
C. 1.33
D. 2.33

CALL US  +91 9936404655