SECTION I : LOGICAL REASONING

1. In the following letter series, some of the letters are missing which are given in that order as one of the alternatives. Choose the correct alternative.

____ c ___ bd ___ cbcda ____ a __ db ___ a

(A) adabcd **(B)** cdbbca **(C)** daabbc **(D)** bdbcba

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2. If MINJUR is coded as 312547 and TADA as 6898, how can MADURAI be coded ?

(A) 3498178 **(B)** 3894871 **(C)** 3849781 **(D)** 3894781

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3. Pointing to a lady in the photograph, Shaloo said, "Her son's father is the son-in-law of my mother." How is Shaloo related to the lady ?

(A) Aunt **(B)** Sister **(C)** Mother **(D)** Cousin

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4. Choose the odd numeral pair/group.

(A) 8 (34) 9 **(B)** 48 (120) 12 **(C)** 7 (144) 11 **(D)** 20 (270) 115

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5. If 'A $ B' means 'A is the father of B', 'A ★ B' means 'A is the mother of B', 'A @ B' means 'A is the wife of B', then which of the following means 'M is the grandmother of N' ?

(A) M ★ T $ N @ R **(B)** M ★ T $ R @ S **(C)** M ★ R $ T @ N **(D)** M ★ R @ T @ N

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6. Johnson left for his office in his car. He drove 15 km towards north and then 10 km towards west. He then turned to the south and covered 5 km. Further, he turned to the east and moved 8 km. Finally, he turned right and drove 10 km. How far and in which direction is he from his starting point?

(A) 2 km west **(B)** 5 km east **(C)** 6 km south **(D)** 2 km east

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7. In the following series of letters, some definite order determines. Which of the following are next two letters in the correct order ?

A J K T U B I L S V C H M R W D G N Q X E F O ? ?

(A) PY **(B)** PZ **(C)** YZ **(D)** ZA

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8. Choose the missing term from the given alternatives.

BZA, DYC, FXE, ?, JVI

(A) HUG **(B)** HWG **(C)** UHG **(D)** WHG

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9. In a row of forty children, *P* is thirteenth from the left end and *Q* is ninth from the right end. How many children are there between *P* and *R* if *R* is fourth to the left of *Q* ?

(A) 12 **(B)** 13 **(C)** 14 **(D)** 15

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10. If > denotes '+', < denotes '–', + denotes '÷', – denotes '=', = denotes 'less than' and × denotes 'greater than', which of the following is a correct statement ?

(A) 3 + 2 > 4 = 9 + 3 < 2 **(B)** 3 > 2 > 4 = 18 + 3 < 1 **(C)** 3 > 2 < 4 × 8 + 4 < 2 **(D)** 3 + 2 < 4 × 9 + 3 < 3

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11. Choose the odd numeral pair/group.

(A) 13 – 21 **(B)** 19 – 27 **(C)** 15 – 23 **(D)** 16 – 24

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12. If South-east becomes North, North-east becomes West and so on, what will West become ?

(A) North-east **(B)** North-west **(C)** South-east **(D)** South

13. Select the correct set of symbols which will fit in the given equation 5 ☐ 0 ☐ 3 ☐ 5 = 20.

(A) ×, ×, × **(B)** –, +, × **(C)** ×, +, × **(D)** +, –, ×

14. If it is possible to form a number with the second, the fifth and the eighth digits of the number 31549786, which is the perfect square of a two-digit even number, which of the following will be the second digit of that even number ?

(A) 2 **(B)** 4 **(C)** 6 **(D)** 5

15. Choose the correct alternative that will continue the given pattern.

0.5, 0.55, 0.65, 0.8, _?_

(A) 0.9 **(B)** 0.82 **(C)** 1 **(D)** 0.95

16. If 453945 stands for DECIDE, then 8978 stands for ____.

(A) BHEE **(B)** CDEH **(C)** GHEE **(D)** HIGH

17. In the given series, count the number of 9's, each of which is not immediately preceded by 5 but is immediately followed by either 2 or 3. How many such 9's are there ?

1 9 2 6 5 9 3 8 3 9 3 2 5 9 2 9 3 4 8 2 6 9 8

(A) One **(B)** Three **(C)** Five **(D)** Six

18. P, Q, R and S are playing cards. P and Q are partners and sitting in front of each other. Similarly R and S are partners and sitting in front of each other. S faces towards North and if P faces towards West, then who faces towards South ?

(A) Q **(B)** R **(C)** S **(D)** Data inadequate

19. If ÷ implies '=', × implies '<', + implies '>', – implies '×', > implies '÷', < implies '+', = implies '–', identify the correct expression.

(A) 1 – 3 > 2 + 1 – 5 = 3 – 1 < 2 **(B)** 1 – 3 > 2 + 1 × 5 = 3 × 1 > 2

(C) 1 × 3 > 2 + 1 × 5 × 3 – 1 > 2 **(D)** 1 – 3 > 2 + 1 × 5 + 3 – 1 > 2

20. Each of these letters gets a numerical value based on its position in M K K I D N E T T Q O B F H A A G T U U X W L S R I, such as, 1 for M, 2 for K, 4 for I and so on.
What is the sum of the values of the group of letters ARM ?

(A) 32 **(B)** 33 **(C)** 41 **(D)** 35

SECTION II : MATHEMATICAL REASONING

21. Simplify : $\sqrt[5]{\sqrt[4]{(2^4)^3}} - 5\sqrt[5]{8} + 2\sqrt[5]{\sqrt[4]{(2^3)^4}}$ **.**

(A) $-2\sqrt[5]{(2)^3}$ **(B)** $\sqrt[5]{(2)^3}$ **(C)** $2\sqrt[5]{(2)^3}$ **(D)** $-\sqrt[5]{(2)^3}$

22. Probability of an event can be

(A) –0.7 **(B)** $\frac{11}{9}$ **(C)** 1.001 **(D)** 0.6

23. If the perpendicular distance of a point P from x-axis is 5 units, then the point P has

(A) x-coordinate = –5 or 5 **(B)** y-coordinate = 5

(C) y-coordinate = –5 **(D)** y-coordinate = 5 or –5

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24. A cube of side 6 cm is painted on all its 6 faces with red colour. It is then broken up into 216 smaller identical cubes. What is the ratio of $N_0 : N_1 : N_2$.
Where, $N_0 \rightarrow$ number of smaller cubes with no coloured surface.
$N_1 \rightarrow$ number of smaller cubes with 1 red face.
$N_2 \rightarrow$ number of smaller cubes with 2 red faces.

(A) 3 : 4 : 6 **(B)** 3 : 4 : 5 **(C)** 4 : 6 : 3 **(D)** 6 : 4 : 3

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25. If $a + b + c = 0$, then $x^{a^2b^{-1}c^{-1}} x^{a^{-1}b^2c^{-1}} x^{a^{-1}b^{-1}c^2}$ = _____

(A) $x^{a^2b^2c^2}$ **(B)** $x^{1/a^2b^2c^2}$ **(C)** $x^{1/2}$ **(D)** x^3

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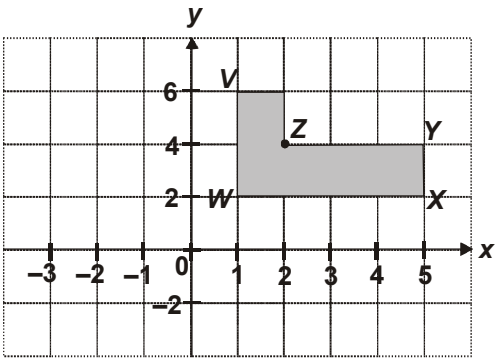
26. In the adjoining diagram, the area of the shaded figure is _____.



(A) 20 cm^2

(B) 10 cm^2

(C) 18 cm^2

(D) 24 cm^2

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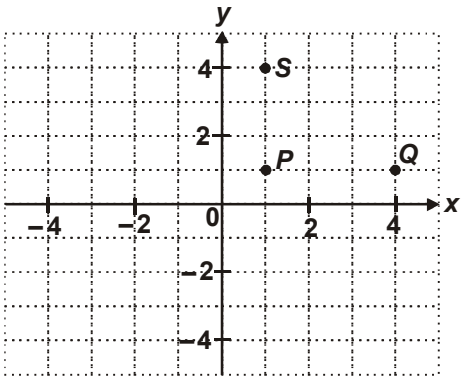
27. Based on the diagram, If $PQRS$ forms a rectangle, find the co-ordinates of R.



(A) (4, 4)

(B) (4, 5)

(C) (6, 4)

(D) (6, 2)

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28. A person's present age is two-fifth of the age of his mother. After 8 years, he will be half of the age of his mother. How old is the mother at present ?

(A) 32 years **(B)** 36 years **(C)** 40 years **(D)** 48 years

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29. Set of values of x, if $\sqrt{(x+8)} + \sqrt{(2x+2)} = 1$, is _____.

(A) {1} **(B)** {1, 17} **(C)** {17} **(D)** ϕ

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30. The perimeter of a circle is equal to the perimeter of a square. Then, the ratio of their areas respectively, is _____.

(A) 4 : 1 **(B)** 11 : 7 **(C)** 14 : 11 **(D)** 22 : 7

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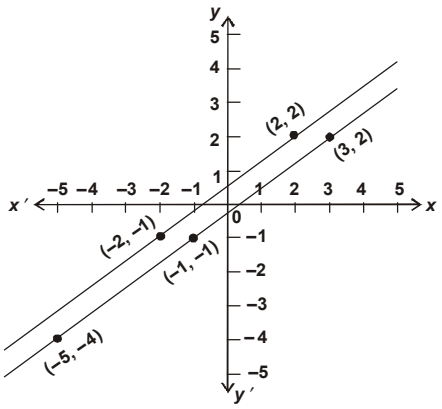
31. The equation representing the given graph is



(A) $7x + 2y = 11;\ y - 2x = 3$

(B) $2x + 7y = 11;\ 4x + (35y/2) = 25$

(C) $3x - 7y = 10;\ 8y - 6x = 4$

(D) $3x - 4y = 1;\ 8y - 6x = 4$

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32. If $x = \dfrac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \dfrac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, then find the value of $x^2 + y^2$.

(A) 32 **(B)** 98 **(C)** 40 **(D)** 0

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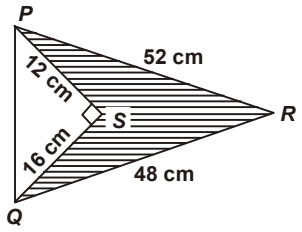
33. In the adjoining figure, the area of shaded portion is ___.



(A) 98 cm^2

(B) 480 cm^2

(C) 384 cm^2

(D) 380 cm^2

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34. The given below question is followed by three statements. You have to study the question and the statements and decide which of the statement(s) is/are necessary to answer the question.
What is the capacity of the cylindrical tank ?

I. The area of the base is 61,600 sq. cm.

II. The height of the tank is 1.5 times the radius.

III. The circumference of base is 880 cm.

(A) I and II **(B)** II and III

(C) Any two of the three **(D)** II and either I or III

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35. The probability of guessing the correct answer to a certain test question is $\dfrac{x}{2}$. If the probability of not guessing the correct answer to this question is $\dfrac{2}{3}$, then x =

(A) 2 **(B)** 3 **(C)** $\dfrac{2}{3}$ **(D)** $\dfrac{1}{3}$

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36. The mean of 40 items is 35 and if each item is multiplied by 'a' then the new mean will be

(A) $35a$ **(B)** $35 + a$ **(C)** 40 **(D)** $40 + a$

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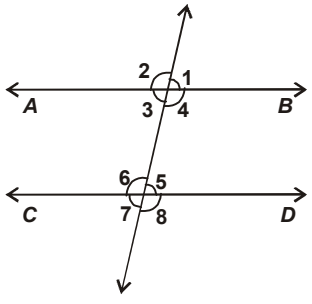
37. In the given figure, $AB \parallel CD$. If $\angle 1 = (2x + y)°$ and $\angle 6 = (3x - y)°$, then the measure of $\angle 2$ in terms of y is ____.



(A) $(108 - y)°$

(B) $(2 - y)°$

(C) $(1 - y)°$

(D) $(100 + y)°$

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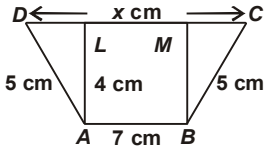
38. In the given figure (not drawn to scale), $ABCD$ is a trapezium in which $AB = 7$ cm, $AD = BC = 5$ cm, $DC = x$ cm and the distance between AB and DC is 4 cm. Then the value of x is _____.

(A) 13 cm
(B) 16 cm
(C) 19 cm
(D) 15 cm



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39. Find the remainder when $9x^3 - 3x^2 + x - 5$ is divided by $x - \frac{2}{3}$.

(A) 3 **(B)** –3 **(C)** 2 **(D)** –2

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40. If $4^{44} + 4^{44} + 4^{44} + 4^{44} = 4^x$, then x is ____.

(A) 45 **(B)** 44 **(C)** 176 **(D)** 11

SECTION III : EVERYDAY MATHEMATICS

41. A hollow garden roller of height 63 cm, with a girth of 440 cm is made of iron 4 cm thick. The volume of the iron used is

(A) 54982 cm^3 **(B)** 56372 cm^3 **(C)** 57636 cm^3 **(D)** 107712 cm^3

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42. An article is sold at a certain price. By selling it at $\frac{2}{3}$ of that price one loses 10%. Find the gain percent at original price.

(A) 35% **(B)** 40% **(C)** 45% **(D)** 50%

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43. 1100 boys and 700 girls are examined in a test; 42% of the boys and 30% of the girls pass. The percentage of the total students who failed is ____.

(A) 58% **(B)** $62\frac{2}{3}\%$ **(C)** 64% **(D)** 78%

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44. A group of students decided to collect as many paise from each member of the group as the number of members. If the total collection amounts to ₹ 59.29, the number of members in the group is ___.

(A) 57 **(B)** 67 **(C)** 77 **(D)** 87

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45. A library has an average of 510 visitors on Sundays and 240 on other days. The best estimate average number of visitors per day in a month of 30 days beginning with a Sunday is ___.

(A) 250 **(B)** 276 **(C)** 280 **(D)** 285

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46. If the radius of a circle is decreased by 50%, find the percentage decrease in its area.

(A) 60% **(B)** 75% **(C)** 70% **(D)** 80%

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47. In how many years will a sum of ₹ 800 at 10% per annum compounded semi-annually become ₹ 926.10 ?

(A) $1\frac{1}{3}$ **(B)** $1\frac{1}{2}$ **(C)** $2\frac{1}{3}$ **(D)** $2\frac{1}{2}$

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48. Arun and Sajal are friends. Each has some money. If Arun gives ₹ 30 to Sajal, then Sajal will have twice the money left with Arun. But, if Sajal gives ₹ 10 to Arun, then Arun will have thrice as much as is left with Sajal. How much money does Arun and Sajal have ?

(A) ₹ 62, ₹ 34 **(B)** ₹ 60, ₹ 34 **(C)** ₹ 60, ₹ 30 **(D)** ₹ 62, ₹ 30

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49. A boy multiplied 12345679 by second, third and seventh multiple of 9, then the average of their total is _____.

(A) 444444444 **(B)** 44444444 **(C)** 4444444 **(D)** 444444

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50. If the cost of *x* metres of wire is ₹ *d*, then what is the cost of *y* metres of wire at the same rate ?

(A) ₹ $\left(\frac{xy}{d}\right)$ **(B)** ₹ (xd) **(C)** ₹ (yd) **(D)** ₹ $\left(\frac{yd}{x}\right)$

SPACE FOR ROUGH WORK

ANSWER KEYS

1.	(A)	**2.**	(D)	**3.**	(B)	**4.**	(C)	**5.**	(A)	**6.**	(A)	**7.**	(A)
8.	(B)	**9.**	(C)	**10.**	(C)	**11.**	(D)	**12.**	(C)	**13.**	(B)	**14.**	(B)
15.	(C)	**16.**	(D)	**17.**	(B)	**18.**	(B)	**19.**	(D)	**20.**	(C)	**21.**	(A)
22.	(D)	**23.**	(D)	**24.**	(C)	**25.**	(D)	**26.**	(B)	**27.**	(A)	**28.**	(C)
29.	(D)	**30.**	(C)	**31.**	(D)	**32.**	(B)	**33.**	(C)	**34.**	(D)	**35.**	(C)
36.	(A)	**37.**	(A)	**38.**	(A)	**39.**	(B)	**40.**	(A)	**41.**	(D)	**42.**	(A)
43.	(B)	**44.**	(C)	**45.**	(D)	**46.**	(B)	**47.**	(B)	**48.**	(A)	**49.**	(A)
50.	(D)												