ANSWERS and EXPLANATIONS

1	3	2	4	3	4	4	3	5	3	6	1	7	1	8	3	9	3	10	3
11	2	12	4	13	1	14	4	15	1	16	1	17	1	18	4	19	2	20	3
21	3	22	3	23	4	24	1	25	3	26	3	27	2	28	2	29	2	30	2
31	2	32	4	33	4	34	2	35	2	36	2	37	3	38	2	39	1	40	4
41	2	42	2	43	2	44	4	45	3	46	1	47	3	48	2	49	4	50	3
51	3	52	2	53	1	54	2	55	1	56	4	57	4	58	2	59	4	60	4
61	3	62	2	63	4	64	3	65	3	66	2	67	2	68	4	69	3	70	1
71	3	72	2	73	3	74	4	75	4	76	1	77	1	78	4	79	2	80	4
81	4	82	3	83	4	84	3	85	1	86	3	87	*2	88	3	89	2	90	2
91	4	92	4	93	4	94	3	95	4	96	2	97	2	98	4	99	3	100	3
101	3	102	2	103	4	104	2	105	4	106	3	107	1	108	3	109	4	110	2
111	3	112	1	113	4	114	3	115	1	116	4	117	3	118	2	119	3	120	2
121	1	122	4	123	1	124	3	125	1	126	3	127	2	128	3	129	4	130	1
131	1	132	4	133	4	134	4	135	2	136	4	137	2	138	2	139	4	140	4
141	4	142	1	143	1	144	2	145	1	146	3	147	4	148	3	149	1	150	3

Scoring table

Section	Question number	Total questions	Total attempted	Total correct	Total incorrect	Net score	Time taken
DI	1 to 50	50					
QA	51 to 100	50					
EU + RC	101 to 150	50					
Total		150					

1. 3 Statement I tells us that

(1) Ashish is not an engineer, (2) Ashish got more offers than the engineers.

Hence, Ashish did not have 0 offers.

After this the following table can be achieved.

Profession	Names		Offers				
		3	2	1	0	X Profession	
CA	Ashish	×	×	✓	×	X Engineer	
MD	Dhanraj	✓	×	×	×	X Engineer	
Economist	Sameer	×	✓	×	×		
Engineer		×	×	×	✓		

From statement IV, Dhanraj is not at 0 and 1.

2. 4 Option (3) is ruled out by statement VII.

Option (1) is ruled out by statements VII and VIII.

From statement IV, Sandeep had Rs. 30 to start and Daljeet Rs. 20.

From statement II, option (2) is not possible as Sandeep was left with Re 1, he spent Rs. 29. But according to (2) he spent Rs. 1.50 more than Daljeet. But Daljeet had only Rs. 20. Hence option (4) is correct.

3. 4 Data insufficient, please check the question.

4. 3 Statements V and VI rule out options (1) and (2). Since contestants from Bangalore and Pune did not come first, school from Hyderabad can come first. Convent is not in Hyderabad which rules out option (4).

5. 3 The only two possible combinations are:

Younger	Older
2	4
3	9

Cubes of natural numbers are 1, 8, 27, 64, ...

Here, 64 and above are not possible as the age will go above 10 years.

If younger boy is 2 years old, then older boy is 4 years old. Then, Father's age is 24 years and Mother's age

is $\frac{42}{2} = 21$ years.

Also, 24 – 21 = 3

∴ Age of younger boy = 2 years

6. 1

Total seats in the hall	200
Seats vacant	20
Total waiting	180
Ladies	72

Seating capacity of flight $\frac{2}{3} \times 180 = 120$

Number of people in flight A = 100
For flight B = 180 – 100 = 80

Thus, airhostess for A = $\frac{80}{20} = 4$

Empty seats in flight B = 120 – 80 = 40
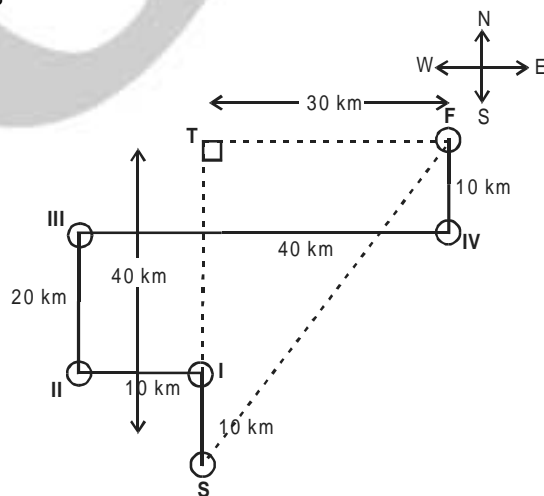40 : 4 = 10 : 1

7. 1

Note: s = Distance covered; v = Velocity (km/hr)
t = Time taken; s = v × t

The total distance travelled by the motorist from the starting point till last signal = 10 + 10 + 20 + 40 + 10 = 90 km.

8. 3

By Pythagoras' Theorem,

$$SF = \sqrt{ST^2 + TF^2} = \sqrt{40^2 + 30^2} = \sqrt{2500} = 50 \text{ km}$$
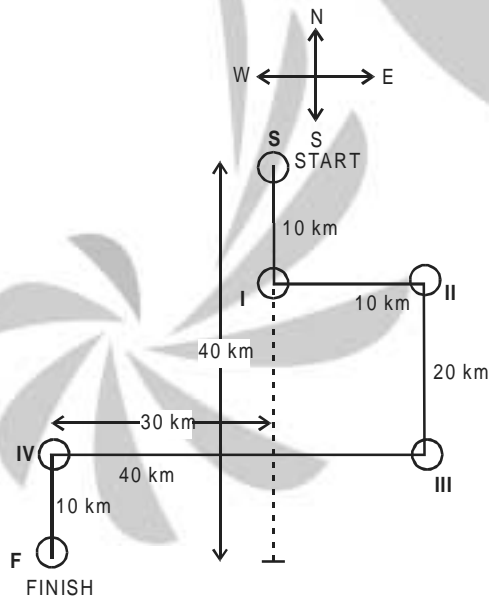
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9. 3 For the case when 1st signal were 1 red and 2 green lights, the surface diagram will be as given below.
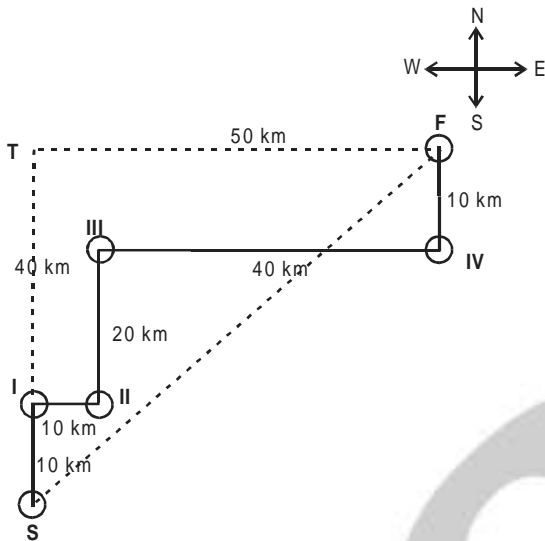
TF = 50 km; ST = 40 km
Considering the above figure, option (3) is correct, 50 km to the east and 40 km to the north.

10. 3 If the car was heading towards South from the start point, then the surface diagram will be as given below.

Hence, we can see that option (3) is correct.

11. 2 Total five lie between 10 E and 40 E.
Austria, Bulgaria, Libya, Poland, Zambia
N   N   N   N   S

$\dfrac{1}{5} = 20\%$

12. 4 Number of cities starting with consonant and in the northern hemisphere = 10.
Number of countries starting with consonant and in the east of the meridian = 13.
Hence, option (4) is the correct choice.
The difference is 3.

13. 1 Three countries starting with vowels and in southern hemisphere — Argentina. Australia and Ecuador and two countries with capitals beginning with vowels — Canada and Ghana.

14. 4 Let us consider two cases:
(a) If 5 min remaining the score was 0 – 2. Then final score could have been 3 – 3. [Assuming no other Indian scored]
(b) But if the score before 5 min was 1 – 3, then final score could have been 4 – 3.

From statement A, we know only the number of goals made by India is the last 5 minutes. But, as we don't know what the opponent team did in the last 5 minutes, we can't conclude anything. So statement A alone is not sufficient.
Similarly, statement B does not talk about the total number of goals scored by India. So statement B is not sufficient.
Using both the statements, we have two possibilities:
(I) If Korea had scored 3 goals 5 minutes before the end of the match India would have scored 1 goal. In the last 5 minutes as India made 3 goals and Korea on the whole made 3 goals, we can conclude that India had won the game.
(II) If Korea had scored 3 goals 5 minutes before the end of the match, India would have scored zero goals. In the last 5 minutes, as India made 3 goals and Korea on the whole made 3 goals, we can say the match was drawn.
Hence, we cannot answer the question even boy using both the statements together.

15. 1 From A, if by adding 12 students, the total number of students is divisible by 8. By adding 4 students, it will be divisible by 8.

16. 1 From (A), $(x + y)\left(\dfrac{1}{x} + \dfrac{1}{y}\right) = 4$ or $(x + y)\left(\dfrac{y + x}{xy}\right) = 4$

$\Rightarrow (x + y)^2 = 4xy$
$\Rightarrow (x - y)^2 = 0$
$\Rightarrow x = y$ ... (i)

From (B), $(x - 50)^2 = (y - 50)^2$
On solving
$x(x - 100) = y(y - 100)$ ... (ii)
This suggests that the values of x and y can either be 0 or 100.

17. 1   Statement:
   A. Let the wholesale price is x.
       Thus, listed prices = 1.2x
       After a discount of 10%, new price = 0.9 × 1.2x
                                          = 1.08x
       ∴ 1.08 − x = 10$.
       Thus, we know x can be found.

   B. We do not know at what percentage profit, or at what amount of profit the dress was actually sold.

18. 4   A gives 500 as median and B gives 600 as range. A and B together do not give average.
Therefore, it cannot be answered from the given statements.

19. 2   From statement A, we know that for all −1 < x < 1, we can determine |x − 2| < 1 is not true. Therefore, statement A alone is sufficient.
From statement B, −1 < x < 3, we cannot determine whether |x − 2| < 1 or not. Therefore, statement B alone is sufficient.

20. 3   From statement A, we cannot find anything.
From B alone we cannot find.
From A and B,

300

F ⬭⬭ R
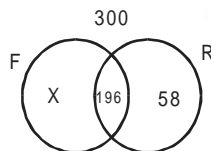
X 196 58

x + 196 + 58 = 300. Thus, x can be found.

21. 3   Jagdish (J), Punit (P), Girish (G)

Statement A: $J = \dfrac{2}{9}[P + G]W$

P + G + J = 38500
Thus, only J can be found.

Statement B: Similarly, from this only P can be found.
Combining we know J, P and G can be found.

22. 3   Emp. numbers 51, 58, 64, 72, 73 earn more than 50 per day in complex operations.
Total = 5

23. 4   80% attendance = 80% of 25 = 20 days
Emp. numbers 47, 51, 72, 73, 74, 79, 80.
Thus, total = 7

24. 1

Emp. No.	Earnings	No. of days	E/D
	E	**D**	
	(medium)	**(medium)**	
2001151	159.64	13.33	11.97
2001158	109.72	9.61	11.41
2001164	735.22	12.07	60.91
2001171	6.10	4.25	-
2001172	117.46	8.50	13.81
2001179	776.19	19.00	40.85
2001180	1262.79	19.00	66.46

Hence, Emp. number 2001180 earns the maximum earnings per day.

25. 3   Emp. numbers 51, 58, 64, 71, 72 satisfy the condition.
[For emp. 64, you see 12 is not the double of 5. And 735 is not even double of 402.

Hence, $\dfrac{402}{5} > \dfrac{735}{12}$.

Note: Emp. numbers 48, 49, 50 are not eligible for earnings. Hence, they are not counted.

26. 3   Total revenue of 1999 = 3374

5% of 3374 = $3374 \times \dfrac{5}{100}$ = 168.7

For 1999, revenue for Spain is 55, Rest of Latin America is 115, North Sea is 140, Rest of the world is 91.
So total four operations of the company accounted for less than 5% of the total revenue earned in the year 1999.

27. 2   **The language in the question is ambiguous.**
Taking the question to be more than 200% growth in revenue, the revenue in 2000 will be more than 3 times that in 1999. Hence, (2) is the answer.
Taking the revenue in 2000 to be more than 200% of that in 1999, the revenue in 2000 should be more than twice of that in 1999. Then there will be 4 operations.

28. 2   Four operations, as given below:
(1) North Africa and Middle-East
(2) Argentina
(3) Rest of Latin America
(4) Far East
have registered yearly increase in income before taxes and charges from 1998 to 2000.

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29. 2 Percentage increase in net income before tax and charges for total world (1998-99)

$= \dfrac{1375 - 248}{248} \times 100 = 454.4\%$

Spain is making loss.

Percentage increase for North Africa and Middle-East

$\dfrac{341 - 111}{111} \times 100 = 207.2\%$

Percentage increase for Argentina $= \dfrac{838 - 94}{94} \times 100$
$= 791.5\%$

From the table one can directly say that there is no operation other than Argentina, whose percentage increase in net income before taxes and charges is higher than the average (world).

30. 2 Statement 1 is obviously wrong.

(2) $\dfrac{54}{65} > \dfrac{20}{52}$. Hence, (2) is correct.

(3) $\dfrac{500}{1168} > \dfrac{61}{187}$. Hence (3) is wrong.

31. 2 Profitability of North Africa and Middle-East in 2000

$= \dfrac{356}{530} = 0.67$

Profitability of Spain in 2000 $= \dfrac{225}{43} = 5.23$

Profitability of Rest of Latin America in 2000 $= \dfrac{169}{252}$, i.e. < 1.

Profitability of Far East in 2000 $= \dfrac{189}{311} = < 1$

32. 4 Except Rest of Latin America and Rest of the World all the operations are greater than 2.

33. 4 Options (1), (2) and (3), are ruled out. So the correct option is (4).

34. 2 It can be easily observed from the two charts that Switzerland's ratio of chart 1 to chart 2 is $\dfrac{20}{11}$ has the highest price per unit kilogram for its supply.

35. 2 Total value of distribution to Turkey is 16% of 5760 million Euro.
Total quantity of distribution to Turkey is 15% of 1.055 million tonnes.
So the average price in Euro per kilogram for Turkey is

$\dfrac{\left(5760 \times \dfrac{16}{100}\right)}{\left(1055 \times \dfrac{15}{100}\right)} \simeq 5.6$

36. 2 BC → AC → AAC = 0

37. 3 $BD \xrightarrow{\ 0\ } AE \xrightarrow{\ 95.2\ } AAB$
∴ Least cost of sending one unit from any refinery to AAB
= 0 + 95.2 = 95.2.

38. 2 BB → AB → AAG = 311.1
Same as above.

39. 1 First we will have to check the minimum cost for receiving at AAA. This is 0 for AE. But, BB to AE is very high. Next is AC [314.5]. BB to AC is 451.1. After AC, the others are high. Hence, 314.5 + 451.1 = 765.6 is the least cost.

40. 4 Number of refineries = 6
Number of depots = 7
Number of districts = 9
Therefore, number of possible ways to send petrol from any refinery to any district is 6 × 7 × 9 = 378.

41. 2 The highest cost is for the route
BE → AE → AAH = 2193.0

For questions 42 to 47:

Position of States (Rank)	Year					
	96-97	97-98	98-99	99-00	00-01	
1	MA	MA	MA	MA	MA	
2	TN	TN	TN	TN	TN	
3	GU	AP	AP	AP	AP	
4	AP	GU	GU	GU	UP	} changed
5	KA	UP	UP	UP	GU	} twice
6	UP	KA	KA	KA	KA	
7	WB	WB	WB	WB	WB	

42. 2 From above table, we can conclude that option (2) is correct.

43. 2 On referring to the table, we can see that UP is the state which changed its relative ranking most number of times.

44. 4 We can say directly on observing the graph that the sales tax revenue collections for AP has more than doubled from 1997 to 2001.

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45. 3 Growth rate of tax revenue can be calculated as:
(Sales tax revenue of correct year – Sales tax revenue of previous year)

For year 1997-98 $\dfrac{7826 - 7290}{7826} = 0.068$

For year 1998-99 $\dfrac{8067 - 7826}{7826} = 0.030$

For year 1999-2000 $\dfrac{10284 - 8067}{8067} = 0.274$

For year 2000-01 $\dfrac{12034 - 10284}{10284} = 0.170$

46. 1 For increase by the same amount for 2 successive years, eliminate the options by subtracting only the last digit.
For Karnataka, increase in 2000-01 is 5413 – 4839 = 574 and increase in 1999-2000 is 4839 – 4265 = 574. Hence, (1) is the correct option.

47. 3 On referring to the table, we can see that Tamil Nadu has been maintaining a constant rank over the years in terms of its contribution to total tax collections.

48. 2 Only R9 is that region which produces medium quality of crop – 2 and low quality of crop – 4.

49. 4 Statement (1) is not satisfied by R9.
Statement (2) is not satisfied by R3.
Statement (3) is incorrect as there are six such regions R1, R2, R3, R4, R9 and R11.
Statement (4) is correct.

50. 3 Three regions namely R9, R10 and R11.

51. 3 Total possible arrangements = 10 × 9 × 8
Now 3 numbers can be arranged among themselves in 3! ways = 6 ways
Given condition is satisfied by only 1 out of 6 ways.
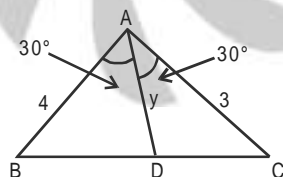Hence, the required number of arrangements

$= \dfrac{10 \times 9 \times 8}{6} = 120$

Alternate solution:
$^{10}C_3 = 120$
Any three numbers selected out of 10 numbers will have only one possible arrangement.

52. 2

Let BC = x and AD = y.

As per Bisector Theorem, $\dfrac{BD}{DC} = \dfrac{AB}{AC} = \dfrac{4}{3}$

Hence, BD $= \dfrac{4x}{7}$; DC $= \dfrac{3x}{7}$

In $\triangle ABD$, $\cos 30^\circ = \dfrac{(4)^2 + y^2 - \dfrac{16x^2}{49}}{2 \times 4 \times y}$

$\Rightarrow 2 \times 4 \times y \times \dfrac{\sqrt{3}}{2} = 16 + y^2 - \dfrac{16x^2}{49}$

$\Rightarrow 4\sqrt{3}y = 16 + y^2 - \dfrac{16x^2}{49}$ ... (i)

Similarly, from $\triangle ADC$, $\cos 30^\circ = \dfrac{9 + y^2 - \dfrac{9x^2}{49}}{2 \times 3 \times y}$

$\Rightarrow 3\sqrt{3}y = 9 + y^2 - \dfrac{9x^2}{49}$ ... (ii)

Now (i) × 9 – 16 × (ii), we get

$36\sqrt{3}y - 48\sqrt{3}y = 9y^2 - 16y^2 \Rightarrow y = \dfrac{12\sqrt{3}}{7}$
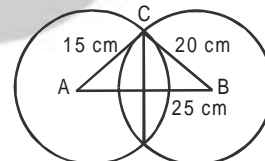
Alternate solution:
Area of $\triangle ABC$ = Area of $\triangle ABD$ + Area of $\triangle ADC$

$\Rightarrow \dfrac{1}{2} \times 4 \times 3 \sin 60^\circ = \dfrac{1}{2} \times 4 \times y \sin 30^\circ + \dfrac{1}{2} \times 3 \times y \times \sin 30^\circ$

$\Rightarrow 12\sqrt{3} = 4y + 3y$

$\Rightarrow y = \dfrac{12\sqrt{3}}{7}$

53. 1

Let the length of the chord be x cm.

$\therefore \dfrac{1}{2}(15 \times 20) = \dfrac{1}{2} \times 25 \times \dfrac{x}{2} \Rightarrow x = 24$ cm

54. 2 $f(x) + f(y) = \log\left(\dfrac{1+x}{1-x}\right) + \log\left(\dfrac{1+y}{1-y}\right)$

$= \log\left(\dfrac{(1+x)\ (1+y)}{(1-x)(1-y)}\right)$

$= \log\left(\dfrac{1+x+y+xy}{1+xy-x-y}\right)$

$= \log\left(\dfrac{1+xy+x+y}{1+xy-(x+y)}\right)$

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$$= \log\left(\frac{1+\left(\dfrac{x+y}{1+xy}\right)}{1-\left(\dfrac{x+y}{1+xy}\right)}\right)$$

$$= f\left(\frac{x+y}{1+xy}\right)$$

55. 1   Total area = 14 × 14 = 196 m²

Grazed area = $\left(\dfrac{\pi \times r^2}{4}\right) \times 4$

$= \pi r^2 = 22 \times 7$ (r = 7 m) = 154 m²

Ungrazed area is less than (196 − 154) = 42 m², for which there is only one option i.e. 22 m².

56. 4   Every trip will need more than 180 m and there are

$4\dfrac{1}{2}$ trips. Hence, the distance covered will be greater

than 750 m, for which there is only one option = 860.

Alternative method:
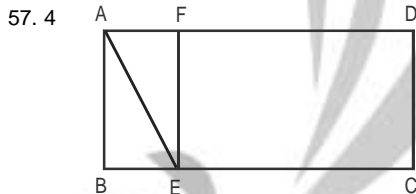For the first stone, he will cover 100 m.
For second, 200 − 4 = 196 m
For third, 200 − 8 = 192 m
For fourth, 200 − 12 = 188 m
For fifth, 200 − 16 = 184 m
Hence, total distance = 860 m

57. 4

Area of ∆ABE = 7 cm²
Area of rectangle ABEF = 14 cm²
∴ Area of ABCD = 14 × 4 = 56 cm²

58. 2
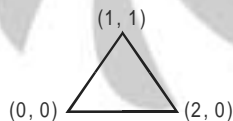
Let a = 0

Hence, area = $\dfrac{1}{2}$(2) (1) = 1

Note: Answer should be independent of a and area of the triangle does not have square root.

59. 4   Check choices, E.g. $\dfrac{1}{2}$ ⇒ Diagonal = $\sqrt{5}$

Distance saved = $3 - \sqrt{5} \approx 0.75 \neq$ Half the larger side. Hence, incorrect.

$\dfrac{3}{4} \Rightarrow$ Diagonal = 5

Distance saved = (4 + 3) − 5 = 2 = Half the larger side.

60. 4   If speed of N = 4, speed of S = 1,

⇒ Average speed = $\dfrac{2 \times 4 \times 1}{4+1} = 1.6$

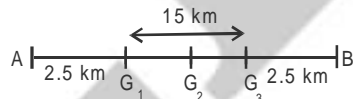Because time available is $\dfrac{2}{3}$, speed = $\dfrac{3}{2}$

Now average speed = 2.4
Now speed of N = 8
Now speed of S = y

$\dfrac{2 \times 8 \times y}{8+y} = 2.4 \Rightarrow y = 1.3$

Required ratio = 1.3 : 8 ≈ 1 : 6

61. 3

Let G_1, G_2 and G_3 be the three gutters such that $G_2G_3 = 2\,G_1G_2$.
$AG_1 = 5$ min × 30km/hr = 2.5 km
∴ $G_1G_3 = 20 - 2 \times 2.5 = 15$ km
Time taken to cover AG_1 = 5 min
Time taken to cover ($G_1G_3 + G_3A$)

$= \dfrac{(15+17.5)\text{km}}{2 \times 30 \text{ km/hr}} = \dfrac{32.5}{60} \times 60 = 32.5$ minutes

The patient reaches the hospital in a total of (32.5 + 5) = 37.5 minutes
Maximum time that the doctor gets to attend the patient = 40 − 37.5 − 1 = 1.5 minutes.

62. 2   Check choices
Choice (2) 54 ⇒ S = $(5 + 4)^2$ = 81
⇒ D − S = 81 − 54 = 27. Hence, the number = 54

63. 4 $x_0 = x$
$x_1 = -x$
$x_2 = -x$
$x_3 = x$
$x_4 = x$
$x_5 = -x$
$x_6 = -x$
…………
⇒ Choices (1), (2), (3) are incorrect.

64. 3 $xy + yz + zx = 3$

$\Rightarrow xy + (y + x)z = 3$

$\Rightarrow xy + (y + x)(5 - x - y) = 3$

$\Rightarrow x^2 + y^2 + xy - 5x - 5y + 3 = 0$

$\Rightarrow y^2 + (x - 5)\,y + x^2 - 5x + 3 = 0$

As it is given that y is a real number, the discriminant for above equation must be greater than or equal to zero.

Hence, $(x - 5)^2 - 4(x^2 - 5x + 3) \geq 0$

$\Rightarrow 3x^2 - 10x - 13 \leq 0$

$\Rightarrow 3x^2 - 13x + 3x - 13 \leq 0$

$\Rightarrow x \in \left[-1, \dfrac{13}{3} \right]$

Largest value that x can have is $\dfrac{13}{3}$.

65. 3   Area = 40 × 20 = 800 m².
If 3 rounds are done, area = 34 × 14 = 476 m²
$\Rightarrow$ Area > 3 rounds
If 4 rounds $\Rightarrow$ Area left = 32 × 12 = 347 m²
Hence, area should be slightly less than 4 rounds.

66. 2   Since thief escaped with 1 diamond,
Before 3rd watchman he had (1 + 2) × 2 = 6 diamonds.
Before 2nd watchman he had (6 + 2) × 2 = 16 diamonds.
Before 1st watchman he had (16 + 2) × 2 = 36 diamonds.

67. 2   Mayank paid $\dfrac{1}{2}$ of the sum paid by other three.

$\Rightarrow$ Mayank paid $\dfrac{1}{3}$rd of the total amount = \$20.

Similarly, Mirza paid \$15 and Little paid \$12.
Remaining amount of \$60 − \$20 − \$15 − \$12 = \$13 is paid by Jaspal.

68. 4   Let the number of gold coins = x + y
$\therefore 48(x - y) = x^2 - y^2$
$\Rightarrow 48(x - y) = (x - y)(x + y) \Rightarrow x + y = 48$
Hence, the correct choice will be none of these.

69. 3   Let's assume that
p days : they played tennis
y days : they went for yoga
T days : total duration for which Ram and Shyam stayed together
$\Rightarrow$ p + y = 22
(T − y) = 24 and (T − p) = 14
Adding all of them,
2T = 22 + 24 + 14 $\Rightarrow$ T = 30 days.

70. 1   Coefficient of $x^n = \dfrac{1}{2}(n + 1)(n + 4)$

$S = 2 + 5x + 9x^2 + 14x^3 + ...$

$xS = \quad 2x + \quad 5x^2 + ...$

$S(1 - x) = 2 + 3x + 4x^2 + 5x^3 + ...$

Let $S_1 = S(1 - x) \Rightarrow S_1 = 2 + 3x + 4x^2 + ...$

$xS_1 = \quad 2x + 3x^2 + ...$

$S_1(1 - x) = 2 + x + x^2 + ...$

$S_1(1 - x) = 2 + \dfrac{x}{1 - x}$

$S(1 - x)^2 = 2 + \dfrac{x}{1 - x} \Rightarrow S = \dfrac{2 - x}{(1 - x)^3}$

71. 3 $x^2 + 5y^2 + z^2 = 4yx + 2yz$

$(x^2 + 4y^2 - 4yx) + z^2 + y^2 - 2yz = 0$

$(x - 2y)^2 + (z - y)^2 = 0$

It can be true only if x = 2y and z = y

72. 2   Let the number be ab.
Arithmetic mean is more by 1.8 means sum is more by 18.
$\therefore (10b + a) - (10a + b) = 18$
$\Rightarrow 9\,(b - a) = 18$
$\Rightarrow b - a = 2$.

73. 3   By trial and error:
30 × 12 = 360 > 300
30 × 7.5 = 225 < 300
50 × 6 = 300. Hence, he rented the car for 6 hr.

74. 4 $575 = \dfrac{n^2 + n}{2} - x$

$1150 = n^2 + n - 2x$

$n(n + 1) \geq 1150$

$n^2 + n \geq 1150$
The smallest value for it is n = 34.
For n = 34
$40 = 2x \Rightarrow x = 20$

75. 4 $x - 1 \leq [x] \leq x$

$2x + 2y - 3 \leq L(x, y) \leq 2x + 2y \Rightarrow a - 3 \leq L \leq a$

$2x + 2y - 2 \leq R(x, y) \leq 2x + 2y \Rightarrow a - 2 \leq R \leq a$

Therefore, $L \leq R$

Note: Choice (2) is wrong, otherwise choice (1) and choice (3) are also not correct. Choose the numbers to check.

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76. 1 Number of regions $= \dfrac{n(n+1)}{2} + 1$, where n = Number of lines, i.e. for 0 line we have region = 1.
For 1 line we have region = 2.
It can be shown as:

Number of lines	0	1	2	3	4	5	...	10
Number of regions	1	2	4	7	11	16	...	56

Therefore, for n = 10, it is $\dfrac{10 \times 11}{2} + 1 = 56$

77. 1 $\left(2^4\right)^{64} = (17-1)^{64} = 17n + (-1)^{64} = 17n + 1$

Hence, remainder = 1

78. 4 $\dfrac{A^2}{x} + \dfrac{B^2}{x-1} = 1 \Rightarrow A^2(x-1) + B^2 x = x^2 - x$

When one of A or B is zero, it will be a linear equation which will have one real root. When both A and B are non-zero, it will be a quadratic equation which can have two real roots.

79. 2 Since each word is lit for a second, least time after which the full name of the bookstore can be read again

$= \text{LCM}\left(\dfrac{5}{2}+1, \dfrac{17}{4}+1, \dfrac{41}{8}+1\right) = \text{LCM}\left(\dfrac{7}{2}, \dfrac{21}{4}, \dfrac{49}{8}\right)$

$= \dfrac{\text{LCM}(7,21,49)}{\text{HCF}(2,4,8)} = \dfrac{49 \times 3}{2} = 73.5 \text{ s}.$

80. 4 $\text{HCF}\left(\dfrac{9}{2}, \dfrac{27}{4}, \dfrac{36}{5}\right) = \dfrac{\text{HCF}(9, 27, 36)}{\text{LCM}(2, 4, 5)} = \dfrac{9}{20}$ lb
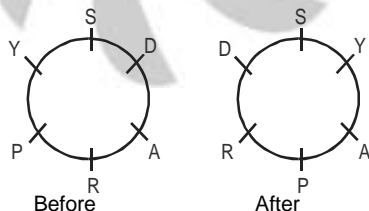
= Weight of each piece
Also, total weight of three pieces of cakes = 18.45 lb
∴ Maximum number of guests that could be entertained

$= \dfrac{18.45 \times 20}{9} = 41.$

81. 4 $3(4(7x+4)+1)+2 = 84x + 53$
Therefore, remainder is 53.

82. 3

Before   After

Suresh is sitting to the left of Dhiraj.

83. 4 Number of oranges at the end of the sequence
= Number of (2s) − Number of (4s) = 6 − 4 = 2

84. 3 Number of (1s + 2s + 3s) − 2(Number of 4s) = 19 − 8
= 11

85. 1 11 × 10 × 9 × 8 = 7920

86. 3 Total number of passwords with atleast 1 symmetric letter
= Total number of passwords using all letters − Total number of passwords using no symmetric letters
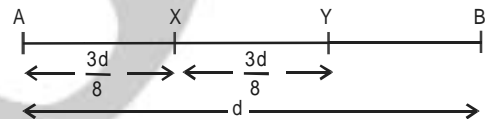= (26 × 25 × 24) − (15 × 14 × 13) = 12870

87. *2 AB is the tunnel and 'd' km be its length.
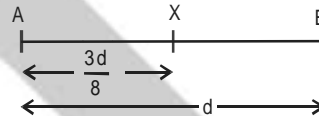
Let the current position of the cat be X. If it runs towards A, it would reach A at the same time as the train reaches A.
However, if it runs towards the other end B, it would reach point Y at the same time when the train reaches A. Hence, point Y would be at a distance of $\dfrac{3d}{8}$ km from X

As the cat and the train would reach B simultaneously, the cat would cover the rest $\dfrac{2d}{8} = \dfrac{d}{4}$ km distance in the same time that the train takes to cover the whole tunnel i.e. d km.
Therefore, the speed of the train = 4 × the speed of the cat
Hence, ratio of the speeds of the train and cat is 4 : 1.

* The language in the question is slightly ambiguous. A possible interpretation is that the ratio of their speeds is to be determined which is correctly 4 : 1.

88. 3 Let the largest piece = 3x
Middle = x
Shortest = 3x − 23
∴ 3x + x + (3x − 23) = 40
⇒ x = 9
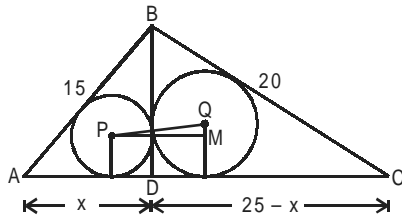∴ The shortest piece = 3(9) − 23 = 4

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89. 2 Each traveller had $\frac{8}{3}$ loaves.

$\Rightarrow$ First traveller has given $5 - \frac{8}{3}$ loaves to the third.

Second traveller sacrificed only $3 - \frac{8}{3} = \frac{1}{3}$rd of a loaf.

So, first should get 7 coins.

90. 2

$(15)^2 - x^2 = (20)^2 - (25 - x)^2$

$\Rightarrow x = 9$

$\Rightarrow BD = 12$

Area of $\Delta ABD = \frac{1}{2} \times 12 \times 9 = 54$

$s = \frac{1}{2}(15 + 12 + 9) = 18$

$r_1 = \frac{\text{Area}}{s} \Rightarrow r_1 = 3$

Area of $\Delta BCD = \frac{1}{2} \times 16 \times 12 = 96$

$s = \frac{1}{2}(16 + 20 + 12) = 24$

$r_2 = \frac{\text{Area}}{s} \Rightarrow r_2 = 4$

In ΔPQM, $PM = r_1 + r_2 = 7$ cm
   $QM = r_2 - r_1 = 1$ cm

Hence, $PQ = \sqrt{50}$ cm

91. 4 $u^m + v^m = w^m$

$u^2 + v^2 = w^2$

Taking Pythagorean triplet 3, 4 and 5, we see that m < min (u, v, w).
Also, $1^1 + 2^1 = 3^1$ and hence, m $\leq$ min (u, v, w).

92. 4 A black square can be chosen in 32 ways. Once a black square is there, you cannot choose the 8 white squares in its row or column. So the number of white squares available = 24
Number of ways = 32 × 24 = 768

93. 4 $7^{6n} - 6^{6n}$

Putting n = 1.

$7^6 - 6^6 = (7^3 - 6^3)(7^3 + 6^3)$

This is a multiple of $7^3 - 6^3 = 127$ and $7^3 + 6^3 = 559$ and $7 + 6 = 13$. Hence, all of these is the right answer.

94. 3 Given pqr = 1 $\Rightarrow$ pq = $\frac{1}{r}$ and $\frac{1}{p}$ = qr

$\dfrac{1}{1 + p + q^{-1}} + \dfrac{1}{1 + q + r^{-1}} + \dfrac{1}{1 + r + p^{-1}}$

$= \dfrac{q}{1 + q + pq} + \dfrac{r}{1 + qr + r} + \dfrac{1}{1 + r + qr}$

$= \dfrac{qr}{1 + qr + r} + \dfrac{r}{1 + qr + r} + \dfrac{1}{1 + r + qr} = \dfrac{1 + r + qr}{1 + r + qr} = 1.$

Alternate solution:
Putting x = y = z = 1, we get

$\dfrac{1}{1 + p + q^{-1}} + \dfrac{1}{1 + q + r^{-1}} + \dfrac{1}{1 + r + p^{-1}}$

$= \dfrac{1}{1 + 1 + 1} + \dfrac{1}{1 + 1 + 1} + \dfrac{1}{1 + 1 + 1} = \dfrac{1}{3} + \dfrac{1}{3} + \dfrac{1}{3} = 1.$

95. 4 Total amount of work = 60 man-hours
From 11 am to 5 pm, 6 technicians = 36 man-hours
From 5 pm to 6 pm, 7 technicians = 7 man-hours
From 6 pm to 7 pm, 8 technicians = 8 man-hours
From 7 am to 8 pm, 9 technicians = 9 man-hours
Total = 60 man-hours

96. 2 Number of samosas = 200 + 20n, n is a natural number.
Price per samosa = Rs.(2 – 0.1n)
Revenue = (200 + 20n)(2 – 0.1n) = 400 + 20n – 2n^2
= 450 – 2 (n – 5)^2
Revenue will be maximum if n – 5 = 0
$\Rightarrow$ n = 5
$\therefore$ Maximum revenue will be at (200 + 20 × 5)
= 300 samosas.

97. 2 Three small pumps = Two large pumps

Three small + One large pumps = Three large pump

$\therefore$ $\frac{1}{3}$ rd of total time is taken by the large pump alone.

98. 4 If KL = 1, then IG = 1 and FI = 2

Hence, $\tan\theta = \frac{2}{1} = 2$

Thus, θ none of 30°, 45° and 60°.

99. 3 Area of quadrilateral ABCD $= \frac{1}{2}(2x + 4x) \times 4x = 12x$

Area of quadrilateral DEFG $= \frac{1}{2}(5x + 2x) \times 2x = 7x$

Hence, ratio = 12 : 7

100. 3 Number of ways for single digit = 2
2 digits = 2 × 3 = 6
3 digits = 2 × 3 × 3 = 18
4 digits = 2 × 3 × 3 × 3 = 54
5 digits = 2 × 3 × 3 × 3 × 3 = 162
6 digits = 2 × 3 × 3 × 3 × 3 × 3 = 486
Total number of ways = 728

101. 3 The size of the pitch is the usage of measure.
The vessel is used to take out a litre of oil.
Action against tresspassers was instituted in the campus.
Sheila ascertained the measurement of each item.

102. 2 Dinesh could not stand the discussion and he was forced to walk out.
Vidya's story is the limit, very hard to believe.
Jyoti wanted to go to the Bar.
The forces were such that he was certain to go over the edge.

103. 4 Hussain tried to capture the spirit of India in this painting (on the canvas).
Sorry, I could not understand what you just said.
Is there some deception (vanishing act) in this proposal?
All her friends agreed that Prakash was a person worth entrapping in the snares of romance.

104. 2 I decided not to do business in handmade cards.
My brother is a trader of cards.
Dinesh insisted on giving out the cards to the players.
This contract is concerned with handmade cards.

105. 4 Ashish asked Laxman to turn his face in a new direction.
Leena never sent a beggar away without offering anything.
The old school building has taken the form of a museum.
Now he had the opportunity to voice his protest.

106. 3 The reason why the demand for branded diapers may be price-sensitive is given in A. This is supported by DB. C contrasts, supported by the example in E. F can be linked with private-labels.

107. 1 (3) is a haphazard choice with no definite beginning, middle or end. Discipline goes better with strong focus as in AC. E further elaborates. DBF talks about making strategy foolproof through the value chain.

108. 3 BEA form a mandatory sequence. 'They' in E refers to ambassadors' in B. Further E also follows B because it goes on to explain why ambassadors have to choose their words as stated in B. A carries forward the same argument by elaborating further about their job. Hence, option (3) is correct.

109. 4 The 'recent revival' in C elaborates 'an inadequate monsoon' in E. Hence, EC forms a mandatory pair. D follows B and A concludes the paragraph. Hence, option (4) is correct.

110. 2 BE is a mandtory pair. B talks about a question regarding the shape of the earth and E answers the question. ED is another mandatory pair wherein E talks about the question of 'how much more' and D answers the question by stating "One way of doing that is to determine..." The mandatory sequence BED is only there in option (2). Hence, option (2) is correct.

111. 3 Obviously is the right answer as it matches the tone of great simplifications.

112. 1 Numerical value in the earlier paragraph points to quantitatively as the answer.

113. 4 Assess alternatives that follows the blank gives the answer alternatives.

114. 3 The passage deals with firing employees.

115. 1 Resolve means to find a solution to something.

116. 4 The failed product would not be present had it not passed through the process.

117. 3 This is a simple question of parallelism, not that it is ... but that it is.

118. 2 You generate money through deals, and not by deals or on deals. The two factors — escalated costs and black money — are lucidly given in (2).

119. 3 We always have to use the conjunction between to compare prices at two levels.

120. 2 Reduce and encourage will make a parallel construction. Action is taken by someone, not of someone.

121. 1 Opprobrium is the state of being abused or scornfully criticized.

122. 4 Portend means to predict or foreshadow.

123. 1 Prevaricate means to speak evasively with intent to deceive.

124. 3 Restive means to be restless or nervous.

125. 1 Ostensible means what is apparent or seeming to be the situation.

126. 3 Refer 2nd para, especially to the part: 'Then Indian historians trained in … mainly political.'

127. 2 (1), (3) and (4) seem to be superficial answers. (2) matches the syntax of the statement given in the question.

128. 3 Refer to the part glamour departed from politics.

129. 4 (4) is mentioned as a desirable characteristic towards the end of the passage.

130. 1 In (1), the writers and their respective approaches are correctly matched as per the information given in the passage.

131. 1 Refer to the part abortion access when their countries were perceived to have an overpopulation problem.

132. 4 (1), (2) and (3) are stated towards the end of the second paragraph and the beginning of the third paragraph.

133. 4 (1), (2) and (3) are too far-fetched and find no place in the passage.

134. 4 (1) need not be necessarily true as an inference. (2) and (3) are explicitly stated towards the end of the penultimate paragraph.

135. 2 Refer towards the end of the fourth paragraph. (2) comes closest to what the writer wants to say.

136. 4 (1), (2) and (3) find no place in the passage to support the pro-choice lobby.

137. 2 Simple. Just read the last line of the passage.

138. 2 (1), (3) and (4) are factually incorrect as per information given in the 3rd paragraph. (2) comes closest to the central idea in the third paragraph.

139. 4 The writer does not harbour a very favorable view of theologians, refer to all too definite.

140. 4 (1), (2) and (3) take the form of questions raised by the writer in the course of the passage.

141. 4 Refer towards the end of the second paragraph.

142. 1 Refer to inside of a cell bustles with more traffic and polymers, along which bundles of molecules travel like trams.

143. 1 Refer to 'The dynein motor ... is still poorly understood and without motor proteins. Our muscles wouldn't contract'.

144. 2 Refer to the part without motor proteins ... We couldn't grow and these particles create an effect that seems to be so much more than the sum of its parts.

145. 1 Refer to the part three families of proteins, called myosin, kinesin and dynein and the growth process requires cells to duplicate their machinery and pulls the copies apart.

146. 3 Refer to the part They think for us and is giving the language a lot of responsibility.

147. 4 (4) does not qualify as rhetoric on the basis of information given in the fourth paragraph. Commands are, at best, staid.

148. 3 (1), (2) and (4) cannot qualify as an answer as they sound extreme or implausible. (3) comes closest to what the writer would like to suggest.

149. 1 Arcane in the context of usage in the passage means esoteric.

150. 3 Refer to the part bringing scholars to accept the better argument and reject the worse.