

CAT 2006 Actual Paper

Answers and Explanations

1	1	2	3	3	4	4	5	5	5	6	3	7	1	8	1	9	4	10	5
11	4	12	2	13	2	14	2	15	3	16	3	17	2	18	1	19	5	20	4
21	5	22	2,3	23	1,4	24	4	25	3	26	5	27	1	28	2	29	3	30	4
31	2	32	1	33	4	34	5	35	3	36	3	37	2	38	5	39	1	40	4
41	3	42	1	43	4	44	2	45	4	46	3	47	5	48	4	49	2	50	1
51	1	52	2	53	1	54	2	55	5	56	2	57	2	58	4	59	2	60	4
61	2	62	4	63	1	64	4	65	4	66	3	67	2	68	5	69	1	70	5
71	5	72	5	73	2	74	5	75	3										

	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
LRDI	1 to 25	25					
EU + RC	26 to 50	25					
QA	51 to 75	25					
Total		75					

For questions 1 to 5:

From statement one, team would include exactly one among P, R, S
 $\Rightarrow P$ (or) R (or) S.

From statement two, team would include either M, or Q
 $\Rightarrow M$ but not Q
 (or) Q but not M

From statement three, if a team includes K, it will include L or vice versa.
 $\Rightarrow K, L$ always accompany each other.

From statement four, if one of S, U, W is included, then the other two also have to be included.
 $\Rightarrow S, U, W$ are always together.

From statement five, L and N cannot be included together
 $\Rightarrow L, N$ are never together.

From statement six, L and U cannot be included together.
 $\Rightarrow L, U$ are never together.

1. 1 From statements one and two;
 one of P, R, S and
 one of M, Q are to be selected. We require one more member.
 But from statement three; (K, L) are always together.
 Hence 'L' cannot be included in a team of 3 members.

2. 3 Again, from statement one;
 one of P, R, S has to be selected.

To make a team of '5'
 'S' will be chosen (which leaves out P and R)
 \Rightarrow If 'S' is chosen 'U' and 'W' have to be chosen (statement four)
 \Rightarrow If 'U' is chosen 'L' cannot be chosen (statement five)
 \Rightarrow K cannot be chosen (statement three)
 And from statement two; one of M (or) Q has to be chosen.

3. 4 From statements one and two
 Two members are to be selected.
 Of the remaining seven;
 To maximize the size of the team.
 We would chose S,
 \Rightarrow U and W are included in the team (statement four)
 We cannot include K (or) L because we would then have to leave out N and U (from statements five and six)

4. 5 If 'K' is included 'L' has to be included (statement three)
 If 'L' is chosen neither N nor U can be chosen (statements five and six)
 $\Rightarrow S, W$ are also not included because S, U, W have to be always together. (Statement four)

Hence one of P (or) R would be selected (statement one) and one of M (or) Q would be selected statement (two)
 (K, L) and two of the above five have to be included.

5. 5 If a team includes N, it cannot include 'L'.
 And therefore not even 'K' (from statement five and three)

According to statement one
 One of P (or) R (or) S has to be included.
 According to statement two
 One of M (or) Q has to be selected.

So the following cases are possible
 P Q N,
 R Q N
 P M N,
 R M N

If 'S' is selected
 S U W M N
 S U W Q N

are the only possible cases.
 Hence in all $4 + 2 = 6$ ways can be constituted.

For questions 6 to 10:

6. 3 Let Dipan get x marks in paper II
 Dipan's average in PCB group = 98
 Maths group = 95
 S.S. group = 95.5
 Vernacular group = 95
 English group = $\left(\frac{96+x}{2} \right)$

Sum of all = 96×5

$$95.5 + 96 \times 3 + 48 + \frac{x}{2} = 96 \times 5$$

$$\Rightarrow \frac{x}{2} = 96 \times 2 - 95.5 - 48$$

$$x = 2(96.5 - 48) = 2 \times 48.5 = 97$$
 So, answer is (3)

7. 1 The only boy getting 95 in atleast one of the subjects of the group among all the groups is Dipan.
 So answer is option (1).

8. 1 A group score of 100 in Social Science would have increased the scores as follows:

	Score Increase	Group Score	Final Score Increase	Final group Score
Pritam	22	11	$\frac{11}{5} = 2.2$	96.1
Joseph	9	4.5	$\frac{4.5}{5} = .9$	95.9
Trina	21	10.5	$\frac{10.5}{5} = 2.1$	95.8
Agni	9	4.5	$\frac{4.5}{5} = .9$	95.2

So, the order is Pritam > Joseph > Trina > Agni.
Option (1).

9. 4 The student having atleast 95 in every group is Dipan, so the answer is Dipan, option (4).
10. 5 Let us increase the score in one of the subjects of the following candidates

	Least Scores	Contribution in net Score	Final Score
Ram	94 in group of 2	3 in 5 groups	$96.1 + .6 = 96.7$
Agni	82 in group of 2	9 in 5 groups	$94.3 + 1.8 = 96.1$
Pritam	83 in group of 2	8.5 in 5 groups	$93.9 + 1.7 = 95.6$
Ayesha	93 in group of 2	3.5 in 5 groups	$96.2 + .7 = 96.9$
Dipan	95 in group of 1	5 in 5 groups	$96 + 1 = 97.0$

So, Dipan will end with a highest total.
So the answer is option (5).

For questions 11 to 15:

As only Paul Erdős was having an Erdős number of zero so the minimum Erdős number among A, B, C, D, E, F, G, H should be 1 or greater than one. At the end of the third day F co-authored a paper with A and C. F had the minimum Erdős number among the 8 people. So if F's Erdős number is y, then A and C's Erdős number should change to (y + 1) after third day. As A and C decreased the average by maximum possible extent, it means C had the second-highest Erdős number among all eight, as A had an Erdős number of infinity. Suppose Erdős numbers of A, B, C, D, E, F, G, H are y + 1, b, y + 1, c, d, e, y, g, h respectively at the end of third day.

$$\therefore (y + 1 + b + y + 1 + c + d + e + y + g + h) = 24 = (3 \times 8)$$

$$3y + 2 + b + d + e + g + h = 24$$

When E co-authored with F, the average Erdős number reduced again, it means, E's Erdős number was not the same with A & C initially. As at the end of third day, 5 people had same Erdős number, they should be A, C and any 3 out of B, D, G, H. Suppose those 3 people are B, D, G. Then

$$(3y + 2 + y + 1 + y + 1 + y + 1 + e + h) = 24$$

$$6y + h + e = 19 \quad \dots(i)$$

On the fifth day E co-authored a paper with F and hence Erdős number of E changed to (y + 1). Also the average decreased by 0.5 that means the total decreased by

$$\text{Hence, } e - (y + 1) = 4$$

$$\Rightarrow e - y = 5$$

Putting the value of e in equation (i), we get

$$6y + h + (5 + y) = 19$$

$$7y + h = 14$$

Only possible value of y = 1 as h cannot be zero.

So after 3rd round Erdős number of A, C, E, F were 2, 2, 6, 1 respectively.

11. 4 Only A, C, E changed their Erdős number, rest 5 did not change their Erdős number.

12. 2 At the end of conference 6 people including E were having an Erdős number of 2 and F was having 1 as Erdős number. So 8th person was having an Erdős number of $[20 - (2 \times 6 + 1)] = 7$

13. 2 As at the end of 3rd round 5 people were having same Erdős number. A and C changed their Erdős number after coauthoring with F. So, the other 3 would have same Erdős number in the beginning.

14. 2 2

15. 3 After co-authoring with F, E was having Erdős number of 2, which was 4 less than initial Erdős number of E. So answer is $2 + 4 = 6$.

For questions 16 to 20:

16. 3

	Day 1	Day 2	Day 3	Day 4	Day 5
Start price	100	90	100	110	120
End price	90	100	110	120	110

In the above table Chetan sold shares on Day 2, Day 3 and Day 4 whereas Michael sold shares on Day 4 only. Therefore at the end of day 3 the price of Share is Rs. 110.

17. 2

	Day 1	Day 2	Day 3	Day 4	Day 5
Start price	100	90	100	110	100
End price	90	100	110	100	100

Let initial amount with Chetan and Michael is y. Total Money with Chetan = $y - 900 + 1000 + 1100 + 1200 - 1100 = y + 1300$
Total money with Michael = y
Therefore Chetan ended up with Rs.1300 more cash than Michael.
Therefore at the end of day 4 the price of Share is Rs. 100.

18. 1

	Day 1	Day 2	Day 3	Day 4	Day 5
Start price	100	90	80	90	100
End price	90	80	90	100	110

Assume initial number of share with Chetan and Michael is x. In the above table Chetan buy 10 share each on day 1, day 2 and sold 10 share on day 3, day 4 and day 5.

\therefore Total shares with Chetan is $x - 10$.
In the above table Michael buy shares only on day 2.
 \therefore Total shares with Michael is $x + 10$.
 \therefore Michael had 20 shares more than Chetan.
Therefore at the end of day 3 the price of share is Rs. 90.

19. 5

	Day 1	Day 2	Day 3	Day 4	Day 5
Start price	100	90	100	110	120
End price	90	80	110	120	110

Let initial amount with Chetan and Michael is Y. Total money with Chetan = $Y - 900 + 1000 + 1100 + 1200 - 1100 = Y + 1300$
Total money with Michael = $Y + 1200$
Therefore difference between Chetan and Michael is Rs. 100 and Number of shares with Michael and Chetan is same.

20. 4

	Day 1	Day 2	Day 3	Day 4	Day 5
Start price	100	110	120	130	120
End price	110	120	130	120	110

Let initial amount with Chetan and Michael is Y. Chetan sold shares on Day 1, Day 2, Day 3 whereas buys shares on Day 4 and Day 5.
Total Money with Chetan is = $Y + 110 \times 10 + 120 \times 10 + 130 \times 10 - 120 \times 10 - 110 \times 10 = Y + 1300$
Total money with Michael = $Y + 1200$
Total money with Michael = $Y + 120 \times 10 + 130 \times 10 + 120 \times 10 = Y + 3700$
Total money with Michael & Chetan = $2Y + 5000$.
Therefore maximum possible increase is 5000.

For questions 21 to 25:

In this set the fuel cost for each of the path is given. In addition there are four toll collection junctions.

21. 5

No traffic flows on the street from D to T
Now we have fuel cost on different paths as
SAT $9 + 5 =$ Rs. 14 + toll at junction A
SBAT $2 + 2 + 5 =$ Rs. 9 + toll at junction B and D
SBCT $2 + 3 + 2 =$ Rs. 7 + toll at junction B and C
SDCT $7 + 1 + 2 =$ Rs. 10 + toll at junction D and C
Now checking the options we find that toll at junction A is 0 or 1.
When toll is 0, fuel cost on SAT = $14 + 0 =$ Rs. 14
When toll is 1, fuel cost on SAT = $14 + 1 =$ Rs. 15
The fuel cost on all the paths should be equal.
Option, (1), (2), (3) can be ruled out as in all these options toll at C and D adds up to more than Rs. 5. As fuel cost on SDCT is Rs. 10 without toll, so with toll it cannot exceed Rs. 15 (i.e. toll of path SAT).
Option (4) is ruled out as in this option SAT comes out to be Rs. 14 and SDCT sums up to 15.
Correct answer is option (5).

22. 2 & 3

Available routes are

SAT → Rs. 14

SBAT → Rs. 9

SDCT → Rs. 10

SDT → Rs. 13

Now fuel cost of SAT - fuel of SDT = $14 - 13 = \text{Rs. } 1$.

Hence toll at junction D should be 1 more than the toll at A. So option (1), (4) and (5) are ruled out.

Now fuel cost of SAT - fuel cost of SBAT = $14 - 9 = \text{Rs. } 5$. So toll at junction B should be Rs. 5. So answer could be either (2) or option (3).

23. 1 & 4

Note: Both the options (1) and (4) are correct.

Available paths considering no toll are

SAT → Rs. 14

SBCT → Rs. 7

SBAT → Rs. 9

SDCT → Rs. 10

SDT → Rs. 13

Fuel cost on path SAT - fuel cost on SDT = $14 - 13 = \text{Rs. } 1$, toll at junction D should be 1 more than the toll at junction A.

So option (2), (3) and (5) are ruled out.

Checking options (1) and (4).

When $A = 0$, paths SAT, SBAT and SDT are equally likely to be taken by a motorist.When $A = 1$, toll at B and C should be equal to Rs. 5 and Rs. 3 respectively.

24. 4

Available routes are

SAT → Rs. 14

SBAT → Rs. 9

SBCT → Rs. 7

SDCT → Rs. 10

SDT → Rs. 13

Fuel cost on path SAT - fuel cost on path SDT = $14 - 13 = \text{Rs. } 1$.

So the toll at junction D should be 1 more than toll at junction A. So option 1 and 3 are ruled out.

Fuel cost on path SAT - fuel cost on path SBCT = $14 - 7 = \text{Rs. } 7$.

So sum of toll at junction B and C should be 7 more than the toll at A. Hence only option (4) matches.

25. 3 We have to find a path on which minimum cost is incurred and such that total traffic through B does not exceed 70%

So, option (5) is ruled out because we can send all traffic through SDCT or SDT and meet all conditions. Option (1) is also ruled out as in that case all traffic will be passed through SBCT [not possible as traffic at B can't be more than 70%]

Option (2) is also ruled out as it is possible only when toll at junction C is 2. In that case also all traffic will pass through B.

Option (3) can be the answer, when toll at junction B is 4 and toll at junction C is 0. Then SDCT will have toll equal to Rs. 10.

As Rs. 10 is lesser than Rs. 13 so option (4) is also ruled out.

Answer is option (3).

26. 5 The paragraph stresses on the relationships between the factories, dealers and the consumers. Every entity has certain short-term expectations from each other. This makes these relationships strenuous. This strain leads to feelings of mistrust and lack of commitment. So the longer this continues, the more the chances of everyone succumbing to this vicious trap and they would soon realize that they have sacrificed long-term stability and gain for short-term benefits. Hence Option (5). Option (4) is too specific to industry (at the cost of the other players – dealers and customers), option (2) suffers from the same short-comings together with throwing the technical (unexplained) jargon 'supply chain' to us. Option (1) takes into account only 2 players and repeats what is stated in the passage about "dealers adjusting prices and making deals" in the term 'Deal making'; option (3) seems close but can be eliminated as the word 'adversary' is too strong. The passage implies that everyone tries to maximize his benefits, not that they 'oppose' one another.

27. 1 The passage heads towards describing the functions that bad / good maps (and therefore theories) serve. Just as a 'Bad theory' does not help us understand a problem, a 'good theory' is invaluable to us, though it may be simplified. 'Simplified' here implies that less valuable information is left out. According to this logic, option (2), (3), (4), get eliminated. Option (5) is close but more negative in tone than required. The word 'limitation' here indicates a short coming whereas the passage implies that it is a simplification as it would not be of practical use otherwise.

28. 2 Going with the direction of the passage, the last line is stating 'now all players "profess" to seek only peace'. Profess means to mask or to pretend. Thus option (2) which talks about the veil being lifted is the most logical statement that completes the passage. More so this also follows from the source of the text.

29. 3 The answer is very direct. With every statement of his, the author seeks to show how foolish those people are who call his advice 'rules'. After his first statement he has posed the rhetorical question "Call that a rule?" The same should follow after his second "scarcely a rule!"

30. 4 In the first part of the passage, the author seeks to explain why one who is young would exploit an entrepreneurial opportunity. Thus, in the second part of the passage once the "however" is established, evidence will seek to show how older people will be reluctant to exploit entrepreneurial opportunity. Option (2) seems correct but it only gives a general statement that with age, people become reluctant to new ideas. Between option (2) and (4), option (4) goes in continuation with the text as it states that at a mature age, people are unwilling to utilize entrepreneurial opportunities. So option (4) is correct.
31. 2 According to the passage, "A critical attitude needs for its raw material, as it were, theories or beliefs which are held more or less dogmatically". Therefore, our critical attitude is the tool by which we shape our dogmatic beliefs. Thus, the relationship of dogmatic beliefs and critical attitude is equivalent to that of a chisel and that of a marble stone.
32. 1 Option (3), (4) and (5) are ruled out because they are not supported by the passage. (negative, neutral, inferior) - Option (1) and (2) are close but (1) is better because the question is about the role of dogmatic behaviour with respect to the development of science. In the third paragraph, 8th line, it is mentioned that dogmatic attitude is pseudo/pre-scientific attitude. Science needs dogmatic beliefs for their critical revision. Beginning of fourth paragraph states that science begins with myths and criticism of myths. Thus, dogmatic behavior is required to develop science because the former serves as the base on which science is made.
33. 4 Refer to the last sentence of the second paragraph. It is clear from the context (especially from the words - 'experience', 'maturity') that time has a direct effect on the evolution of thinking. Option (4) is the only option which takes into account the element of time (the word - 'stages').
34. 5 Option (5) is correct because this statement suggests that critical attitude is a process of questioning which leads to tentative hypothesis. A critical attitude by itself is not opposed to conviction, but it tries to modify the conviction according to reason.
35. 3 Refer to the third last paragraph of the passage; dogmatic attitude is pseudo-scientific because its aim is only to verify its laws and schemata even if it has to neglect the refutations. Whereas critical attitude is flexible enough to change, refute or falsify its tenets and therefore has a questioning attitude.
36. 3 We refer to the tenth line of the third paragraph. Here Mr. Goran Lindblad admits that communism did commit brutalities but it also had positive consequences like rapid industrialization. Hence option (3) is the best answer.
37. 2 Option (4) is very blatant, but is not the 'real' reason for the attack. The reason that the West repeatedly attacks communism (as stated by the author in the last para) is that they want to establish the current capitalist order as supreme i.e. they idealise 'global capitalism'. Option (5) is close, but wrongly states that communist nations might overtake the capitalists. This is not given in the passage.
38. 5 The answer can be found in the first line of the last paragraph, which in essence implies that it is important to go beyond and look at the motives of atrocities perpetrated by different regimes. The motive is global capitalism as described in the last paragraph. Therefore, Option (5) is correct.
39. 1 (1) is the correct answer. In the fourth paragraph the author explains the 'intimate link' between colonialism and Nazism. A peripheral view of this relationship suggests that the answer should be (3) which explains the terms and ideas that were imported and used by the Nazi party. But the next few lines explain the deeper relationship that exists between the two. These lines refer to the atrocities that one race has committed upon the other. The British imposed their rule on the Indian people. Similarly, the Belgian forced labour and mass murder led to the death of 10 million Congolese. These references are clearly race centric. Therefore, (1) is correct.
40. 4 On the basis of the given choices the best answer is option (4). In the second last paragraph, the author attempts to portray the magnitude of the atrocities committed by the European Colonialists. In doing so he mentions in a sarcastic tone "Presumably European lives count for more." Thus, this is not an inference that can be drawn from the passage. The rest of the statements can be easily inferred from the passage.
41. 3 A careful scrutiny of the second paragraph reveals that the concept of "justice as fairness" is a hypothetical situation in a real society. Thus options (1), (2) and (5) can be eliminated. The possible answers are (3) or (4). (3) is more specific in comparison to option (4). Thus (3) is the correct answer.
42. 1 Refer to para 1. "Rather, the idea is that the principles...initial position of equality." Associate these lines with paragraph 2. So, option (1) can be inferred from the passage.
43. 4 Refer to the latter half in the second paragraph. In essence it states that the principles of justice should be so chosen that they neither favour or disfavour a particular class of society. A law maker who chooses the principle of justice without being aware of his status in society in the next birth exemplifies the situation that has been described as choosing the principles of justice behind a veil of ignorance. Thus

option (4) is the most appropriate choice. Option (1) is incorrect because if there is a possibility of return then the businessmen would obviously choose those principles which will favour their situation. Option (2) is incorrect because the reference to school children is quite vague. Option (3) is incorrect because if businessmen were to choose these principles then they might choose those which favour their family. Also, these businessmen are aware that there is no possibility of their return. Option (5) is incorrect because they may or may not migrate ('potential immigrants'). It also suggests that the current principles of justice in their society do not contribute to their success. If they are unsuccessful in their own society then why would they choose certain principles which do not favour their situation.

44. 2 Option (2) is correct because 'fair' in this option means 'just'. We cannot choose option (4) though it's a close choice because 'fairly' means 'gradually'. Here, the choice clearly depends upon the usage and the context of this word.

45. 4 When all children are provided free education, it indicates that the decision to do so has not been taken with any other consideration in mind, save the children's benefit. Thus, the children's family background and social status do not matter, in accordance with the passage's theme.

46. 3 Statement 3 is a fact because it is open to discovery or verification. This eliminates option (2). The words "has to be..." make statement 4 a judgement as it expresses a personal viewpoint. This eliminates options (4) & (5). As "... statistical indications..." have been referred to in statement 1, it is definitely an inference. This is because it is a conclusion about the unknown which is based on the known. The second statement is a judgement because this statement is open to debate. Therefore option (3) is the correct answer.

47. 5 Statement 3 is a judgement because it expresses a personal viewpoint regarding the consequences of red tape. This eliminates option (1). Statement 2 is a fact because the latter half of the sentence is given by way of an example and not by way of a conclusion. This eliminates option (3). Statement 1 describes what "we should..." do. This statement explains the speaker's disapproval regarding the consequences of red tape. Therefore, it is a judgement. This eliminates option (4). Statement 4 is an inference. It is known to us that a red tape procedure is a point of contact with an official. That this point of contact offers a potential opportunity is a conclusion based on this information. This makes option (5) correct.

48. 4 Statement 1 is a judgement as it is based on the author's opinion. This eliminates option (1) & (2). Statement 2 uses the general term "we". This makes it a judgement. If it had been about "I" or "us" then it would have been a fact. Statements 3 and 4 are personal opinions. Hence, the correct answer is option (4).

49. 2 Looking at the 1st statement, if you mark the keywords 'is certainly' then it gives us a clear idea that it is a point of view expressed by the author. Therefore, it is a judgement. The 2nd statement is an inference as it arrives at a conclusion from a stated premise. The 3rd statement, where the author mentions 'is the only insurance' (although there may be other insurances, that the author negates) qualifies it as a judgement. The 4th statement is a pure fact. So, option (2) is correct.

50. 1 Statement 1 is a judgement because it expresses an approval/disapproval. It is a subjective opinion- an advice given to HIV affected patients. So, options (3) & (4) can be eliminated. Statement 2 is clearly factual. This eliminates option (2). Statement 3 is a conclusion about the future scenario which is based on the "recent initiatives". Hence, this statement is an inference. In statement 4, "But how ironic ..." shows the author's disapproval. So statement 4 is a judgement. Thus, option (1) is the correct answer.

51. 1 $\frac{a}{b} = \frac{1}{3}$ $\frac{b}{c} = \frac{2}{1}$
 $\Rightarrow a : b : c = 2 : 6 : 3$
 Similarly $a : b : c : d : e : f = 6 : 18 : 9 : 18 : 6 : 24$
 $\therefore \frac{abc}{def} = \frac{6 \times 18 \times 9}{18 \times 6 \times 24} = \frac{3}{8}$
 Hence option (1).

Alternate method:

$$\frac{a}{b} \times \frac{b}{c} \times \frac{c}{d} \times \frac{d}{e} \times \frac{e}{f} = \frac{a}{f} = \frac{1}{3} \times 2 \times \frac{1}{2} \times 3 \times \frac{1}{4} = \frac{1}{4}$$

$$\frac{b}{c} \times \frac{c}{d} = \frac{b}{d} = 2 \times \frac{1}{2} = 1$$

$$\frac{c}{d} \times \frac{d}{e} = \frac{c}{e} = \frac{1}{2} \times 3 = \frac{3}{2}$$

$$\text{So, } \frac{abc}{def} = \frac{a}{f} \times \frac{b}{d} \times \frac{c}{e} = \frac{1}{4} \times 1 \times \frac{3}{2} = \frac{3}{8}$$

52. 2 Go by option, put $x = \frac{-4}{2}$

(1) $2^{-2} = \frac{1}{4}$

(2) $\frac{1}{x} \Rightarrow \frac{1}{-1/2} = -2$

(3) $\frac{1}{x^2} \Rightarrow \frac{1}{(-1/2)^2} = 4$

(4) $2^{-1/2} = \frac{1}{\sqrt{2}}$

53. 1 $t_3 t_4 t_5 \dots t_{53}$
 $\frac{3}{5} \times \frac{4}{6} \times \frac{5}{7} \times \dots \times \frac{51}{53} \times \frac{52}{54} \times \frac{53}{55} = \frac{3 \times 4}{54 \times 55} = \frac{2}{495}$

Hence option (1).

54. 2 LCM of 2, 3, 4, 6, 12 = 12

$12\sqrt[2]{6} \quad 12\sqrt[3]{3^4} \quad 12\sqrt[4]{3} \quad 12\sqrt[6]{2} \quad 12\sqrt[12]{2^1}$

$\therefore 3^4$ is greatest

Note: $n^{1/n}$ is maximum when $n = e$ (2.718). Among the options $n = 3$ is closest to the value of e .

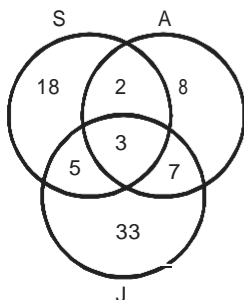
55. 5 Area of 4 walls = $x(3x + 2x) = 5x^2$

$= \frac{x}{2}[7x] = \frac{7x^2}{2}$

$\frac{5x^2 - \frac{7x^2}{2}}{5x^2}$

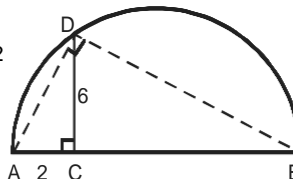
$\frac{3x^2}{10x^2} = 30\%$

56. 2



So, total people reading the newspaper in consecutive months i.e. July and August and August and Sept. is $2 + 7 = 9$ people.

57. 2



$\angle ADC = 90^\circ$ (\angle in semicircle)

$CD = AC \times CB$

$(6)^2 = 2 \times CB$

$36 = 2 \times CB$

$CB = 18$

Hence $AB = AC + CB = 20$

Area of semicircle = $\frac{1}{2} \pi (10)^2 = 50\pi$

Option is (2).

For questions 58 and 59:

Let for Raja allowed luggage be A and excess luggage be E

Hence for Praja his luggage must be $A + 2E$.

If all luggage belongs to one, $(A + 3E)$ is the excess.

E corresponds to Rs. 1200.

Hence, A must correspond to $(5400 - 3600) = \text{Rs. } 1800$

If $E = 2x$; $A = 3x$

So total weight = $2(A) + 3E = 12x$

Or $x = 5$

Hence, Praja's luggage weight = $7x = 35$ kg

Alternate method:

Let, Raja = x kg Free allowance = F kg

Praja = $(60 - x)$ kg

According to question

$(x - F)V = 1200$... (1)

{ $V =$ rate of levy on excess luggage}

$(60 - x - F)V = 2400$... (2)

$(60 - F)V = 5400$... (3)

Divide (2) equation by (1) equation:

$\frac{60 - x - F}{x - F} = 2$

$60 - x - F = 2x - 2F$

$3x - F = 60$... (4)

Divide (3) equation by (1) equation

$\frac{60 - F}{x - F} = 4.5$

$60 - F = 4.5x - 4.5F$

$4.5x - 3.5F = 60$... (5)

Multiply (4) by 1.5

$4.5x - 1.5F = 90$

$4.5x - 3.5F = 60$

$2F = 30$

$F = 15$

Put F in (4)th equation

$3x = 75 \Rightarrow x = 25$

58. 4 Praja have 35 kg luggage

59. 2 15 kg.

60. 4 Let the no. of students in front row be x .
So, the no. of students in next rows be $x - 3$,
 $x - 6$, $x - 9$... so on
If n i.e. no. of rows be 3 then no. of students
 $x + (x - 3) + (x - 6) = 630$
 $3x = 639$
 $x = 213$
So possible similarly $n = 4$
 $x + (x - 3) + (x - 6) + (x - 9) = 630$
 $4x - 18 = 630$

$$x = \frac{648}{4} = 162$$

If $n = 5$

$$(4x - 18) + (x - 12) = 630$$

$$5x - 30 = 630$$

$$x = 120$$

Again possible.

If $n = 6$

$$(5x - 30) + (x - 15) = 630$$

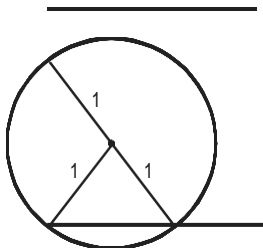
$$6x - 45 = 630$$

$$6x = 675$$

$x \neq$ Integer

Hence $n \neq 6$

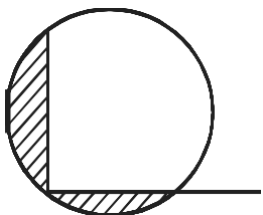
61. 2



$$\text{Remaining area} = 4 - \left(\frac{\pi}{2} + \frac{1}{2} \times 1 \times 2 \right) = \frac{6 - \pi}{2}$$

$$\text{Remaining proportion} = \frac{6 - \pi}{8}$$

62. 4



$$\text{Area} = \pi(1)^2 - \left(\frac{\pi}{2} + 1 \right) = \pi - \frac{\pi}{2} - 1 = \frac{\pi - 2}{2}$$

$$63. 1 \quad x^{2/3} + x^{1/3} - 2 \leq 0$$

$$\Rightarrow x^{2/3} + 2x^{1/3} - x^{1/3} - 2 \leq 0$$

$$\Rightarrow (x^{1/3} - 1)(x^{1/3} + 2) \leq 0$$

$$\Rightarrow -2 \leq x^{1/3} \leq 1$$

$$\Rightarrow -8 \leq x \leq 1$$

64. 4 Let number of elements in progression be n , then
 $1000 = 1 + (n - 1)d$

$$\Rightarrow (n - 1)d = 999 = 3^3 \times 37$$

Possible values of $d = 3, 37, 9, 111, 27, 333, 999$

Hence 7 progressions.

65. 4 From the graph of $(y - x)$ Vs. $(y + x)$, it is obvious that inclination is more than 45° .

$$\text{Slope of line} = \frac{y - x}{y + x} = \tan(45^\circ + \theta);$$

$$\Rightarrow \frac{y - x}{y + x} = \frac{1 + \tan\theta}{1 - \tan\theta}$$

By componendo-dividendo, $\Rightarrow \frac{y - x}{y + x} = \frac{1 + \tan\theta}{1 - \tan\theta}$ which

is nothing but the slope of the line that shows the graph of y Vs. x .

And as $0^\circ < \theta < 45^\circ$, absolute value of $\tan \theta$ is less than 1.

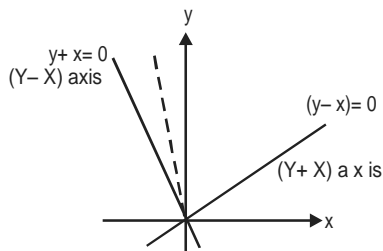
$\frac{-1}{\tan\theta}$ is negative and also, greater than 1.

\Rightarrow The slope of the graph y Vs. x must be negative and greater than 1. Accordingly, only option (4) satisfies.

You can also try by putting the values of $(y + x) = 2$ (say) and $(y - x) = 4$ (anything more than 2 for that matter). You can solve for values of y and x and cross check with the given options.

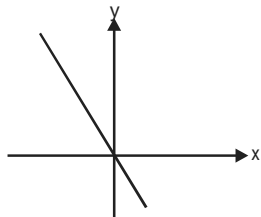
Alternate method:

In the normal X-Y coordinate plane the X-axis corresponds to $y = 0$
 And Y-axis corresponds to $x = 0$
 $y + x = 0$ and $y - x = 0$ are perpendicular lines on this plane.



And $y-x = 0$ is the axis $Y+X$ and $y+x = 0$ is the axis $Y-X$

So, the dotted line is the graph drawn in the question. When you observe w.r.t to X-axis it looks like



66. 3 By options checking option (3), four consecutive odd numbers are 37, 39, 41 and 43. The sum of these 4 numbers is 160.

When divided by 10, we get 16 which is a perfect

\therefore 41 is one of the odd numbers.

67. 2 $2x + y = 40$

$x \leq y$

$\Rightarrow y = 40 - 2x$

Values of x and y that satisfy the equation

x	y
1	38
2	36
3	34
.	.
.	.
.	.
13	14

\therefore 13 values of (x, y) satisfy the equation such that $x \leq y$

68. 5 Using options, the sum of the numerator and denominator of the ratio should be a prime number. Only option (5) satisfies $[97 + 84 = 181]$

69. 1 Task 2 can only be given to two persons i.e. (3 and 4)
 \therefore Number of ways = 2 ways
 First task can be done in 3 ways by 3 persons.
 Third task can be done by 4 persons.
 \therefore 4 ways similarly for fourth, five and six tasks, number of ways is 3, 2 and 1 respectively.
 \therefore Total number of ways = 144 ways

70. 5 $\log_y^x = a \cdot \log_z^y = b \cdot \log_x^z = a \times b$

$$a = \frac{\log_y^x}{\log_z^y} \text{ and } b = \frac{\log_x^z}{\log_y^z}$$

$$\Rightarrow a \times b = \frac{\log_y^x}{\log_z^y} \times \frac{\log_x^z}{\log_y^z}$$

$$= \left(\frac{\log_k^x}{\log_k^y} \right) \times \left(\frac{\log_k^z}{\log_k^x} \right) \quad \{ \text{For some base } k \}$$

$$= \left(\frac{\log_k^x}{\log_k^y} \right)^3 = (\log_y^x)^3 = (ab)^3$$

So, $ab - a^3b^3 = 0$
 Or, $a \times b(1 - a^2b^2) = 0$

$\Rightarrow ab = \pm 1$

Only option (5) does not satisfy. Hence (5).

71. 5 Equation (ii) can be written as

$$4^{0.3x} \times 9^{0.2y} = 8 \times (81)^{1/5}$$

$$(2^2)^{0.3x} (3^2)^{0.2y} = 8 \cdot (81)^{1/5}$$

$$2^{0.6x} 3^{0.4y} = 2^3 \cdot (3^4)^{1/5} = 2^3 \cdot 3^{4/5}$$

$$0.6x = 3 \Rightarrow x = 5$$

$$\text{and } 0.4y = \frac{4}{5}$$

$$\Rightarrow y = 2$$

If we put the values of x and y in first equation these values satisfy the first equation also.

So the answer is $x = 5, y = 2$

Hence, option (5)

72. 5 $f(x) = \max(2x + 1, 3 - 4x)$
 So, the two equations are $y = 2x + 1$ and $y = 3 - 4x$
 $y - 2x = 1$

$$\frac{y}{1} + \frac{-x}{-1/2} = 1$$

Similarly $y + 4x = 3$

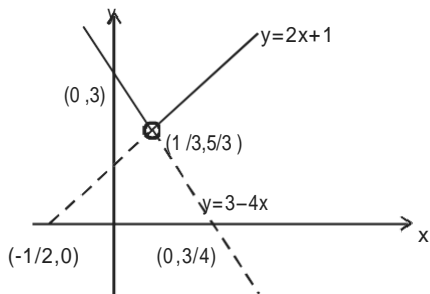
$$\frac{y}{3} + \frac{-x}{3/4} = 1$$

Their point of intersection would be

$$2x + 1 = 3 - 4x$$

$$6x = 2$$

$$x = \frac{1}{3}$$



So, when $x \leq \frac{1}{3}$ then $f(x) = 3 - 4x$
 $\max = -$
 And when $x \geq \frac{1}{3}$ then $f(x) = 2x + 1$
 $\max = +$

Hence the min. of this would be at $x = \frac{1}{3}$

$$y = \frac{5}{3}$$

i.e. $\frac{5}{3}$

Alternative method:

As $f(x) = \max(2x + 1, 3 - 4x)$

We know that $f(x)$ would be min at the point of intersection of these curves

$$\text{i.e. } 2x + 1 = 3 - 4x$$

$$6x = 2$$

$$\text{i.e. } x = \frac{1}{3} \quad \text{Hence min } f(x) \text{ is } \frac{5}{3}$$

73. 2 Let the number be $10x + y$ so when number is reversed the number becomes $10y + x$. So, the number increases by 18

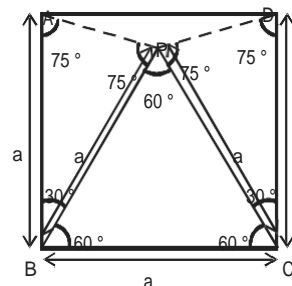
$$\text{Hence } (10y + x) - (10x + y) = 9(y - x) = 18$$

$$y - x = 2$$

So, the possible pairs of (x, y) is $(3, 1)$ $(4, 2)$ $(5, 3)$ $(6, 4)$ $(7, 5)$ $(8, 6)$ $(9, 7)$

But we want the number other than 13 so, there are 6 possible numbers are there i.e. 24, 35, 46, 57, 68, 79. So total possible numbers are 6.

74. 5



$\angle PBC = \angle CPB = \angle BPC = 60^\circ$ (L's of equilateral triangle)

$PC = CD$ (both a)

$$\text{Also } \angle CPD = \angle PDC = \frac{180^\circ - 30^\circ}{2} = 75^\circ$$

Similarly, $\angle BAP = \angle BPA = 75^\circ$

$$\angle APD = 360^\circ - 75^\circ - 75^\circ - 60^\circ = 150^\circ$$

75. 3 Let us assume that Arun started running at 10 AM and Barun started at 12 noon. So, in these two hours distance traveled by Arun is 60 km and the relative speed of Barun w.r.t Arun is 10 km/hr. So Barun will

$$\text{overtake Arun after } = \frac{60}{10} = 6 \text{ hours}$$

So, Barun reaches there at 6 PM.

So, Kiranmala also overtakes Arun at 6 PM.

Let us assume Kiranmala takes 't' time to overtake Arun and the relative speed of Kiranmala w.r.t Arun is 30 km/hr and Arun ran for 8 hrs.

So, distance travelled by Arun is

While Kiranmala's distance traveled is

$t = 4$ hours.

So, after 4 hrs, Kiranmala will start running.