

The logo for CETking, featuring the text "CET" in white on a blue rounded rectangle, followed by "king" in black on a yellow background with a crown icon above the 'i'.

IIMs or Nothing

Verbal Section

1. The passage states, "For these reasons some cognitive scientists have described language as a psychological faculty, a mental organ, a neural system, and a computational module. But I prefer the admittedly quaint term "instinct". Combine this extract with "Thinking of language as an instinct inverts the popular wisdom" and we arrive at option 5 as the correct answer option. Option 1: While the passage mentions 'cultural artifact', it does not relate it to popular wisdom. Hence, option 1 is incorrect. Option 2 is mentioned in the passage but there is no data to suggest that it is not popular wisdom. Option 3 is incorrect because the author has criticized the common view that children learn language as they grow, he instead says that children are born with it. Option 4 is mentioned in the passage and does not invert popular wisdom in any way. Hence, the correct answer is option 5.

2. The analogy describes an action which is a critical activity to the species, such that it is instinctive and not something that develops over time. The analogy emphasises the fact that language is instinctive, and not something that is learnt. Options 3, 4 and 5 about a donkey carrying the load, a horse running the derby and a pet dog protecting property, are not instinctive and basic actions attributed to those animals. They have to be trained to perform these functions. Option 1 is about 'learning', whereas the original example is about instinctively 'knowing'. Hence, the correct answer is option 2.

3. At the end of the second paragraph, "a knack for communicating information about who did what to whom by modulating the sounds we make when we exhale". This ability is unique to humans as mentioned in the passage. This resonates with option 2. Option 1, 3 and 4 are negated as the author has not mentioned or implied in any way that non-humans cannot use symbols, cannot communicate information or do not use sound as a means of communication. Therefore, option 5 - all of the above - is incorrect. Hence, the correct answer is option 2.

4. The passage states, "The complexity of language, from the scientist's point of view, is part of our biological birthright; it is not something that parents teach their children or something that must be elaborated in school".

This implies that children are born with an instinctive skill for language and that it cannot be taught. Option 2 is about learning as they grow and not about instinctively knowing language. Option 3 is close, but the question is related to 'complexity' of language. The author is silent on whether language is amenable to teaching or not. Option 4 is irrelevant as there is no comparison between the language skills of teachers/ parents and their children. Option 5 contradicts the passage. "Semiotics" is the study of symbols and signs and the passage states that children are not good at semiotics. Hence, the correct answer is option 1.

5. Option 4 succinctly summarizes the crux of the author's arguments. The author is trying to propound the 'instinctive' nature of language. He mentions it is unique to "Homo sapiens" but that is not the crux of the passage making option 1 unsuitable as a summary. Option 2 focuses on a non critical aspect of language which deals with 'learning' or 'teaching', which is true yet not central to the discussion. Option 3 is incorrect as it focuses on ancillary aspects. Option 5 has no base in the paragraph, and is a radical statement. Hence, the correct answer is option 4.

6. Option 2. Third last line of the passage: A preschooler's tacit knowledge of grammar is more sophisticated than the thickest style manual or the most state-of-the-art computer language system. This means its mentioned as an analogy.

7. b US was more concerned with 'order' than with reforms of any kind.

8. d Latin Americans regarded it as economic imperialism.

9. a The Act of Bogota was most closely related to the Marshall Plan or Latin America.

10. c US preferred dictatorship to the spread of communism in Latin America.

11. b The President's initiative to present financial economic aid to Latin America has been presented as an example of his efforts to mend his 'Latin American fences'. Thus he was not acting to continue to keep communism from intruding the country.

12. a The passage states that speeding up social reforms implied a risk of revolt, which could be avoided by maintaining status quo.

13. b The diverse cultural and socio-economic factors are a major problem affecting the Indian education system. (a) and (c) are not stated in the passage.

14. d 'Grizzled mandarins' refers to bureaucrats. It would be unfair to label the mandarins as (a), (b) or (c).

15. c Those in charge of education are totally out of touch with the ground reality. This point is given in the

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fourth paragraph. Hence, it will not be necessary to mark (a), (b) or (d) as the answer.

16. a The author advocates decentralizing education planning and implementation to improve the education system. This point is given in the fourth paragraph. Hence, it will not be necessary to mark (b), (c) or (d) as the answer.

17. d None of the given statements can be related to primary education, on the basis of the passage.

18. c Politicians are specially responsible for obstructing the implementation of education policies as decentralization of educational administration will take away certain powers from them. We are not sure about the intentions of (a), (b) or (d).

19. Ans. (c) Sol. Refer the first two sentences of the passage "In a poor country like India, as income rises people first concentrate on increasing their consumption of what they regard as basic or more essential consumer goods. For the poor, these goods would primarily include cereals and for people at successive levels of higher income protective foods, simple non-food consumer goods, more modern, better quality non-food consumer goods and simple consumer durables, better quality consumer goods, and so on."

20. Ans. (a) Sol. Refer the second sentence of the second paragraph "Until the mid-seventies one notices a rise in the proportion of consumption expenditure on cereals, and thereafter, a steady decline reflecting a progressive increase in the relative expenditure on non-cereal or protective foods."

21. Ans. (a) Sol. Refer the second last sentence of the passage "Approach to the Seventh Plan, importance was given to edible oils, pulses and some of the other protective foods but the overall impression created was that food grains still hold the centre of the stage".

22. Ans. (a) Sol. Refer the third sentence of the first paragraph "It's more like golf than tennis, you are playing against yourself and the course, not the guy across the net or in the next office."

23. Ans. (b) Sol. The author means by the phrase "more flash than substance" is that there was no quality.

24. Ans. (c) Sol. We can get the idea from last few lines of the passage "It all begins with attitude".

25. TITA: A; This question asks you to choose the statement that best describes the Essence or structure of the passage. The first two sentences of the passage give you information about children and walking. In the third sentence, the author asserts that the idea of walking when the time is right should be applied to the activity of teaching children to read. The fourth sentence tells what might happen if the idea were applied. Choice A accurately describes the Essence of the paragraph.

26. TITA: BDAC; B shows the problem faced by a researcher, D. elaborates why this happens, A continues with it and C., by using 'however' introduces the way out of the problem.

27. TITA: 4; Option 1 has already been mentioned in the first statement of the paragraph. This does not make it an effective paragraph ending. Option 2 mentions only OECD countries while the paragraph mentions "powerful industrialized countries" of which the OECD countries are only a part. Furthermore, the option is again a repetition of ideas presented in the paragraph. The focus of option 3 is on 'China' and 'India', while the focus of the paragraph is not. Option 5 brings in 'global economic inequity' which is an opinion not expressed or implied in the passage. Option 4 addresses the gist of the paragraph. Powerful countries, including the OECD countries are posing as climate change champions due to their lacklustre economic performance as compared to China and India which are growing rapidly. 'Climate change champions' in this option completes the paragraph, and addresses the point raised in the first sentence. Hence, the correct answer is option 4.

28. TITA: D; The best answer for this question is D. Several pieces of explicitly stated information point to D as the best answer. The first sentence of the passage states that, in one respect, local property taxes "are superior to" state taxes as a way of financing public schools. The second sentence states what this superiority or advantage is in helping schools to avoid competition for funding. The third and fourth sentences tell more about this advantage.

29. TITA: 3; The main sentence of the paragraph that decides the ending is "On this basis, Henry Perowne loses a number of cases each year." Option 1 moves away from the core of the paragraph - losing patients. Option 5 does not complete the paragraph and leaves one wanting for more data to explain the importance of hands being large. Option 4 loses out on the sentence structure and style. There is no logical continuity to the paragraph. Option 3 provides a logical finish to the paragraph by showing that in spite of the losing patients, Perowne is not concerned. Option 2 brings in a disconnect to the idea from the paragraph. It states that other patients' observations are also negative and those who stay with Perowne do so out of ignorance of available alternatives. This is not in continuation of the main idea expressed in the paragraph. Hence, the correct answer is option 3.

30. TITA: C; The user of word 'rather' in B. indicates that it should follow 1. D. states that the competition depends on five basic competitive forces, A. continues with the same idea. C. states that not all industries have the same potential and this is elaborated in 6.

31. TITA: B; This question asks you to identify the essence in writing the whole passage. The author does not plainly state the essence; the essence must be determined on the basis of the information in the passage and how that

information is organized. The first two sentences classify Shakespeare's plays into four categories and offer an explanation, endorsed by "some scholars." Note that up to this point in the passage, you know only that the author is concerned about the kinds of plays Shakespeare wrote and with explaining why he may have written them when he did. The word "But" in the sixth sentence of the passage informs you that the passage is about to change direction. The author states that there is evidence to suggest that the first explanation may be wrong. The ESSENCE of the passage, then, is not simply to describe the kinds of plays Shakespeare wrote, but rather to refute the explanation attributed to "some scholars" by providing evidence to suggest it may not be true. This purpose is described in choice B.

32. TITA: ADBCE; DB and CE are mandatory pairs. In D, the author sends emails and B mentions when he gets replies. Statement C ends with the senior stating that she studies in her sleep. Statement E continues the same by explaining how she manages to study like that. However, if you figured out DB, you have arrived at the answer right away. Statement A begins the paragraph. It introduces the author's intention of getting to know Princeton university students. DBCE are extensions of what happens at the university. Hence, the correct answer is option ADBCE.

33. TITA: 1; The paragraph starts with a location (as a backdrop) and moves on to describe things associated with the location. While various things are described about the location, we are looking for a sentence that completes the ideas stated in the paragraph. The paragraph juxtaposes various disparate ideas and cultures together: note the saree and sarong, the Indian Jews, and the image of religious tolerance. Option 2 is a disconnect from the main idea of the paragraph – it talks about religious discrimination which is not an idea found in the paragraph. Option 1 is about Matancherry, which the whole paragraph is about. It brings together the ideas in the paragraph to a logical, cohesive whole. Option 5, with 'thus' for pretty pastel streets is disconnected. No reason is provided in the paragraph for pastel streets being popular. It is the majority community which has to show tolerance towards a minority group, not the other way round. The paragraph clearly states "home to the last twelve..." indicating the Indian Jews to be very few in numbers. Option 3 can be eliminated. Option 4 is contrary to the data provided in the passage. Hence, the correct answer is option 1.

34. TITA: DABC; D starts with 'but' and states why use of electricity in industries poses problems. A. continues with the idea and the word 'also' shows that it should follow D. B. presents an alternate to the costly options by using 'in contrast', C. states another reason to avoid using mineral resources for generating electricity and leads to 6.

DILR Section

1. Since Aditya didn't get a call from any of the colleges, so for each college, he either didn't clear one of the sectional cut-offs or he didn't clear the aggregate cutoff or both. If he didn't clear one of the sectional cut-offs, then for that section he scored less marks than the least cut-off among the given cut-offs of all the colleges. For example, for section A, it is given that the cut-offs for colleges 1, 4 and 5 are 42, 43 and 45 respectively. The least cut-off among them is 42. So, in order to not clear the sectional cut-off of section A for colleges 1, 4 and 5, he should have scored less than 42. Similarly, For colleges 1, 2 and 6, Aditya's Section B marks < 41 For colleges 1, 2, 3 and 5, Aditya's Section C marks < 42 For colleges 4 and 6, Aditya's Section D marks < 44 If he scores less in Section C and D, he would not get calls for any colleges. Also in order to maximise the score we would assume that he got just one less than the cut-off in section C and D and he scored maximum marks (50) in other sections. Maximum marks obtained by Aditya such that he doesn't get any calls = $41 + 43 + 50 + 50 = 184$ TITA: 184.

2. Since Bhama got calls from all colleges, she must have cleared each of the 4 sections. This means that for a particular section she scored more marks than the greatest cut-off for that section across the six colleges. For example, for section A, it is given that the cut-offs for colleges 1, 4 and 5 are 42, 43 and 45 respectively. The greatest cut-off among them is 45. So, in order to clear the sectional cut-off of section A for all the colleges, she should have scored at least 45. Since we wish to minimise her marks, we should take her score in section A as 45. Similarly, in sections B, C and D, she scored 45, 46, and 45 marks respectively. Bhama's minimum marks such that she gets calls from all the colleges = $45 + 45 + 46 + 45 = 181$ TITA: 181. Note: This is already greater than the highest aggregate cut-off of all colleges (which is 180 for college 5). So, she will get calls from all 6 colleges.

3. The aggregate cut-off for each college is given in the common data. In order for Charlie to get minimum marks in one of the sections, he should have got maximum marks (i.e. 50) in the other three sections. For example, the aggregate cut-off in college 1 is 176. Since, we want minimum marks in a section he should have gotten an aggregate of exactly 176. To minimise one of the sections, assume that he got 50 marks in the 3 sections whose cut-off is given in the common data. Then, Charlie will get a call from college 1 if he gets at least $176 - (50 \times 3) = 26$ marks in section D, provided that the cut-off for this section is also 26. Now, there is at least one unknown sectional cut-off for each of the colleges, so we can use the same logic as used above for each of the remaining colleges. For college 2, the minimum marks that Charlie needs to get a call = $175 - 150 = 25$ For college 3, the minimum marks that Charlie needs to get a call = $171 - 150 = 21$ For college 4, the minimum marks that Charlie needs

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to get a call = $178 - 150 = 28$ For college 5, the minimum marks that Charlie needs to get a call = $180 - 150 = 30$ For college 6, the minimum marks that Charlie needs to get a call = $176 - 150 = 26$ The question states that Charlie only gets a call from 2 of the colleges. So, Charlie got 25 marks. TITA: 25

4. Maximum score required by a Cetking student in Section D so that student clear all colleges cut-off is 43. TITA 43

5. 1 GPA of Preeti = 3.2 i.e. $F + D + X + D + Y / 5 = 3.2 \Rightarrow 0 + 2 + x + 2 + y = 16 \Rightarrow x + y = 12$. So only combination possible is A, A. So Preeti obtained A grade in statistics.

6. 4 Tara received same grade in 3 courses. We already know that Tara has got B grade in one of the subject and GPA is 2.4. So in 3 courses in which he scored same grade is B. So Tara has received the same grade as Manab.

7. 2 GPA of Gowriis 3.8 i.e. $3 + 3 + 6 + x + 4 = 3.8 \times 5$ $16 + x = 18$ $x = 2$ So in strategy, Gowri's grade is C. Rahul's grade in strategy = $(4.2 \times 5) - 15 = 6$, i.e., A. Fazal's grade in strategy = $(2.4 \times 5) - 8 = 4$, i.e., B. Hence, Gowri's grade will be higher than that of Hari.

8. 3 As Fazal GPA = 2.4 So $D + F + B + P + D = 2.4 \times 5$ $2 + 0 + 4 + P + 2 = 12$ $P = 4$ So his grade in strategy is B. So Grade of Utkarsh in marketing is also B. So for Utkarsh, $x + B + F + C + A = 3 \times 5$ $x + 4 + 0 + 3 + 6 = 15$ $x = 2$ So grade of Utkarsh in finance = D.

9. Two players - Exact value of M of only Rahul and Saurav.

10. Only Kaif or Yuvraj will have lowest R.

11. Only one player scored less than yuvraj

12. Virender got best M index.

	Pakistan	South Africa	Australia
K	28	51	50
R		49	50
S		75	50
V	130		87
Y	40		192
Top 3 bats	198	175	240
India Total	220	250	240
Blank players	0 to 22	0 to 49	0 to 48

Comparing Table 1 and 2, university 4 corresponds to UK and university 6 corresponds to USA (after as day 3 values are concerned and university 8 corresponds to India and university 3 to Netherlands now Indian or Netherlands can take university 1 or university 5. Now university 2 and 7 belongs to either UK or Canada (only one)

13. (1) India or Netherlands but not USA

14. (3) Netherlands

15. (1) None

16. (2) 2

	Day1	Day2	Day3	Country
Univ 1	1	0	0	I or N
Univ 2	2	0	0	UK or Can
Univ 3	0	1	0	N
Univ 4	0	0	2	UK
Univ 5	1	0	0	I or N
Univ 6	1	0	1	USA
Univ 7	2	0	0	UK or Can
Univ 8	0	2	0	India

Let the bold letters denote the teams that have lost. From condition 3 of stage I, D lost to A. D won against C. D won against F. These can be represented as: $D - A D - C D - F$ Similarly, condition 4 of stage I can be represented as: $E - B E - C E - F$ Since D and E have participated in three matches in stage I, they would not be involved in any other match in stage I. From the above representations it is clear that all other teams except A have lost at least one match. From condition 1, of stage I, only A has won all the three matches in stage I. Also, A will participate in 2 more matches as every team participates in 3 matches in stage I. A will win in 2 of the remaining 3 matches. Also A is the top team as it wins all matches in stage I. From condition 6 of stage I, F did not play against A. A won against B and C which can be represented as: $B - A - C$ The only 2 teams which have not won even a single match so far is C and F. From statement 6 of stage I, F loses in the remaining match against B, which can be represented as: $F - B$ Stage I can be represented as: $D - A B - A D - C A - C D - F F - B E - B E - C E - F$ From condition 1 of stage II, A lost both matches in stage II. Also, since no team plays against the same team more than once in the event, A plays matches against E and F. $A - E A - F$ Since one of the two teams at the bottom after stage I won both matches in stage II, F is the team which has won both the matches in stage II. Also C lost both matches in stage II. $F - C B - C$ The last condition states that one more team lost both matches in stage II. D lost both matches in stage II. $D - B D - E$ Stage II can be represented as: $A - E A - F F - C B - C B - D - E$ Now, we can calculate the number of times each team has won.

Team	Stage I	Stage II	Total
A	3	0	3
B	2	2	4
C	0	0	0
D	2	0	2
E	2	2	4
F	0	2	2

17. E and F defeated A. Hence, option 2.

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18. B, E and F are the three teams that won both matches in stage II. Hence, option 4.

19. From the table it is clear that the teams that won exactly two matches in the event are D and F. Hence, option 4.

20. It can be observed from the above table that B and E have most wins in the event. Hence, option 4.

21. (4) Since Chetan's return is always higher than or equal to that of Bikram, the trader with the maximum return would be either Abdul or Chetan. If it is a continuously rising market then Abdul would end up having the highest gain as seen in the example above.

But there might be a scenario when the share price of XYZ would go down after 10 AM and rise in the end at 3 PM to a higher value. In such a case, if Chetan gets the shares at lower prices than what the price was at 10 AM he would end up making more profit and hence higher return.

Time of the Day Share Price (in Rs.) 10 am (open) 100 11 am 110 12 noon 140 1 pm 150 2 pm 180 3 pm (close) 200 Here, Abdul's returns remain unaltered as 100%. Let Chetan always buy shares worth Rs. 100. So he would end up buying $1 + 10 + 10 + 10 + 10 = 41$ shares. When he sells the same at Rs. 200 he gets Rs. 8,200 for the same. Chetan's profit = $8200 - 500 = 7700$. We cannot say for sure who would have higher returns.

22. (4) From the explanation seen till now we can rule out options 1 and 3. Now, option 2 is only partially correct. We have seen that Chetan's return would be higher than or equal to that of Bikram. It would be equal to Bikram's return in the scenario when the share price remains at a constant value throughout the day. Option 2 is not always true..

23. (1) Firstly, let us try to understand the way the investments of the three traders behave. Abdul buys shares at 10 am everyday and sells them at a particular price at 3 pm. So his return is determined by the difference in the share price at these two times. Bikram and Chetan buy shares at equal intervals. But since Chetan buys them in equal amount he would end up buying more when the price is less and less when the price is more. Whether the prices are continuously rising or continuously falling down or in a fluctuating market, Chetan always has a higher proportion of lower priced shares as compared to Bikram. This increases his profit in a rising market and reduces his loss in a falling market. Therefore Chetan never has return lower than that of Bikram. We have explained this concept by taking examples. For more depth we have also provided the theoretical explanation. The theoretical explanation is only for better understanding and may not be suitable in a test environment.

Now, let's compare Bikram's and Chetan's returns. Since Arithmetic Mean is always greater than or equal to the

Harmonic Mean, Chetan's returns will be greater than or equal to Bikram's. Hence, option 1.

24. (1) On a bear day, Abdul's return < Chetan's return < Bikram's return. Hence, option 1.

25. Option 2. Let work = 180 units
 pulkit' 1 day's work20 (work/ no. of days taken),
 paras's 1 day's work20, neha's 1 day's work.....7.5
 happy's 1 days work.....7.5, ruhi's 1 day's work20.
 Therefore, paras and pulkit worked for 2 days..... $(20+20)*2 = 80$...remaining work = 100. Now for 2 days ($7.5+7.5+20$)*2 = 70remaining work = 30 ..so $30/180 = 1/6$

26. Option 3. total days taken by boys to do the work = $180/100 = 9/5$ days. days taken by 4 girls = $180/45 = 4$ days
 ...difference = $4 - 9/5 = 1/5$ days

27. Option 2. Pradeep's one day's work $180/12 = 15$ units
 N one day's work..... $180/10 = 18$ units
 now, Pradeep works at 120% of 15 = 18 units
 Nikku at $5/6$ of 18 = 15 units
 Pradeep + Nikku's 2 days' work = 33
 In 10 days $33*5 = 165$ units
 Remaining15 unitsPradeep does...18 days a day so to do 15 units He will take $5/6$ days therefore total time taken = $10 + 5/6$ days

28. Option 4. Punit's 1 day's work15 units so to do 25% work (assumed total work = 180) = 45 he will take 3 days
 to do 10% work..i.e 18 units nikku will take 1 days ...noe remaining work = $180 - 63 = 117$
 to do 117 , suman will take $117/9 = 13$ days (suman's 1 day's work = $180/20 = 9$ units)
 Total days = $3 + 1 + 13 = 17$ days

29. We solve this question by options. If we consider option 4 to be true, then either the White or Red horse will finish first. It means that the amount Raju receives at the end of the race will be at least Rs. 8000 or Rs. 12000 (depending on which of the two horses finish first). However, his investment at the start of the race was only Rs. 6000. So, his profit could never be zero; in the worst scenario he will at least make Rs. 2000. Option (4) cannot be true. Hence, option 4.

Investment Red = 3k White 2k and Black 1k

	First x4	Second x3	Third x1	Fourth	Fifth	Income
Case 1		White 6k		R/B	B/R	6k
Case 2	Black 4k		White 2k	R	R	6k

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Case 3		Black 3k	Red 3k	W	W	6k
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30. We solve this question by options. If we consider option 3 to be true, then White finishes second and one of the Red or Black horses will come in the first or third positions. With White at the second position, the amount Raju receives at the end of the race will be at least Rs. 6000, and from Red or Black he will earn some money. Therefore, the total money Raju receives will be more than Rs. 6000. Since his investment at the start of the race was only Rs. 6000, his profit could never be zero. Option (3) cannot be true. Hence, option 3.

31. Option 4. Black or Red came in last if white came in second

32. Option 2. If Red came in last than white have to win (case 1 and 2) White finished 2rd or 3th.

Quant Solution

1. d Let us assume that he has Rs. 100. In this he can buy 50 oranges or 40 mangoes. In other words, the price of an orange is Rs. 2 and that of a mango is Rs. 2.50. Now if he decides to keep 10% of his money for taxi fares, he would be left with Rs. 90. Now if he buys 20 mangoes, he would spend Rs. 50 and will be left with Rs. 40, in which he can buy 20 oranges.

2. a Let there be 100 voters in all. So initially there were 40 of these who promised to vote for P, while 60 of them promised to vote for Q. On the last day, (15% of 40) = 6 voters shifted their interest from P to Q and (25% of 60) = 15 voters shifted their interest from Q to P. So finally, P would end up getting (40 - 6 + 15) = 49 votes and Q would end up getting (60 - 15 + 6) = 51 votes. Hence, margin of victory for Q = (51 - 49) = 2, which matches the data given in the question. Hence, there were 100 voters in all.

3. b Profit percentage in each case is

(i) 10%

(ii) $(100 \times 100) / 900 = 100/9\%$

(iii) $(100 - 100 / 1.1) / (100/1.1) = 10\%$

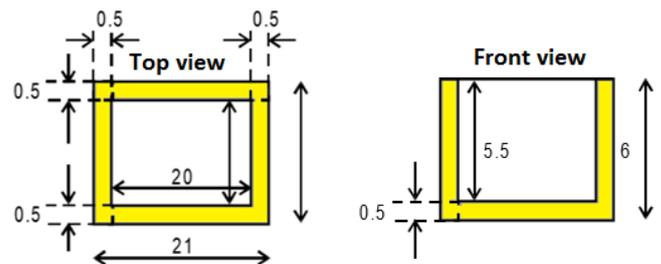
(iv) $(100 \times 100) / 9 = 200/19\%$

4. d Since $n(n + 1)$ forms two consecutive integers, one of them will be even and hence the product will always be even. Also the sum of the squares of first n natural numbers is given by $n(n+1)(2n+1)/6$. Hence, our product will always be divisible by this. Also you will find that the product is always divisible by 3 (you can use any value of n to verify this). However, we can find that the option (d) is not necessarily true. Only under certain situation does it hold good. e.g. if $n = 118$, $(2n + 1) = 237$ or if $n = 236$, then $(n + 1) = 237$ or if n itself is 237, etc.

5. The sum of the perimeters of the triangles = (Perimeter of the square) + $2 \times$ (Sum of its diagonals). This is so because the bases of each triangle will be counted once. But since each of the other two sides of the triangles is common to two triangles, it will be counted twice. Since area of the square = 4, its side = 2 and perimeter = 8. Also its diagonal = $2\sqrt{2}$. So the required perimeter = $(8 + 2 \times 4\sqrt{2}) = 8(1 + \sqrt{2})$.

6. a In the given figure, the area of the circle = πr^2 . To find the area of the circle, we need to find the length of the side of the square. We know that $OR = OT + TR = OT + OS = 2r$. So in the right-angled triangle ORS, we have $OR = 2r$, $OS = r$. So $SR^2 = OR^2 - OS^2$. But $SR^2 =$ Area of the square = $4r^2 - r^2 = 3r^2$. So the required ratio = $\pi/3$.

7. Area of the original paper = $\pi(20)^2 = 400\pi$ cm². The total cut portion area = $4(\pi)(5)^2 = 100\pi$ cm². Therefore, area of the uncut (shaded) portion = $(400 - 100) = 300\pi$ cm². Hence, the required ratio = $300\pi : 100\pi = 3 : 1$.



8. As it can be seen from the diagram, because of the thickness of the wall, the dimensions of the inside of the box is as follows: length = $(21 - 0.5 - 0.5) = 20$ cm, width = $(11 - 0.5 - 0.5) = 10$ cm and height = $(6 - 0.5) = 5.5$. Total number of faces to be painted = 4 walls + one base (as it is open from the top). The dimensions of two of the walls = (10×5.5) , that of the remaining two walls = (20×5.5) and that of the base = (20×10) . So the total area to be painted = $2 \times (10 \times 5.5) + 2 \times (20 \times 5.5) + (20 \times 10) = 530$ cm². Since the total expense of painting this area is Rs. 70, the rate of painting = $70/530 = 0.13 =$ Re 0.1 per sq. cm.

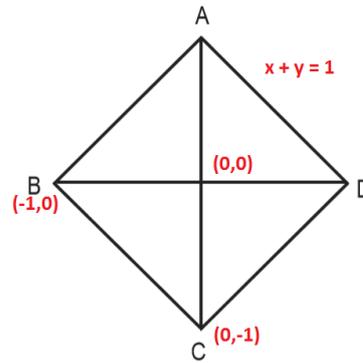
9. c Let the original weight of the diamond be $10x$. Hence, its original price will be $k(100x^2) \dots$ where k is a constant. The weights of the pieces after breaking are x , $2x$, $3x$ and $4x$. Therefore, their prices will be kx^2 , $4kx^2$, $9kx^2$ and $16kx^2$. So the total price of the pieces = $(1 + 4 + 9 + 16)kx^2 = 30kx^2$. Hence, the difference in the price of the original diamond and its pieces = $100kx^2 - 30kx^2 = 70kx^2 = 70000$. Hence, $kx^2 = 1000$ and the original price = $100kx^2 = 100 \times 1000 = 100000 =$ Rs. 1 lakh.

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10. Let radius of the semicircle be R and radius of the circle be r . Let P be the centre of semicircle and Q be the centre of the circle. Draw QS parallel to BC . Now, $\Delta PQS \sim PBC$

$$\begin{aligned} \therefore PQ / PB &= QS / BC \\ \Rightarrow (R+r) / \sqrt{2}R &= (R-r) / R \\ \Rightarrow R+r &= \sqrt{2}R - \sqrt{2}r \\ \Rightarrow r(1+\sqrt{2}) &= R(\sqrt{2}-1) \\ \Rightarrow r &= R(\sqrt{2}-1) / (\sqrt{2}+1) \times (\sqrt{2}-1) / (\sqrt{2}-1) \\ \Rightarrow r &= R(\sqrt{2}-1)^2 \\ \text{Required Ratio} &= \pi r^2 / \pi R^2 \times 2 \\ &= \pi R^2 (\sqrt{2}-1)^4 / \pi R^2 \times 2 \\ &= 2(\sqrt{2}-1)^4 : 1 \end{aligned}$$



11. d In a mile race, Akshay can be given a start of 128 m by Bhairav. This means that Bhairav can afford to start after Akshay has travelled 128 m and still complete one mile with him. In other words, Bhairav can travel one mile, i.e. 1,600 m in the same time as Akshay can travel (1600 – 128) = 1,472 m. Hence, the ratio of the speeds of Bhairav and Akshay = Ratio of the distances travelled by them in the same time = 1900/1472 = 25 : 23. Bhairav can give Chinmay a start of 4 miles. This means that in the time Bhairav runs 100 m, Chinmay only runs 96 m. So the ratio of the speeds of Bhairav and Chinmay = 100/96 = 25 : 24. Hence, we have B : A = 25 : 23 and B : C = 25 : 24. So A : B : C = 23 : 25 : 24. This means that in the time Chinmay covers 24 m, Akshay only covers 23 m. In other words, Chinmay is faster than Akshay. So if they race for 1 1/2 miles = 2,400 m, Chinmay will complete the race first and by this time Akshay would only complete 2,300 m. In other words, Chinmay would beat Akshay by 100 m = 1/16 mile.

12. d We can solve this by alligation. But while we alligate, we have to be careful that it has to be done with respect to any one of the two liquids, viz. either A or B. We can verify that in both cases, we get the same result. e.g. the proportion of A in the first vessel is 5/6 and that in the second vessel is 1/4, and we finally require 1/2 parts of A. Similarly, the proportion of B in the first vessel is 1/6 that in the second vessel is 3/4 and finally we want it to be 1/2. With respect to liquid A.

$$\begin{aligned} 13. b \quad x^2 + y^2 &= 0.1 \\ |x - y|^2 &= x^2 + y^2 - 2xy \\ (0.2)^2 &= 0.1 - 2xy \text{ or } 2xy = 0.06 \text{ or } xy = 0.03 \\ \text{Now } |x| + |y| &= \sqrt{(x^2 + y^2) - 2xy} = \sqrt{(0.1 + 0.06)} \\ |x| + |y| &= 0.40 \\ \text{Hence, } x &= 0.3, y = 0.1 \text{ or vice versa.} \end{aligned}$$

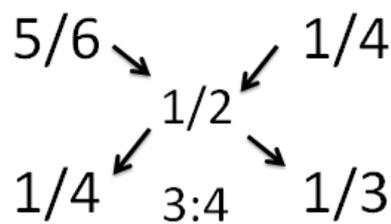
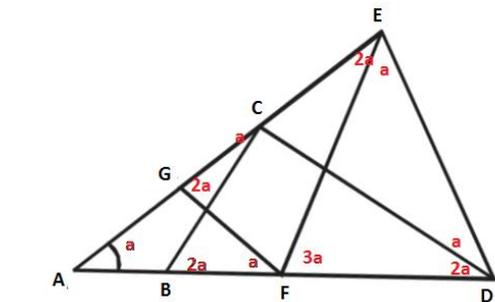
14. The gradient of the line AD is -1 . Coordinates of B are $(-1, 0)$. Equation of line BC is $x + y = -1$.

15. b $g(1) = f[f(1)] + 1 = 2$. Since $f(1)$ has to be 1, else all the integers will not be covered. $f(n)$ is the set of odd numbers and $g(n)$ is the set of even numbers.

16. b $f(1, 2) = f(0, f(1, 1))$; Now $f(1, 1) = f[0, f(1, 0)] = f[0, f(0, 1)] = f[0, 2] = 3$ Hence, $f(1, 2) = f(0, 3) = 4$

17. Let $\angle EAD = a$. Then $\angle AFG = a$ and also $\angle ACB = a$. Therefore, $\angle CBD = 2a$ (exterior angle to ΔABC). Also $\angle CDB = 2a$ (since $CB = CD$). Further, $\angle FGC = 2a$ (exterior angle to ΔAFG). Since $GF = EF$, $\angle FEG = 2a$. Now $\angle DCE = \angle DEC = b$ (say). Then $\angle DEF = b - 2a$. Note that $\angle DCB = 180 - (a + b)$.

Therefore, in ΔDCB , $180 - (a + b) + 2a + 2a = 180$ or $b = 3a$. Further $\angle EFD = \angle EDF = \gamma$ (say). Then $\angle EDC = \gamma - 2a$. If CD and EF meet at P , then $\angle FPD = 180 - 5a$ (because $b = 3a$). Now in ΔPFD ,



Therefore, in ΔPFD , $180 - 5a + \gamma + 2a = 180$ or $\gamma = 3a$. Therefore, in ΔEFD , $a + 2\gamma =$

180 or $a + 6a = 180$ or $a = 26$ or approximately 25.

18. b Since a bucket holds 5 litres of water, Tap A discharges 20 litres of water in 24 min or 5/6 litres of water in 1 minute. Tap B discharges 40 litres in 1 hours or 2/3 litres in 1 minute. Tap C discharges 10 litres in 20 min. or 1/2 litres in 1 minute. If A, B & C are all opened simultaneously, total discharge = $(5/6 + 2/3 + 1/2) = 2$ litres in 1 minute. So in 2 hours, the discharge would be 240 litres, which should be the capacity of the tank.

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19. c It is clear that the ratio of the distances between (Delhi-Chandigarh) : (Chandigarh-Shimla) = 3 : 4. The ratio of the speeds between (Delhi-Chandigarh) : (Chandigarh-Shimla) = 3 : 2. Let the distances be $3x$ & $4x$ respectively and speeds be $3y$ and $2y$. So the time taken will be (x/y) and $(2x/y)$ respectively. Since average speed is given as (Total Distance) / (Total Time) = $(7x)/(x/y + 2x/y) = 7y/3 = 49$. Hence $y = 21$. So the average speed from Chandigarh to Shimla = $2y = 42$ kmph.

20. c HINT : Students please note that you need not apply any formula in this case. The middle term of an AP is always the average of all the terms. Hence, if we multiply the middle term by the number of terms, we should get the sum of all the terms of that AP. In our problem, we have to find the sum of first 7 terms and we have been given the 4th term (which is the middle term). Hence the required answer is $8 \times 7 = 56$.

21. d

Option	Location	Expenditure of Town A students	Expenditure of Town B students	Total Expenditure
(a)	33 km from A	$33 \times 1.2 \times 30 = 1188$	$67 \times 1.2 \times 100 = 8040$	$1188 + 8040 = 9228$
(b)	33 km from B	$67 \times 1.2 \times 30 = 2412$	$33 \times 1.2 \times 100 = 3960$	$2412 + 3960 = 6372$
(c)	Town A	0	$100 \times 100 \times 1.2 = 12000$	12000
(d)	Town B	$30 \times 100 \times 1.2 = 3600$	0	3600

Hence we find that the least expenditure will be incurred if the school is located in town B. HINT : Students please note that since there are more number of students from Town B, to minimise the total expenditure the school should be located as closer to town B as possible.

22. C.

Let the number of 25 p, 10 p and 5 p coins be x , $2x$, $3x$ respectively.

$$\text{Then, sum of their values} = \text{Rs.} \left(\frac{25x}{100} + \frac{10 \times 2x}{100} + \frac{5 \times 3x}{100} \right) = \text{Rs.} \frac{60x}{100}$$

$$\therefore \frac{60x}{100} = 30 \Leftrightarrow x = \frac{30 \times 100}{60} = 50.$$

Hence, the number of 5 p coins = $(3 \times 50) = 150$.

23. a $U_0 = 2^0 - 1 = 0$

$U_1 = 2^1 - 1 = 1$

$U_2 = 2^2 - 1 = 3$

$U_3 = 2^3 - 1 = 7$ and so on.

$\therefore U_{10} = 2^{10} - 1 = 1023$.

24. b Since there are two numbers which are < 1 (viz. x & y), it is obvious that the median will be less than 1. Hence (c) cannot be the answer. Since $x < 0.5$ and $0 < y < 1$, the median will not be < 0 . Hence the answer is (b) between 0 and 1.

25. C. Let initial price of Maruti Car be Rs. 100.

As price increases 30%, price of car will become, $(100 + 30\% \text{ of } 100) = \text{Rs. } 130$.

Due to increase in price, sales is down by 20%. It means, it is going to make 20% less revenue as expected after increment of price.

So, New revenue = $(130 - 20\% \text{ of } 130) = \text{Rs. } 104$.

The initial revenue was Rs. 100 which becomes Rs. 104 at the end. It means there is 4% increment in the total revenue.

Shortcut Method:

$$100 \xrightarrow{+30\%} 130 \xrightarrow{-20\%} 104$$

Hence, 4% rises.

26. a Let us evaluate each option. (b) since $0 < y < 1$ and $z > 1$, yz will always be < 1 . (c) Since both x & y are not equal to 0, xy will never be 0. (d) y is a positive number < 1 and z is a positive number > 1 , hence $(y^2 - z^2)$ is always negative. Since, (b), (c) and (d) are always true, the answer has to be (a). And this can be verified. For eg. If $x = -2$ and $z = 3$, then $(x^2 - z^2) = 4 - 9 = -5$, not a positive number.

27. b If you were to run two of three cycles of how she is counting, you will observe that the number that she counts on thumb are 1, 9, 17, 25 and so on. So it forms a pattern such that all the numbers that are 1 more than the multiples of 8 are counted on thumb. The closest multiple of 8 near 1994 is 1992. In other words she would count 1993 on thumb. So she would count 1994 on the index finger.

28. D. Quantity of milk = $\left(60 \times \frac{2}{3} \right)$ litres = 40 litres.

Quantity of water in it = $(60 - 40)$ litres = 20 litres.

New ratio = 1 : 2

Let quantity of water to be added further be x litres.

Then, milk : water = $\left(\frac{40}{20 + x} \right)$.

Now, $\left(\frac{40}{20 + x} \right) = \frac{1}{2}$

$\Rightarrow 20 + x = 80$

$\Rightarrow x = 60$.

\therefore Quantity of water to be added = 60 litres.

29. 2 $2x + y = 40$ $x \leq y \Rightarrow y = 40 - 2x$ Values of x and y that satisfy the equation

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X	Y
1	38
2	36
3	34
4	32
5	30
6	28
7	26
8	24
9	22
10	20
11	18
12	16
13	14

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

30. 4

$$\log_y x = (a \cdot \log_z y) = (b \cdot \log_x z) = ab$$

$$a = \log_y x / \log_z y \text{ and similarly } b = \log_y x / \log_x z$$

$$a \times b = \log_y x / \log_z y \times \log_y x / \log_x z = (\log_y x)^3$$

$$\Rightarrow ab - a^3 b^3 = 0$$

$$\text{Or, } a \times b (1 - a^2 b^2) = 0$$

$$ab = \pm 1$$

Only option (4) does not satisfy. Hence (4).

31. 2 Let the number be $10x + y$ so when number is reversed the number becomes $10y + x$. So, the number increases by 18 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.

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

33. C.

Let $A = 2k$, $B = 3k$ and $C = 5k$.

$$\text{A's new salary} = \frac{115}{100} \text{ of } 2k = \left(\frac{115}{100} \times 2k \right) = \frac{23k}{10}$$

$$\text{B's new salary} = \frac{110}{100} \text{ of } 3k = \left(\frac{110}{100} \times 3k \right) = \frac{33k}{10}$$

$$\text{C's new salary} = \frac{120}{100} \text{ of } 5k = \left(\frac{120}{100} \times 5k \right) = 6k$$

$$\therefore \text{New ratio} \left(\frac{23k}{10} : \frac{33k}{10} : 6k \right) = 23 : 33 : 60$$

34. Let OT be the tower.

Therefore, Height of tower = OT = 30 m

Let A and B be the two points on the level ground on the opposite side of tower OT.

Then, angle of elevation from A = $\angle TAO = 45^\circ$

and angle of elevation from B = $\angle TBO = 60^\circ$

Distance between AB = AO + OB = x + y (say)

Now, in right triangle ATO,

$$\tan 45^\circ = OT/AO = 30/x$$

$$\Rightarrow x = 30/\tan 45 = 30 \text{ m}$$

and in right triangle BTO

$$\tan 60^\circ = OT/OB = 30/y$$

$$\Rightarrow y = 30/\tan 60 = 30/\sqrt{3} = 30\sqrt{3}/3 = 17.32 \text{ m}$$

Hence, the required distance = $x + y = 30 + 17.32 = 47.32 \text{ m}$