

Answer Key Actual CAT Slot - III

| Q. No | Key | Q. No | Key | Q. No | Key |
|-------|-----|-------|-----|-------|-----|
| 1. | A | 25. | A | 47. | 2 |
| 2. | C | 26. | 3 | 48. | 8 |
| 3. | D | 27. | D | 49. | C |
| 4. | D | 28. | C | 50. | B |
| 5. | B | 29. | 3 | 51. | D |
| 6. | C | 30. | B | 52. | 9 |
| 7. | C | 31. | C | 53. | A |
| 8. | C | 32. | B | 54. | 70 |
| 9. | C | 33. | A | 55. | D |
| 10. | A | 34. | A | 56. | A |
| 11. | D | 35. | B | 57. | 90 |
| 12. | D | 36. | D | 58. | C |
| 13. | A | 37. | 0 | 59. | 2 |
| 14. | 2 | 38. | B | 60. | 30 |
| 15. | 1 | 39. | 34 | 61. | D |
| 16. | B | 40. | 42 | 62. | A |
| 17. | B | 41. | D | 63. | C |
| 18. | C | 42. | 10 | 64. | 378 |
| 19. | D | 43. | 5 | 65. | B |
| 20. | C | 44. | 12 | 66. | B |
| 21. | B | 45. | 24 | 67. | A |
| 22. | B | 46. | 12 | 68. | C |
| 23. | B | | | | |
| 24. | C | | | | |

Explanation Actual CAT Slot - III

| Q. No | Explanation |
|-------|---|
| 1. | <p>The line <i>“Through its mastery of language, AI could even form intimate relationships with people, and use the power of intimacy to change our opinions and worldviews”</i> clearly suggests that the author thinks AI can use the power of intimacy to shape people's worldviews. There is no implication that this emotional manipulation could exacerbate the polarization of world views.</p> <p>Option B is wrong as the lines <i>“AI can create completely new ideas, completely new culture...”</i> clearly indicate that AI has the ability to create completely new ideas and, therefore, new cultures which is a significant threat to human civilization.</p> <p>Option C is wrong as the author expresses a clear concern about AI's role in potentially subverting democratic processes, particularly through the generation of fake news and political content... Refer to the lines <i>“Think of the next American presidential race in 2024, mass-produce political content, fake-news stories and scriptures for the new cult.” “ Democracy is a conversation....., thereby destroying democracy.”</i></p> <p>Option D is wrong. Refer to the lines <i>“What would happen once a non-human intelligence becomes better than the average human at telling stories, composing melodies, drawing images, and writing laws and scriptures?”</i></p> |
| 2. | <p>Refer the lines, <i>“Unregulated AI.... which would benefit autocrats and ruin democracies. Democracy is a conversation When AI hacks language,thereby destroying democracy...”</i></p> <p>This clearly indicates that the author believes one of the greatest dangers posed by AI is its ability to disrupt the democratic process, making Option C the correct choice.</p> <p>Option A: The passage discusses the risks and dangers of unregulated AI, particularly its potential to manipulate culture, language, and democracy. The author does not discuss the positive impacts of AI making Option A incorrect.</p> <p>Option B: The author does not dismiss the fears about AI harming humanity. In fact, they highlight the significant dangers AI could pose, particularly in terms of language manipulation and its effects on society and democracy. The passage mentions that AI could form intimate relationships with humans and manipulate opinions, which implies real concerns about its negative impact. Therefore, Option B is also incorrect.</p> <p>Option D: The passage does mention concerns about AI being used by students (such as ChatGPT writing essays), however the author shifts the focus to much broader, more significant issues, such as the potential for AI to influence political processes and subvert democracy. The author does not argue that fears about AI in schools are unfounded; rather, they suggest that these concerns are a distraction from the larger issues. Therefore, Option D is incorrect as well.</p> |
| 3. | <p>Option D is correct as the author highlights how language is crucial in creating cultural artefacts, conveying human values, and influencing opinions, but does not suggest that language is the basis for AI tools like ChatGPT. While AI tools use language, the primary focus of the author is on how language underpins human society and culture and how its manipulation by AI can have terrible consequences for human civilization.</p> <p>Option A: Refer to the line, <i>“Human rights, for example, aren't inscribed in our DNA. Rather, they are cultural artefacts we created by telling stories and writing laws.”</i></p> <p>Option B: This is correct because the passage underscores how language is the key to expressing and spreading human values, culture, and societal norms. The author writes: <i>“Language is the stuff almost all human culture is made of.”</i></p> <p>Option C: Refer to line, <i>“AI could even form intimate relationships with people, and use the power of intimacy to change our opinions and worldviews.”</i></p> |
| 4. | <p>The author raises significant concerns over AI's potential to disrupt language, culture, democracy, and human relationships. The overall tone of the passage warns readers about the risks of these tools and calls for quick regulation. The author writes:</p> <p><i>“We can still regulate the new AI tools, but we must act quickly... Unregulated AI deployments would create social chaos, which would benefit autocrats and ruin democracies.”</i></p> <p>This tone of caution about the future impacts of AI is a defining characteristic of the passage.</p> <p>Option A: While the passage does contain a rhetorical question at the end, this is not the dominant tone of the passage. The focus is not on curiosity or uncertainty but on the dangers of AI and the need for regulation.</p> <p>Option B: The author raises significant concerns but does so with reason and logic, aiming to provoke thought and call for regulation, rather than inducing panic. The focus is on the adverse consequences and their implications, not on sensationalizing the threat.</p> <p>Option C: While the passage does discuss the future impact of AI tools, the tone is more focused on warning about the immediate need for regulation and action to avoid negative consequences. The author is not</p> |

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| | primarily forecasting the future but urging preventive measures against potential harms. |
| 5. | <p>The paragraph highlights the tension between lyric poetry's personal focus and Marxism's societal focus, while also suggesting that lyric poetry could still serve a critical purpose. It acknowledges that although lyric poetry is personal and often focused on the small scale, it can function as a form of resistance against a repressive culture — something the passage hints at when it discusses how poetry may be implicitly critical or utopian. Option B captures this idea.</p> <p>Option A: The focus of the passage is more on the possibility of lyric poetry serving a role in resisting oppression, rather than solely highlighting Marxism's internal contradictions.</p> <p>Option C: This option is not entirely correct because it suggests that the resolution of the tension between Marxism and lyric poetry is necessary for poetry to avoid being utopian. The passage does not argue that a resolution is required for poetry to be utopian; rather, it suggests that lyric poetry may inherently be utopian but can still serve a critical function.</p> <p>Option D: The passage does not suggest that Marxism makes "unreasonable demands" on lyric poetry. Neither does it argue that Marxism "ignores" the merits of poetry.</p> |
| 6. | <p>The sentence describes financial stress due to new and previously unincurred costs, which is directly related to the idea of workers experiencing increased expenses after a period of remote work. Blank 3 is the best fit as it discusses how workers were able to save during remote work, when the additional costs (like transportation, lunches, etc.) were absent, which aligns well with the sentence that talks about the stress of these newly incurred costs.</p> <p>Option A introduces the rising costs (petrol, food) but doesn't immediately connect with the stress of the added costs workers are now facing.</p> <p>Option B talks about wage stagnation, but it's not as directly related to the personal stress caused by the new return-to-office costs.</p> <p>Option D is about a specific example of spending return-to-office costs, but it's more about individual cases rather than the general sentiment about the costs employees are now facing.</p> |
| 7. | <p>Option C: This option works best because it connects directly to the earlier sentence about the horrifying photograph and gives more historical context and significance to the image, specifically about the title and nickname of the photograph.</p> <p>Option A: It's more focused on the children's reaction (terror, pain, confusion) and the visual details the sentence would break the flow of the narrative if it were placed right after the opening sentence.</p> <p>Option B: This too would break the flow in describing the terrifying visual of children fleeing from the ravages of destruction and weary soldiers following after them.</p> <p>Option D: The focus here is on the nickname of the 9-year-old girl at the center of the photo, which should come after the paragraph has discussed the photograph's historical and emotional impact.</p> |
| 8. | <p>Moutai's biggest market is drinkers in their mid-30s..... <i>"Its biggest market now is (male) drinkers in their mid-30s. Many..... which also means..... splash out on weddings and banquets. Moutai is often a guest of honor."</i> At the same time the author also says, <i>"In the long run, its biggest risk may be millennials. As they grow older.....the desire for more wholesome pursuits than binge-drinking..... curb heavy drinking..... on which so much of the demand for Moutai rests."</i> Thus, Option C is the correct choice.</p> <p>Option A: While appealing to the rich is a reason for success, it is not portrayed as a future threat. The passage suggests that targeting the wealthy market remains a good strategy for Moutai.</p> <p>Option B: This cultural factor contributes to Moutai's success, but it is not a threat. In fact, it is described as a strong foundation for Moutai's continued sales in the present and near future.</p> <p>Option D: While government involvement can pose risks, it is not both a reason for success and a threat in the same way the appeal to the older demographic is. The passage mainly discusses the government's control over pricing, which is presented as a risk, but not an immediate factor of success in the way the appeal to older consumers is.</p> |
| 9. | <p>Option C: The author contrasts Moutai's marketing strategy with typical Western business practices, such as digital marketing, environmental sustainability, and appeal to millennials. Moutai's marketing strategy is unconventional, ignoring Western business mantras in favor of appealing to Chinese nationalism, the super-rich, and older generations. The author refers to this combination as an "unholy trinity" because it contradicts the Western approach to business.</p> <p>Option A: While nationalism is a key factor in Moutai's success, it alone doesn't explain the term.</p> <p>Option B: The main focus of the passage is the contradiction between Moutai's strategy and Western practices, not the long-term risks directly.</p> <p>Option D: The author does not make any moral judgments on the marketing techniques of Moutai.</p> |
| 10. | <p>The author implies that Moutai's claimed ability to be hangover-proof is so remarkable that it could be considered revolutionary—much like gunpowder was a revolutionary invention. Thus, the lines has been used in a metaphorical sense.</p> <p>Option B: Moutai is not actually a chemical or invention like gunpowder, but a liquor with a claimed quality</p> |

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| | <p>(hangover-proof), which is an exaggeration for effect.</p> <p>Option C: The phrase is not focusing on the actual substance of Moutai or comparing its intrinsic properties to gunpowder. It is a figurative comparison, not a focus on tangible substance.</p> <p>Option D: Moutai and gun powder do not mean the same.</p> |
| 11. | <p>The author emphasizes that Moutai focuses on serving China's super-rich and not its middle class, as many firms have failed in the highly competitive market targeting the middle class... <i>"Second, it chose.... rather than its middle class. Markets.....could not competecut-throat battle for Chinese middle-class wallets.....and still less crowded with prestige brands than advanced economies."</i> Option D contradicts the passage and hence is the correct answer.</p> <p>Option A: This is directly supported by the passage, which notes that many firms have failed in the middle-class market due to the competitive nature of that segment.</p> <p>Option B: Option is consistent with the passage. It mentions that the premium market for liquor in China, catering to the super-rich, is massive and less crowded compared to the middle-class market, making it a lucrative target for Moutai.</p> <p>Option C: The passage mentions that the Chinese government is involved in Moutai's pricing, with the government being the largest shareholder and trying to keep prices stable, which could be seen as controlling the pricing.</p> |
| 12. | <p>Option D best summarises how the tradwife's actions, such as her commitment to vintage fashion and traditional roles, are depicted as exposing the superficial nature of modern life. The passage emphasizes how she challenges current societal norms by insisting on an idealized, seemingly "primitive" way of life, which contrasts sharply with modern, artificial values.</p> <p>Option A: The passage highlights how the tradwife's actions aren't just critiques of modern ideals, but are also a deliberate challenge to societal norms. It's more than just a critique; it's a direct confrontation with and mockery of those norms. This option misses the crucial idea of the tradwife "highlighting" and "challenging" those norms in a way that makes others feel "hollow" and "cheated."</p> <p>Option B: This option doesn't fully capture the idea of "challenging" or "mocking" societal norms, which is a key part of the passage. The word "reveal" here is too passive compared to the active, more confrontational role the tradwife plays in making others feel "hollow" and "cheated" by exposing the contradictions in modern values.</p> <p>Options 3: Option C is not the correct answer because it uses the passive term "exposes," which fails to capture the active confrontation central to the passage. The tradwife's behavior is not just about revealing superficiality, but about challenging and forcing others to confront the hollow nature of modern values. The passage emphasizes her role as a "troll," actively beating society at its own game, which is better captured by the word "challenges" in Option D.</p> |
| 13. | <p>The sentence talks about displacement, which ties in well with the context of "pastoralists" (people who rely on livestock for their livelihood) never being able to return home, which comes after blank 4. Hence Option A is correct.</p> <p>Option B: Inserting the sentence in blank 1 would break the continuity of describing the drought's severity.</p> <p>Option C: Blank 2 introduces the effects of the drought too early, while the displacement sentence works better after the broader context of food insecurity.</p> <p>Option D: The sentence before blank 3 discusses the far-reaching consequences of the drought, which logically flows into the next sentence about farmers and pastoralists. Inserting the sentence in blank 3 will break this continuity.</p> |
| 14. | <p>Sentence 2 talks about the early interest in forecasting from the intelligence community. While it's related to forecasting, it introduces historical context that doesn't fit smoothly with the focus of the other sentences, which deal more with the effectiveness and accuracy of forecasting.</p> <p>Sentence 1 introduces the idea of forecasting and how it doesn't require specialized expertise, making it accessible to a broader group.</p> <p>Sentence 5 adds to that idea by emphasizing that non-experts have performed better in forecasting than experts, aligning with the notion that forecasting can be effective even without specialized knowledge.</p> <p>Sentence 4 supports this idea by citing a study where non-experts performed better than experts in predicting geopolitical events.</p> <p>Sentence 3 fits as it contrasts the performance of non-experts with that of intelligence experts, even though experts had access to classified intelligence, further highlighting the surprising accuracy of non-expert predictions.</p> |
| 15. | <p>Sentence 1 introduces the creation of synapses and the role of the axon terminal, which describes how synapses are formed at a technical, biological level. However, it focuses more on the process of synapse creation rather than the developmental process of synapses which is the focus of the other sentences.</p> <p>Sentence 2: Talks about the importance of early neural connections and their role before the eyes begin functioning, which sets the stage for understanding the developmental process.</p> |

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| | <p>Sentence 5: Explains how synapses are generated excessively in a "rehearsal period", aligning with the developmental focus.</p> <p>Sentence 4: Continues the idea of neural connections forming before birth, which contributes to the process of a child being able to visualize immediately after birth.</p> <p>Sentence 3: Explains synaptic pruning, which is the process of refining these connections, removing weak ones, and reinforcing the important ones.</p> |
| 16. | <p>Option B is not mentioned in the passage. Instead, the author mentions how other countries (like China) have already sent probes to the Moon and experimented with growing plants, without the same level of protest seen in the U.S. There is no claim that probes have had little effect on the environment in the passage.</p> <p>Option A: Refer to paragraph 2.</p> <p>Option C: Refer to para 3..."It's important.....many international competitors will ignore....China recently sent...."</p> <p>Option D: Refer to para 4.... "U.S. lunar landings did not leave the campsites cleaner than they found it..."</p> |
| 17. | <p>: In the first paragraph, the author seems to be questioning and doubting the planetary protection advocates who push for sterilizing robotic probes to avoid contaminating possible, but not proven, biospheres. The author points out how much money NASA spends on cleaning these probes, and suggests that these efforts might be a bit over the top, especially since there's no solid evidence that life exists on Mars or any other planets yet.</p> <p>Option A: The author does not approve of the significant expenses involved in these efforts, but instead suggests that the costs are perhaps too high for uncertain benefits.</p> <p>Option C: The author is not indifferent. In fact, there is an implied critique of the elitist perspective of the planetary protection advocates, but the main focus is on the excessive efforts to sterilize space missions, not indifference to elitism.</p> <p>Option D: The tone is not equivocal (uncertain); the author is clear in their skepticism about these efforts and is questioning them, not presenting a balanced or indecisive view.</p> |
| 18. | <p>The passage highlights how the scientific communities in different countries (China and Israel) react differently to space contamination. While China's actions (sending a terrarium to the moon) sparked no protest, Israel's actions (smuggling tardigrades) led to a significant uproar. This suggests that national scientists may have varying sensitivities or approaches to issues like biosphere protection.</p> <p>Option A: The passage doesn't discuss the type of contamination (animal vs. plant) or its relative importance. The focus is on the reactions to the actions, not the severity of the contamination.</p> <p>Option B: While the reactions to China and Israel are different, the passage doesn't emphasize global biases. The focus is more on the scientific communities in each country, rather than on general global biases.</p> <p>Option D: The passage does not claim that China's actions are particularly reasonable. It contrasts the lack of protest over China's actions with the strong reaction to Israel's, but it doesn't suggest one is more reasonable than the other.</p> |
| 19. | <p>On simplifying, the question is asking what point the author is likely to disagree with. The author disagrees with the idea of placing heavy emphasis on minimizing contamination until life is ruled out. The author argues that life on Mars or other bodies has not been conclusively proven, and the emphasis on contamination should not outweigh the need for exploration and development.</p> <p>Option A: The author agrees with the idea of a compromise approach, where Mars is divided into different zones for science, habitation, and resource exploitation.</p> <p>Option B: The author acknowledges that earlier NASA missions, such as the Apollo missions, did not focus on sterility, but they also did not cause significant harm. The author suggests that the concerns about contamination in previous missions were somewhat exaggerated.</p> <p>Option C: The author argues that the costs of sterilizing probes and maintaining a pristine environment are unsustainable and that focusing too much on contamination could limit human exploration. "...scrubbing everything and hauling out all the trash, would destroy NASA's human exploration budget and encroach on the agency's other directorates, too. Getting future astronauts off Mars is enough of a challenge, without trying to tote weeks of waste along as well."</p> |
| 20. | <p>The passage doesn't mention anything about jobs or economic opportunities helping to save languages. It's more about physical destruction and forced cultural changes, not giving jobs to locals to help them survive.</p> <p>Option A: This could be true because in North America, European colonists took native children away from their families to boarding schools to erase their cultures. If this didn't happen as much in South America, it might explain why languages there survived a bit better.</p> <p>Option B: In North America, colonists were really successful in pushing their own culture and language onto the locals. If South American colonists weren't as successful at forcing locals to adopt their ways, it might have helped the local languages survive longer.</p> <p>Option D: The passage talks about how many Native American communities were wiped out, which led to many languages disappearing. If fewer people were killed in South America, that could explain why their</p> |



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| | languages stuck around longer. |
| 21. | <p>Option B goes against the main idea of the passage because it suggests that a liberal arts education should focus on mastering the top global languages, like English or Spanish. But the passage is all about valuing and preserving endangered languages, not just learning widely spoken ones. The idea is to encourage a deeper understanding of diverse cultures and languages, especially those at risk of disappearing, which wouldn't happen if the focus was only on the most common languages.</p> <p>Option A: The fact that most liberal arts students will pursue jobs in fields like publishing or HR instead of linguistics doesn't contradict the passage. The author is clear that even students who don't become linguistics experts can still play a role in preserving endangered languages through cultural awareness and empathy.</p> <p>Option C: The idea that schools teaching endangered languages might only preserve them for a generation doesn't go against the passage's central theme. The passage acknowledges that some endangered languages are hard to save, but it also shows that efforts, like teaching endangered languages in schools, can make a difference, even if it's only for one generation.</p> <p>Option D: The statement that recording a dying language freezes it in time doesn't directly challenge the passage's message. While the passage emphasizes the importance of actively preserving and revitalizing languages, it also notes the value of documenting them, even if that's just to capture a snapshot of the language before it's lost.</p> |
| 22. | <p>The passage focuses on the loss of cultural knowledge, worldview, and unique perspectives when a language becomes extinct. Option B discusses the loss of a group from a government list of indigenous tribes, which is more about legal or administrative status rather than the cultural and intellectual loss emphasized in the passage.</p> <p>Option A: This is exactly the kind of loss the passage talks about. The extinction of a language can lead to the loss of unique cultural knowledge, including how a group perceives and interacts with their environment.</p> <p>Option C: The passage stresses that languages carry with them unique cultural and emotional expressions that are tied to the way people think and experience the world. The passage highlights that when a language disappears, it doesn't just take the words with it, but also the feelings and meanings those words represent.</p> <p>Option D: This is another example of the kind of cultural and environmental knowledge the passage describes. The Nicobarese language, with its descriptions of 20 different moods of the ocean, reflects a unique way of understanding and interpreting the natural world.</p> |
| 23. | <p>While the passage mentions that some students may engage in language preservation (like recording dying languages), it does not suggest that the primary role of liberal arts students is to establish schools specifically for preserving languages. This is more of an extreme, specialized activity that only a few students might pursue.</p> <p>Option A: A liberal arts education helps students recognize and understand their own cultural biases and practices. By learning about other languages and cultures, they gain insights into their own. This is aligned with the passage's idea that students can become more empathetic and culturally aware.</p> <p>Option C: The passage discusses how studying different languages and cultures helps students navigate cultural differences and communicate more effectively across cultural lines. This is a clear benefit of a liberal arts education.</p> <p>Option D: The passage emphasizes the importance of learning languages, particularly those at risk of extinction, to understand and preserve different worldviews.</p> |
| 24. | <p>The passage discusses the outdated nature of the current regulatory framework for biotechnology, particularly in the context of regulating living organisms, which are unpredictable and unique. It questions whether regulation can ever keep up with the pace of innovation, particularly when it comes to the risks and variations that emerge when new biological entities are introduced.</p> <p>Option A: The option focuses too much on the impossibility of imagining all risks, which the passage does not emphasize. The passage discusses outdated regulation and the challenge of adapting to unpredictability, rather than the sheer impossibility of imagining outcomes.</p> <p>Option B: Doesn't capture the essence of the passage, which raises doubts about whether regulation can actually keep up with rapid innovation in biotechnology, especially considering the unpredictability of biological entities.</p> <p>Option D: It introduces the idea that scientists should shape the regulations, which is not directly suggested in the passage.</p> |
| 25 - 29. | <p>By keeping all conditions in mind, We can see There should be an ATM placed at intersection of V3 and R-C. Also, By condition (2), we can judge there is only one possibility to place ATM with second highest cash requirement at intersection of V2 and R-B. Because this is the only place which is 12 km away. Also, we cannot use distinct integers ranging from 7 to 15. So, By hit and trial, there are only two cases to arrange all 6 ATM's in following manner:</p> |

Case 1:

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|--------------|----|----|----|-----------|
| | V1 | V2 | V3 | Row total |
| R-A | 15 | 0 | 7 | 22 |
| R-B | 0 | 12 | 8 | 20 |
| R-C | 0 | 9 | 11 | 20 |
| column total | 15 | 21 | 26 | 62 |

Case 2:

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|--------------|----|----|----|-----------|
| | V1 | V2 | V3 | Row total |
| R-A | 7 | 0 | 15 | 22 |
| R-B | 8 | 12 | 0 | 20 |
| R-C | 0 | 9 | 11 | 20 |
| column total | 15 | 21 | 26 | 62 |

| 25. | Option (A) is correct as The ATM placed at the (R-C, V2) intersection has a cash requirement of Rs. 9 Lakh. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--|--------------|--------------|---------------|------|-------|-----|-----|-------|-------|-------|----------|------|-------|-------|--------------|--------------|--------------|--------------|-------|-----|------|-------|-------|----------|-------|-------|-------|--------------|--------------|--------------|--------------|--------|-----|--|--|--|----------|--|--|--|--------------|--------------|--------------|---------------|--------------|--|--------|--------|--------|
| 26. | In Case 1, ATMs with cash requirement of 15 L, 12 L, 11L are more than 10 L. In case (2), ATMs with cash requirement of 15 L, 12 L, 11L are more than 10 L. Hence there are 3 ATMs with cash requirements of Rs. 10 Lakh or more. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27. | As we can see in both cases only statement (1) is right but statement (2) is wrong in case (1). Hence option (D) is the answer. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28. | In case (1), ATMs (V2, R-B) and (V3, R-B) are the ATMs with second highest and second lowest requirements. Hence distance between them is 7 KM. In case (2), ATMs ((V1, R-B) and (V2, R-B) are the ATMs with second lowest and second highest requirements. Hence distance between them is 4 KM. So ans is either D or 7 KM. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29. | We can determine only 3 ATMs' locations uniquely and they are (V2, R-B), (V2, R-C) and (V3, R-C). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-33. | <p>Let the total number of subscribers in 2023 = 100x From point 1, the total number of subscribers in 2024 = 100x + 10% of 100x = 110x In 2023, Total number of subscribers from Kid category = 15% of 100x = 15x From point 3 and 4, in 2023 Number of subscribers from Kid category using one app = 10000. So, number of subscribers from Kid category using multiple apps = 15x – 10000 = number of subscribers from Elder category using one app. Also, number of subscribers from Elder category using multiple apps = 15000 So, total number of subscribers from Elder category = 15x – 10000 + 15000 = 20% of 100x = 20x Solving, x = 1000 So, the total number of subscribers in 2023 = 100000 and in 2024 = 110000 The rest of the information can be gathered as follows-</p> <table border="1"> <thead> <tr> <th>Category</th> <th>App(s)</th> <th>2023</th> <th>2024</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Kid</td> <td>One</td> <td>10000</td> <td>11000</td> <td>21000</td> </tr> <tr> <td>Multiple</td> <td>5000</td> <td>11000</td> <td>16000</td> </tr> <tr> <td>Total</td> <td>15000</td> <td>22000</td> <td>37000</td> </tr> <tr> <td rowspan="3">Elder</td> <td>One</td> <td>5000</td> <td>22000</td> <td>27000</td> </tr> <tr> <td>Multiple</td> <td>15000</td> <td>11000</td> <td>26000</td> </tr> <tr> <td>Total</td> <td>20000</td> <td>33000</td> <td>53000</td> </tr> <tr> <td rowspan="3">Others</td> <td>One</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Multiple</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>65000</td> <td>55000</td> <td>120000</td> </tr> <tr> <td>Total</td> <td></td> <td>100000</td> <td>110000</td> <td>210000</td> </tr> </tbody> </table> | Category | App(s) | 2023 | 2024 | Total | Kid | One | 10000 | 11000 | 21000 | Multiple | 5000 | 11000 | 16000 | Total | 15000 | 22000 | 37000 | Elder | One | 5000 | 22000 | 27000 | Multiple | 15000 | 11000 | 26000 | Total | 20000 | 33000 | 53000 | Others | One | | | | Multiple | | | | Total | 65000 | 55000 | 120000 | Total | | 100000 | 110000 | 210000 |
| Category | App(s) | 2023 | 2024 | Total | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kid | One | 10000 | 11000 | 21000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Multiple | 5000 | 11000 | 16000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 15000 | 22000 | 37000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Elder | One | 5000 | 22000 | 27000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Multiple | 15000 | 11000 | 26000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 20000 | 33000 | 53000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Others | One | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Multiple | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Total | 65000 | 55000 | 120000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | | 100000 | 110000 | 210000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30. | Number of subscribers belonged to the Others category in 2024 = 55000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31. | Percentage of subscribers in the Kid category using multiple apps in 2023 = $\frac{5000}{15000} \times 100 = 33.33\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32. | Percentage increase in the number of subscribers in the Elder category from 2023 to 2024 = $\frac{(33000 - 20000)}{20000} \times 100 = 65\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33. | To minimize, let the number of subscribers in Others category using multiple apps in 2024 = 0 So, the minimum percentage of subscribers who used multiple apps in 2024 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



$$= \frac{(11000 + 11000 + 0)}{110000} \times 100 = 20\%$$

| Country | GDP | GDP/CAPITA | Population | GDP growth rate(in %) | Population growth rate(in %) |
|---------|------|------------|-------------------|-----------------------|------------------------------|
| C1 | 15x | 41y | $\frac{15x}{41y}$ | 0.2 | -0.12 |
| C2 | 14x | 25y | $\frac{14x}{25y}$ | 0.9 | -0.41 |
| C3 | 13x | 2y | $\frac{13x}{2y}$ | 6.5 | 0.7 |
| C4 | 12x | 38y | $\frac{12x}{38y}$ | 0.5 | 0.49 |
| C5 | 10x | 36y | $\frac{10x}{36y}$ | 0.7 | 0.31 |
| C6 | 8x | 8y | $\frac{8x}{8y}$ | 3.2 | 0.61 |
| C7 | 8x | 30y | $\frac{8x}{30y}$ | 0.7 | -0.11 |
| C8 | 7x | 41y | $\frac{7x}{41y}$ | 1.2 | 0.71 |
| C9 | 100x | ? | | | |
| C10 | ? | 100y | | | |

34. As is given GDP per capita = GDP/Population
 That implies population = GDP/GDP per capita
 Hence we can calculate population for each country.
 It's always time saving if we check only for given options.
 For C8: $\frac{7x}{41y}$
 For C5: $\frac{10x}{36y}$
 For C3: $\frac{13x}{2y}$
 For C7: $\frac{8x}{30y}$
 Since $\frac{x}{y}$ is a common expression, So, we can compare $\frac{7}{41}, \frac{10}{36}, \frac{13}{2}, \frac{8}{30}$.
 Out of these, C8 has the smallest population.

35. Required ratio = $12x(1 + \frac{0.5}{100})^2 : 10x(1 + \frac{0.7}{100})^2 = 1.195$

36. For C1, Population is $\frac{15x}{41y} \left(1 - \frac{0.12}{100}\right)^3 = \frac{365268x}{10^6 y}$
 For C4, Population is $\frac{12x}{38y} \left(1 + \frac{0.49}{100}\right)^3 = \frac{547x}{10^6 \cdot y}$
 For C5, Population is $\frac{10x}{36y} \left(1 + \frac{0.31}{100}\right)^3 = \frac{280369x}{10^6 \cdot y}$
 For C7, Population is $\frac{8x}{30y} \left(1 - \frac{0.11}{100}\right)^3 = \frac{265787x}{10^6 \cdot y}$
 So, for C1, population is maximum in 2027.

37. Since all the GDP growth rates are positive i.e., GDP is increasing. So, there is no country among C1 through C8 whose GDP per capita in 2027 be lower than that in 2024.

38. As per the graph, the AC must have been turned off 2 times (12 am and 1 pm, when the inside temperature started rising) between 11:01 pm and 1:59 am

39. Given that the AC was turned on for the first time that night at 11 pm. So the temperature inside the room = 38°C = the temperature outside the room.

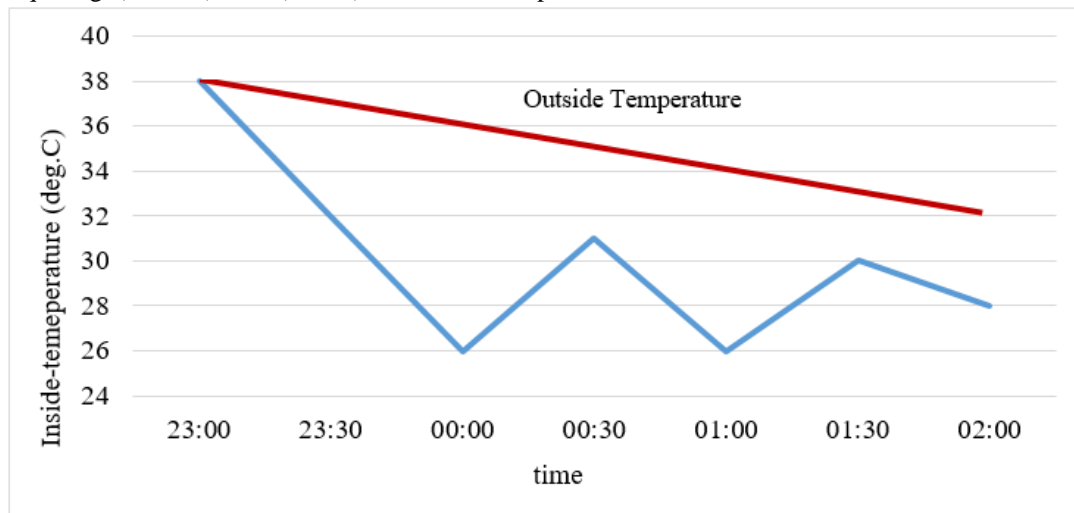
Let the falling rate of temperature outside the room per hour = $x^{\circ}\text{C}$

So, at 1 am (after 2 hours), the outside temperature = $(38 - 2x)^{\circ}\text{C}$

Also given that it takes 1 hour to reach the temperature outside while AC was switched off. Now, from 12 am to 12:30 pm, the temperature reached from 26°C to 31°C while AC was switched off, so it should have been reached from 31°C to 36°C from 12:30 pm to 1 pm (as per the constant rise in the rate), but along with that outside temperature is also falling at $x^{\circ}\text{C}$ per hour.

So, at 1 pm, the outside temperature should be = $(36 - x)^{\circ}\text{C}$

Equating, $(38 - 2x)^{\circ}\text{C} = (36 - x)^{\circ}\text{C} \Rightarrow x = 2^{\circ}\text{C}$ per hour



So, the temperature outside at 1 pm = $36 - 2 = 34^{\circ}\text{C}$

40. Given that the AC was turned on for the first time that night at 11 pm. So the temperature inside the room = 38°C = the temperature outside the room.

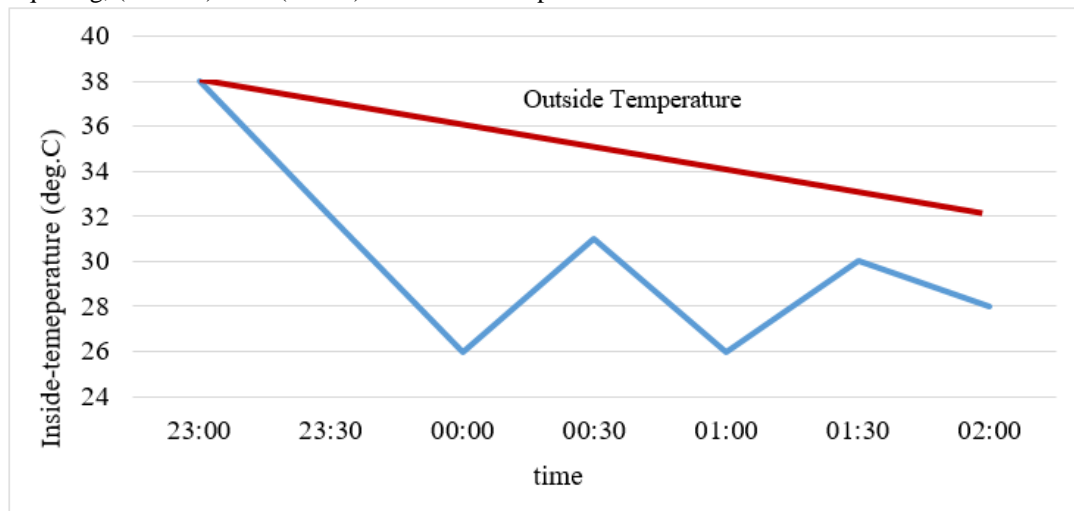
Let the falling rate of temperature outside the room per hour = $x^{\circ}\text{C}$

So, at 1 am (after 2 hours), the outside temperature = $(38 - 2x)^{\circ}\text{C}$

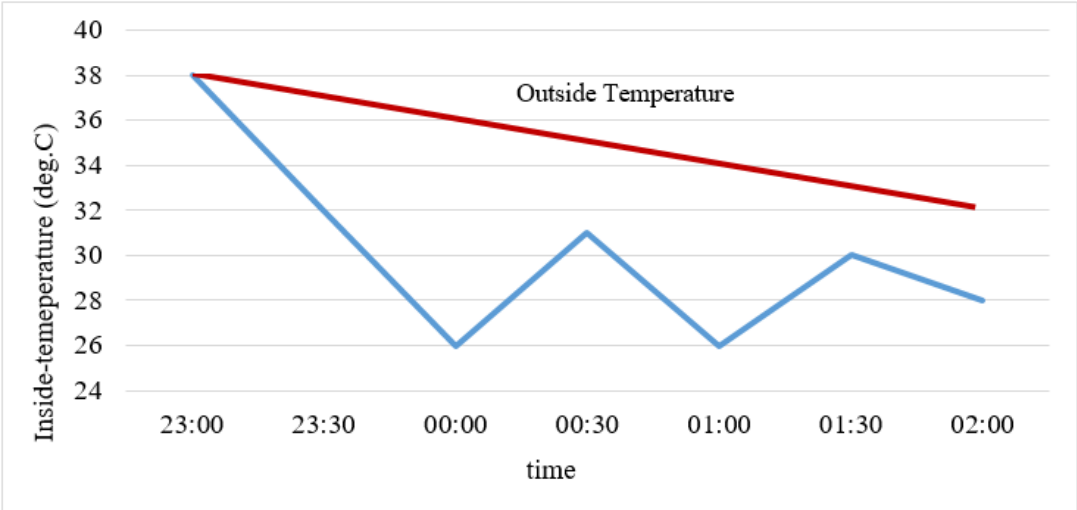
Also given that it takes 1 hour to reach the temperature outside while AC was switched off. Now, from 12 am to 12:30 pm, the temperature reached from 26°C to 31°C while AC was switched off, so it should have been reached from 31°C to 36°C from 12:30 pm to 1 pm (as per the constant rise in the rate), but along with that outside temperature is also falling at $x^{\circ}\text{C}$ per hour.

So, at 1 pm, the outside temperature should be = $(36 - x)^{\circ}\text{C}$

Equating, $(38 - 2x)^{\circ}\text{C} = (36 - x)^{\circ}\text{C} \Rightarrow x = 2^{\circ}\text{C}$ per hour





| | |
|--------|---|
| 41. | <p>At 9 pm (2 hours prior to 11 pm), the temperature outside = $38 + 2x = 42$ °C</p> <p>Between 11:01 pm and 1:59 pm, the AC have been turned on at 12:30 am and 1:30 am, when the inside temperature starts falling.</p> <p>Along with that it is given that the AC used in POWER mode is for longer duration that in REGULAR mode during 11 pm to 2 am and this alteration can be done after every 30 minutes. This is possible as follows-</p> <p>From 11 pm to 11:30 pm – REGULAR mode From 11:30 pm to 12 pm – POWER mode From 12:30 pm to 1 pm – POWER mode From 1:30 pm to 2 pm – POWER mode</p> <p>So, there must be an alteration at 11:30 pm Hence, the number of time the AC must have been turned on or settings altered = $2 + 1 = 3$ (exactly)</p> |
| 42. |  <p>Between 11:01 pm and 11:59 am, the maximum difference between temperature outside and inside was at 12 am = $36 - 26 = 10$ °C</p> |
| 43-46. | <p>From point 1, 2 and 3, for all categories, Carbohydrate (Cereal) > Carbohydrate (Pseudo-cereal) > Carbohydrate (Millet) and all of these missing values are non-zero multiples of 5.</p> <p>Let C1 (carbohydrate) = A, C2 (carbohydrate) = B, M2 (carbohydrate) = C and P2 (carbohydrate) = D such that $A, B > 66, D > 62, C, 56$</p> <p>From point 4 and 5, all missing values of protein, fat and other nutrients are non-zero multiples of 4 such that $P1$ (protein) = $2 \times M3$ (protein)</p> <p>Let C1 (protein) = P, C2 (protein) Q, M2 (protein) = R, M3 (protein) = S and $P1$ (protein) = $2S$ such that $2S, 14 > 10, R, S$ (point 1)</p> <p>Let M1 (fat) = E, P1 (fat) = F and P2 (fat) = G</p> <p>Let M1 (other nutrients) = X and M3 (other nutrients) = Y</p> <p>Solving, $A + P + 0 + 12 = 100 \Rightarrow A + P = 88$</p> <p>Possible values of A (> 66 and multiple of 5) = 70, 75, 80 or 85</p> <p>But considering P is a multiple of 4, so A = 80 and P = 8 is the only possibility</p> <p>Solving, $B + Q + 3 + 10 = 100 \Rightarrow B + Q = 87$</p> <p>Possible values of B (> 66 and multiple of 5) = 70, 75, 80 or 85</p> <p>But considering Q is a multiple of 4, so B = 75 and Q = 12 is the only possibility</p> <p>Solving, $62 + 10 + E + X = 100 \Rightarrow E + X = 28$</p> <p>Solving, $C + R + 7 + 16 = 100 \Rightarrow C + R = 77$</p> <p>Possible values of R (< 14) = 12, 8 or 4, but considering C is a multiple of 5, only possible value of C = 65 and R = 12</p> <p>Solving, $56 + S + 12 + Y = 100 \Rightarrow S + Y = 32$</p> <p>Solving, $66 + 2S + F + 10 = 100 \Rightarrow 2S + F = 24$</p> <p>Considering, S is a multiple of 4, 2S must be a multiple of 8 and > 10</p> <p>The only possible values of $2S = 16$ and F = 8</p> <p>So, S = 8 and Y = 24</p> <p>Solving, $D + 14 + G + 8 = 100 \Rightarrow D + G = 78$</p> <p>Possible values of D (> 62 and multiple of 5) = 65, 70, 75</p> <p>But considering G is a multiple of 4, so D = 70 and G = 8</p> |

The rest of the information can be gathered as follows-

| Food grain Category | Code name of the food grain | Composition per hundred grams of nutrients in the food grains | | | | |
|---------------------|-----------------------------|---|---------|-------|-----------------|-------|
| | | Carbohydrate | Protein | Fat | Other nutrients | Total |
| Cereal | C1 | A = 80 | P = 8 | 0 | 12 | 100 |
| | C2 | B = 75 | Q = 12 | 3 | 10 | 100 |
| Millet | M1 | 62 | 10 | E | X | 100 |
| | M2 | C = 65 | R = 12 | 7 | 16 | 100 |
| | M3 | 56 | S = 8 | 12 | Y = 24 | 100 |
| Pseudo-cereal | P1 | 66 | 2S = 16 | F = 8 | 10 | 100 |
| | P2 | D = 70 | 14 | G = 8 | 8 | 100 |

43. The number of food grains having a higher amount of carbohydrate per 100 grams of nutrients that M1 = 5 (C1, C2, M2, P1 and P2)

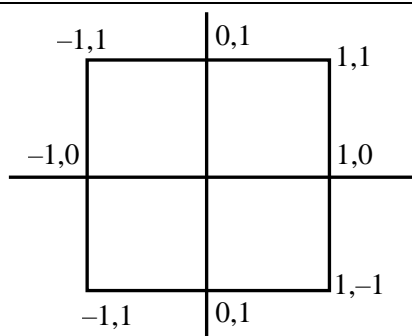
44. The amount of protein in 100 grams of nutrients in M2 = 12 grams

45. The amount of other nutrients in 100 grams of nutrients in M3 = 24 grams

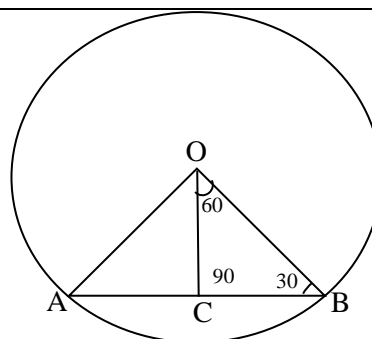
46. The numbers of grams of proteins in 100 grams of nutrients among given food grains in increasing order are 8, 8, 10, 12, 12, 14 and 16. The median value = 12

47. $8^f = 9$
 $7^{ef} = 9$
 $6^{def} = 9$
 $5^{cdef} = 9$
 $4^{bcdef} = 9$
 $3^{abcdef} = 9 = 3^2$
 So $abcdef = 2$

48. Putting $X = 0$, we get $y = 1$
 Putting $Y = 0$, we get $x = 1$
 Putting $X = -1$, we get $y = 1/-1$
 Putting $X = 1$, we get $y = 1/-1$
 So, in total there will be 8 integral solutions



49. In triangle OBC,
 $BC = 5\sqrt{3}$
 So $OB = 10 = \text{radius}$
 Area of smaller region
 = area of sector AOB - Area of triangle AOB
 $= \frac{120}{360} \pi \times 10 \times 10 - \frac{1}{2} \times 5 \times 10\sqrt{3}$
 $= \frac{1}{3} 100 \pi - 25\sqrt{3}$



50. Let the actual speed of the train be x km/hr and let the actual time taken be y hours.
 Distance covered is xy km
 If the speed is increased by 6 km/hr, then time of journey is reduced by 4 hours i.e., when speed is $(x + 6)$ km/hr, time of journey is $(y - 4)$ hours.
 \therefore Distance covered = $(x + 6)(y - 4)$
 $\Rightarrow xy = (x + 6)(y - 4)$
 $\Rightarrow -4x + 6y - 24 = 0$
 $\Rightarrow -2x + 3y - 12 = 0 \dots\dots\dots(i)$
 Similarly $xy = (x - 6)(y + 6)$
 $\Rightarrow 6x - 6y - 36 = 0$
 $\Rightarrow x - y - 6 = 0 \dots\dots\dots(ii)$

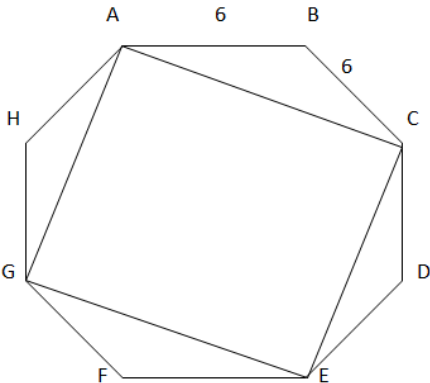


| | |
|-----|---|
| | <p>Solving (i) and (ii) we get $x = 30$ and $y = 24$ Putting the values of x and y in equation (i), we obtain Distance = (30×24) km = 720 km. Hence, the length of the journey is 720 km.</p> |
| 51. | <p>Vimal has total 30 hectares. The cultivation area of wheat and mustard in the land owned by Vimal are in the ratio of 5 : 3.</p> <p>Means Wheat = $\frac{5}{8} \times 30 = 18.75$ ad mustard = $\frac{3}{8} \times 30 = 11.25$</p> <p>Total area is $20 + 30 = 50$ hectares the total cultivation area of wheat and mustard are in the ratio 11 : 9</p> <p>Total Wheat $\frac{11}{20} \times 50 = 27.5$ and mustard = $\frac{9}{20} \times 50 = 22.5$</p> <p>Subtracting we get cultivation area of wheat and mustard in the land owned by Rajesh is, Wheat = $27.5 - 18.75 = 8.75$ Mustard = $22.5 - 11.25 = 11.25$ So the ratio of cultivation area of wheat and mustard in the land owned by Rajesh is = $8.75 : 11.25 = 7 : 9$</p> |
| 52. | <p>$\frac{\text{Amount after 5 years}}{\text{Amount after 3 years}} = \frac{36}{25} = \left(\frac{6}{5}\right)^2$</p> <p>Solving it for rate, we get rate = 20%</p> <p>$A = P \left(1 + \frac{r}{100}\right)^n$</p> <p>$20,000 = 4000 \left(1 + \frac{20}{100}\right)^n$</p> <p>Solving it we get $n = 9$.</p> |
| 53. | <p>Here 13 is a prime number, Euler of 13 will be 12, means $\frac{10^{12}}{13}$ will leave a remainder 1</p> <p>68 can be broken as $12 \times 5 + 8$</p> <p>We are left with = $\frac{10^8}{13}$</p> <p>= $\frac{10^{6+2}}{13}$ = $\frac{(10^6 \times 10^2)}{13}$ = $\frac{(1000 - 1)^2 \times (91 + 9)}{13}$ {Because $10^3 = 1000$ and $10^2 = 100$} = $(-1)^2 \times (9) = 9$</p> |
| 54. | <p>Here average of a, b, c is given as 28 where $a < b < c$</p> <p>$\frac{(a + b + c)}{3} = 28$ $a + b + c = 84$</p> <p>If the smallest number is increased by 7 and the largest number is reduced by 10, the order of the numbers remains unchanged, and the new arithmetic mean becomes 2 more than the middle number, means $(a + 7) + b + (c - 10) = 84$ $a + b + c = 81$ New average = $27 = b + 2$ $b = 2$ Means, $a + c = 59$ ----- {I} The difference between the largest and the smallest numbers becomes 64 $(c - 10) - (a + 7) = 64$ $c - a = 81$ ----- {II} Solving I and II, we get $c = 70$</p> |

| 55. | <p>In a group of 250 students, the percentage of girls was at least 44% and at most 60%.</p> <table style="margin-left: 40px;"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Girl =</td> <td>110</td> <td>150</td> </tr> <tr> <td>Boy =</td> <td>140</td> <td>100</td> </tr> </tbody> </table> <p>Case I = Girl = 110, Boy = 140</p> <table style="margin-left: 40px;"> <thead> <tr> <th></th> <th>Swim</th> <th>Run</th> </tr> </thead> <tbody> <tr> <td>Girl =</td> <td>88</td> <td>66</td> </tr> <tr> <td>Boy =</td> <td>70</td> <td>98</td> </tr> <tr> <td>Total =</td> <td>158</td> <td>164</td> </tr> </tbody> </table> <p>$S + R - S \cap R = 250$ $S \cap R = 72$</p> <p>Case II = Girl = 150, Boy = 110</p> <table style="margin-left: 40px;"> <thead> <tr> <th></th> <th>Swim</th> <th>Run</th> </tr> </thead> <tbody> <tr> <td>Girl =</td> <td>120</td> <td>90</td> </tr> <tr> <td>Boy =</td> <td>50</td> <td>70</td> </tr> <tr> <td>Total =</td> <td>170</td> <td>160</td> </tr> </tbody> </table> <p>$S + R - S \cap R = 250$ $S \cap R = 80$</p> <p>So, the minimum and maximum possible number of students who opted for both swimming and running, are 72 and 80.</p> | | Min | Max | Girl = | 110 | 150 | Boy = | 140 | 100 | | Swim | Run | Girl = | 88 | 66 | Boy = | 70 | 98 | Total = | 158 | 164 | | Swim | Run | Girl = | 120 | 90 | Boy = | 50 | 70 | Total = | 170 | 160 |
|---------|---|-----|-----|-----|--------|-----|-----|-------|-----|-----|--|------|-----|--------|----|----|-------|----|----|---------|-----|-----|--|------|-----|--------|-----|----|-------|----|----|---------|-----|-----|
| | Min | Max | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Girl = | 110 | 150 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boy = | 140 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Swim | Run | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Girl = | 88 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boy = | 70 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total = | 158 | 164 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Swim | Run | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Girl = | 120 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boy = | 50 | 70 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total = | 170 | 160 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56. | <p>$(a + b\sqrt{3})^2 = 52 + 30\sqrt{3}$ $a^2 + 3b^2 + 2 \times \sqrt{3} \times ab = 52 + 30\sqrt{3}$ $a^2 + 3b^2 + 2 \times \sqrt{3} \times ab = 52 + 30\sqrt{3}$ Means $a \times b$ must be 15 and $a^2 + 3b^2 = 52$ Rewriting it $a^2 + 3b^2 + 2 \times \sqrt{3} \times ab = 25 + 27 + 2 \times 5 \times 3\sqrt{3}$ So $a = 5$ and $b = 3$ So $a + b = 8$.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57. | <p>In any triangle, the medians divide the triangle into six smaller triangles of equal area. The area of the medial triangle formed by the midpoints of the sides of the original triangle (in this case, $\triangle XYZ$) is exactly one-fourth of the area of the original triangle. Since the area of $\triangle ABC$ is given as 1440 sq cm, the area of $\triangle XYZ$, which is the medial triangle, is: Area of $\triangle XYZ = \frac{1}{4} \times 1440 = 360$ sq cm However, we must consider the area of the triangle formed by the medians, which is half the area of the medial triangle. Therefore, the area of $\triangle XYZ$ is: {90} sq cm</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58. | <p>Let $10^x = A$ We get $A + \frac{4}{A} = \frac{81}{2}$ $2A^2 - 81A + 8 = 0$ It's a quadratic equation, means 10^x will have 2 values, let it be 10^{x_1} and 10^{x_2} Product of roots = $\frac{8}{2} = 4$ $10^{x_1} \times 10^{x_2} = 4 = (2)^2$ $(10)^{x_1 + x_2} = (2)^2$ Taking log base 10 on both sides $\log_{10}(10)^{x_1 + x_2} = \log_{10} (2)^2$ $(x_1 + x_2) \log_{10}(10) = 2\log_{10} (2)$ $(x_1 + x_2) = 2\log_{10} (2)$ So, sum of all distinct real values of x that satisfy the equation will be $2\log_{10} (2)$</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59. | <p>Here we need to check in three ranges Case 1 $\Rightarrow x \geq 2$, we get $x - 2 = x + 2 - (x - 2)$ $x = 6$ (Satisfied) Case 2 $\Rightarrow -2 \leq x < 2$, we get $2 - x = x + 2 - [-(x - 2)]$ $x = \frac{2}{3}$ (Satisfied) Case 3 $\Rightarrow x < -2$, we get</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| | |
|-----|---|
| | $2 - x = -x - 2 + (x - 2)$ $x = 6$ (Not Satisfied) Number of distinct real values of x , satisfying the equation will be 2. |
| 60. | <p>Here if you think carefully and assume initially the whole container was filled with milk. Firstly x litre of milk was replaced with water. Second time $2x$ litre of mixture was replaced with water. Resultant milk left is 72%. So water is 28%.</p> $(-x) + (-2x) + (-x) \frac{(-2x)}{100} = -28$ $(-3x) + \frac{(2x^2)}{100} = -28$ <p>Solving it we get $x = 10\%$</p> <p>10% of 300 = 30. The amount of water, in litres, that was initially poured into the container was 30.</p> |
| 61. | <p>Given $f(x) + 2f\left(\frac{1}{x}\right) = 3x$ ----- {I}</p> <p>For $\frac{1}{x}$, we get $f\left(\frac{1}{x}\right) + 2f(x) = \left(\frac{3}{x}\right)$ ----- {II}</p> <p>Putting the value of $f(x) = 3$ in I, we get</p> $3 + 2f\left(\frac{1}{x}\right) = 3x$ $f\left(\frac{1}{x}\right) = \frac{(3x - 3)}{2}$ ----- {III} <p>Putting the value of $f(x) = 3$ in II, we get</p> $f\left(\frac{1}{x}\right) + 2(3) = \left(\frac{3}{x}\right)$ $f\left(\frac{1}{x}\right) = \frac{(3 - 6x)}{x}$ ----- {IV} <p>Equating III and IV, we get</p> $\frac{(3x - 3)}{2} = \frac{(3 - 6x)}{x}$ $x^2 + 3x - 2 = 0$ <p>Sum of roots = $\frac{-(-3)}{1} = -3$</p> <p>The sum of all possible values of x will be -3.</p> |
| 62. | <p>Ravi gets 10% discount on this marked price, and thus saves Rs 15 Means 10% of MP = 15Rs MP = 150 Rs.</p> <p>Discount is 15 Rs, SP = 150 - 15 = 135</p> <p>Gopi marks a price on a product in order to make 20% profit Means 1.2 CP = MP 1.2 CP = 150 CP = 125 Rs</p> <p>Profit = SP - CP Profit = 135 - 125 Profit = 10 Rs</p> |

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| 63. | <p>The sum $\frac{1}{t_2} + \frac{1}{t_4} + \frac{1}{t_6} + \dots + \frac{1}{t_{2022}} + \frac{1}{t_{2024}}$ is :</p> <p>At $n = 4$, $t_4 = \frac{4-3}{4-1} \times t_2 = \frac{-1}{3}$</p> <p>At $n = 6$, $t_6 = \frac{6-3}{6-1} \times t_4 = \frac{-1}{5}$</p> <p>And so on.</p> <p>$t_{2024} = \frac{-1}{2023}$</p> <p>$\frac{1}{t_2} + \frac{1}{t_4} + \frac{1}{t_6} + \dots + \frac{1}{t_{2022}} + \frac{1}{t_{2024}} = (-1 - 3 - 5 \dots - 2023)$</p> <p>$= -(1 + 3 + 5 + 7 \dots + 2023)$</p> <p>Total terms are $\frac{2024}{2} = 1012$</p> <p>Sum of first n odd natural number $= n^2$</p> <p>$-(1 + 3 + 5 + 7 \dots + 2023) = -(1012)^2 = -1024144$</p> |
| 64. | <p>We will consider the cases of 1 digit, 2 digit and 3 digit numbers satisfying the above condition separately.</p> <p>1 digit numbers with non-repeating digits = 9</p> <p>2 digit numbers with non-repeating digits = $9 \times 9 = 81$</p> <p>3 digit numbers with non-repeating digits = $4 \times 9 \times 8 = 288$</p> <p>Total 378 such numbers exist</p> |
| 65. | <p>If we go by the options using the formula for net % change $= a + b + \frac{ab}{100}$ i.e., $25 + 50 + 25 \times \frac{50}{100} = 87.5$.</p> <p>We can see that 25 satisfies the condition properly. Therefore it is the answer.</p> |
| 66. | <p>If Mohit is 2 times as efficient as Sam then Efficiency of Mohit : Efficiency of Sam = 2 : 1 i.e. (M : S = 2 : 1)</p> <p>If Mohit is 3 times as efficient as Ayna (M : A = 3 : 1) therefore S : M : A = 3 : 6 : 2</p> <p>Total work = $3 \times 20 = 60$</p> <p>According to the question</p> <p>Sam & Mohit work on the 1st day (So, S + M will complete $3 + 6 = 9$ unit work in one day.)</p> <p>Sam & Ayna work on the 2nd day (So, S + A will complete $3 + 2 = 5$ unit work in one day.)</p> <p>Mohit & Ayna work on the 2nd day (So, M + A will complete $6 + 2 = 8$ unit work in one day.)</p> <p>So, in 3 days $9 + 5 + 8 = 22$ unit work gets finished</p> <p>& in 6 days $22 \times 2 = 44$ unit gets completed</p> <p>On 7th day S + M will complete 9 unit work</p> <p>On 8th day S + A will do 5 unit work</p> <p>On 9th day M + A will do 2 unit work.</p> <p>So, in total the work gets completed on the 9th day but S works on 6 days in total i.e. 1st, 2nd, 4th, 5th, 7th and 8th day</p> <p>Therefore the fraction of the work done by Sam in those 6 days will be $\frac{6 \times 3}{60} = \frac{3}{10}$</p> |
| 67. | <p>As per the given figure below</p>  <p>AC is the shortest diagonal of the octagon and the length of the short diagonal of an octagon is</p> |



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| | <p>$a\sqrt{2 + \sqrt{2}}$ where a is the side of a regular octagon. So, the length of AC will be $6\sqrt{2 + \sqrt{2}}$ And, the area of the square ACEG will be $(6\sqrt{2 + \sqrt{2}})^2 = 36(2 + \sqrt{2})$</p> |
| 68. | <p>The condition for a system of linear equations to have no solution is</p> $\frac{a_2}{a_2} = \frac{b_2}{b_2} \neq \frac{c_2}{c_2}$ <p>Therefore, $\frac{-4}{k} \neq \frac{2}{a}$</p> $\Rightarrow -4a \neq 2k$ $\Rightarrow 2a + k \neq 0$ |