

DASH CAT 4



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Instructions

The passage below is accompanied by a set of questions. Choose the best answer to each question.

The established meat-free company Quorn is in Yorkshire, along with new plant-based companies like Meatless Farm, Plant and Bean, Over the Spoon and VFC. There is another crop coming up behind them, with almost 20 alt-food brands established in Yorkshire in the past year alone, according to Companies House data. Thijs Geijer, an economist at ING Research, says these emerging clusters are a “bit of a trend”. “In the US, there’s the Protein Highway in the Midwest and in the Netherlands, there’s Vegan Valley in the eastern part of the country.” The prize is a big one for the entrepreneurs who get it right.

The demand for alt-meat and dairy products has been fuelled by consumer interest in health, animal welfare and sustainability, which was heightened during the pandemic. But with household budgets now being squeezed by inflation, the “big question” says Geijer, is whether they will keep buying more of what are often more expensive products. Shares in Swedish alt-milk producer Oatly crashed about 20% one day in November on warnings about production delays and inflation, and have continued their slide since then. The share price of alt-meat firm Beyond Meat is also depressed after sales declined in the last three months of 2021. Ethan Brown, its chief executive, said he didn’t know if it was “an aberration or a harbinger of things to come”. However, with its quarter pounders, sausages and chicken breasts shaped from pea protein, Meatless Farm thinks the future is bright as it has raked in £30m from investors and is currently finalising another fundraising.

The brightly coloured graphic painted on the facade of its office in The Calls makes it one of Leeds’ most Instagrammed spots. In jeans and trainers Michael Hunter, the UK managing director, says the six-year-old company’s sales are expected to triple to £31m this year. It has a big market to chase: UK retail sales of meat substitutes hit £600m in the UK last year, according to Mintel, a figure it forecasts to reach £855m by 2026. With its exposed brick walls, the office feels like a trendy warehouse apartment. Founded in 2016, the company benefits from links with local universities. Hunter says that it would be prohibitively expensive to have the same set-up - the office includes a development kitchen - in London. It now has 120 staff, about half of whom are based in the UK.

In the kitchen, there are containers of the pea protein that is the key ingredient in its food. The pale brown colour of Rice Krispies, the texture varies from a fine mince to chicken nugget-sized chunks. This unpromising-looking substance is transformed with the help of vegan beef stock, as well as beetroot, caramelised carrot and blueberry (to create the meat colour), says Ronnie Hayes, its innovation chef. Flecks of coconut and shea butter help replicate the sizzle of a beef burger as it cooks. The company aims to keep ingredients to a minimum. “Everyone looks at the back of the pack and if it looks like a chemistry set they might say that is not for me,” explains Hunter. “The hard thing is keeping the ingredient deck really clean but at the same time delivering a product that people go, wow, that is just like a meat burger.”



1. The phrase "bit of a trend" refers to the fact that:

- A. there is a global trend of plant-based businesses being set up in clusters.
- B. plant-based businesses are gaining more traction in the global market.
- C. the clusters of plant-based businesses have gained the attention of consumers.
- D. it has become trendy to opt for plant-based alternatives for meat.

Sol. Thijs Geijer, an economist at ING Research, says these emerging clusters are a “bit of a trend”. “In the US there’s the Protein Highway in the Midwest and in the Netherlands there’s Vegan Valley in the eastern part of the country.”

The author mentions that the cluster in Yorkshire is a bit of a trend. He then supports it with examples that globally, plant-based businesses are set up in clusters. Thus, the correct answer is Option A.

The trend does not refer to the traction of the product or the clusters among consumers. Hence, the other Options can be eliminated.

2. Which of the following would help the most in answering the "big question" mentioned in the second paragraph?

- A. The awareness about the ill effects of original meat and empathy towards animals is increasing day by day.
- B. The cost of production for plant-based meat could increase in the coming years due to more stringent quality control.
- C. In an experiment, 90% of the participants could not distinguish between original and plant-based meat.
- D. Most buyers of plant-based meat are from high-income households that are less impacted by inflation.

Sol. But with households budgets now being squeezed by inflation the “big question” says Geijer, is whether they will keep buying more of what are often more expensive products.

The big question mentioned here is whether people will continue buying plant-based meat, which is more expensive, in spite of it having a toll on their pockets in harsh times. Thus, a statement that clarifies whether people will or will not buy plant-based meat, in this case, will be the correct answer.

A: Though people are becoming more aware of the subject, this does not necessarily translate into a financial decision. A is not a strong answer.

B: Option B is speculative (could increase) and does not talk about consumer behaviour. It is possible that people have some incentive to buy plant-based protein irrespective of the price. Since Option B does not touch upon this at all, it is not a strong answer.

C: Option C runs tangent to the discussion. It hints that plant-based and original meat are quite similar. This, however, does not confirm whether people will prefer eating it or prefer the cheaper(original) of the two. Thus, Option C is not a strong answer.

D: Option D gives us more insight into customer demographics: if most of the customers are from high-income households who are less impacted by inflation, their propensity to continue buying meat alternatives (in the face of rising prices) is understood. Thus, we might be able to answer the "big question" mentioned by Geijer.



Hence, Option D is the correct choice.

3. Based on the passage, which of the following is the most appropriate indicator of the plant-based meat industry's future?

- A. The volatile stocks of companies in the industry.
- B. The popularity of companies in the industry on social media.
- C. Amount of funds that companies in the industry have raised.
- D. Rising concern about climate change and sustainability.

Sol. A: Ethan Brown, its chief executive, said he didn't know if it was "an aberration or a harbinger of things to come".

It is uncertain whether the volatility in the stock price is an aberration or an indicator of the future. Hence, Option A is not an apt indicator.

B: The popularity of a company on Instagram has not been mentioned in the context of the future of the industry. Hence, Option B is not an apt indicator.

C: However, with its quarter pounders, sausages and chicken breasts shaped from pea protein, Meatless Farm thinks the future is bright as it has raked in £30m from investors and is currently finalising another fundraising.

Meatless Farms thinks the future is bright as it has raked in a decent amount of investment. Hence, Option C is an apt indicator.

D: While sustainability has been tied to the demand for meat alternatives, it is unclear whether it can be used as an indicator to determine future trends. Additionally, there is no mention of climate change in the passage and hence, Option D can be eliminated.

4. From the last paragraph, it can be inferred that Hunter believes that:

- A. consumers focus more on the ingredients than the taste of the plant-based meat.
- B. finding the right balance between taste and the number of ingredients while preparing plant-based meat is critical.
- C. consumers seek out products with natural ingredients and eschew products with artificial ingredients.
- D. a plant-based meat burger will sell only if both the taste and the ingredients are impeccable.

Sol. A: It has not been mentioned whether the consumer prioritizes one among ingredients and taste over the other. Hence, Option A can be eliminated.

B: The statement here can be understood from the following excerpt: {The company aims to keep ingredients to a minimum. "Everyone looks at the back of the pack and if it looks like a chemistry set they might say that is not for me," explains Hunter. "The hard thing is keeping the ingredient deck really clean but at the same time delivering a product that people go, wow, that is just like a meat burger."}



C: While the ingredients listed in the paragraph are natural, we cannot infer that meat alternatives do not contain artificially produced ingredients. Consumer preference, in this case, is also difficult to determine: we cannot definitively comment that consumers avoid artificial ingredients. Hence, Option C is incorrect.

D: It cannot be inferred that a burger will sell only if both the conditions are met. While taste is an important parameter, Hunter also focuses on limiting the number of ingredients used. Hence, Option D is not the correct answer.

Instructions

The passage below is accompanied by a set of questions. Choose the best answer to each question.

My interest in the paranormal started with an impromptu coffee with a colleague, Chris French, who researches reports of paranormal experiences. He told me stories of countless people who had recounted such events. These experiences tended to start while lying in bed. Then something unusual would happen - perhaps a demon would appear or the environment would seem strange or there would be a sensed presence. The person having this experience might also report being glued to their mattress, tarmacked into the bed, totally unable to move. It's unsurprising that people who experience such things might interpret them as paranormal. But certain phenomena such as sleep paralysis provide an alternative to paranormal explanations for such occurrences. Hence my interest in the subject, as a sleep researcher.

When we sleep, we cycle through different stages. We start the night in non-rapid eye movement (NREM) sleep - which gets progressively deeper. We then cycle back until we hit rapid eye movement (REM) sleep. During REM sleep we are most likely to have vivid dreams. At this stage, we are also paralyzed, perhaps as a safety mechanism to stop us from acting out our dreams so that we don't end up attempting to fly.

But during sleep paralysis, features of REM sleep continue into waking life. Those who experience it will feel awake yet might experience dream-like hallucinations and struggle to move. This experience is pretty common, occurring in around 8% of people (although estimates vary dramatically depending on who we are asking). It's even possible to induce sleep paralysis in some people, by disrupting their sleep in specific ways...

....Sleep paralysis aside, how else are sleep researchers helping to explain paranormal experiences? People sometimes describe experiencing huge explosions during the night which simply can't be explained. There is no sign that a shelf has fallen down or a car has backfired. There is no one playing the electric guitar next to their head. Again, this can be linked to our sleep - this time explained by "exploding head syndrome", a term coined relatively recently by the neurologist JMS Pearce. When we fall asleep, the reticular formation of the brainstem (a part of our brain involved in consciousness) typically starts to inhibit our ability to move, see and hear things. When we experience a "bang" in our sleep this might be because of a delay in this process. Instead of the reticular formation shutting down the auditory neurons, they might fire at once. As with sleep paralysis, this phenomenon is also under-researched. For this very reason, in 2017 my colleagues and I joined forces with BBC Focus and Brian Sharpless, a leading expert on this phenomenon, to collect data on this topic.

Finally, what might scientists make of precognitive dreams? We might dream of a friend we haven't seen for years only to have them call us the very next day. French thinks science can provide an explanation for this too. Referencing work by John Allen Paulos that focuses on



probabilities, he explains how such an occurrence may be surprising on any single day, but over time, quite likely to occur.

5. My interest in the paranormal started with an impromptu coffee with a colleague...

Here, by paranormal, the author wants to refer to:

- A. unusual events that seem beyond the scope of scientific understanding.
- B. experiences that involve entities beyond the understanding of science.
- C. mysterious experiences that scientists have failed to explain.
- D. events that are beyond science and generally start while sleeping.

Sol. My interest in the paranormal started with an impromptu coffee with a colleague.....But certain phenomena such as sleep paralysis provide an alternative to paranormal explanations for such occurrences. Hence my interest in the subject, as a sleep researcher.

Here, by paranormal, the author wants to refer to unusual events that baffle scientists and laypeople alike. Though they seem beyond science, the author does not believe they are, as she tries to uncover the causes as a sleep researcher. Option A comes the closest in capturing this definition.

Since the author does not believe that the events/experiences are actually beyond science, Options B and D can be eliminated.

The author tries to explain some of these experiences using scientific research. Hence, we cannot say that scientists have failed to explain them.

6. Which of the following can be inferred from the passage?

- A. If a person hallucinated during non-REM sleep, he is likely to physically act out those dreams.
- B. If a person is hallucinating in sleep, he is more likely to be under the REM sleep state.
- C. During sleep paralysis, the brain functions normally while the body does not.
- D. There is no definitive explanation for why some people hear explosive sounds in their sleep.

Sol. A: We cannot verify the statement here. It is quite possible that the body may have a defence mechanism in place during the non-REM stage. We cannot assert that the body is more likely to act out in this case without the author mentioning the same. Thus, Option A can be eliminated.

B: We cannot substantiate the claim mentioned in B. The author states that hallucinations happen when REM sleep extends to a waking state; however, commenting on the likelihood (probability) of an event based on this relationship is unfounded.

C: We cannot say that the brain functions 'normally' during sleep paralysis. Without sufficient evidence, it would not make sense to comment on the physiological aspects. Hence, Option C can be eliminated too.

D: This can be inferred from the following excerpt: {As with sleep paralysis, this phenomenon is also under-researched. For this very reason, in 2017 my colleagues and I joined forces with BBC Focus and Brian Sharpless, a leading expert on this phenomenon, to collect data on this



topic.} The author states that there isn't enough information to explain the exploding head syndrome conclusively.

Hence, Option D is the correct choice.

7. Which of the following is associated with "exploding head syndrome"?

- A. Night-time explosions whose cause cannot be determined.
- B. A delay in the reticular formation shutting down the auditory neurons.
- C. Paranormal activities such as sleep paralysis.
- D. The inability of the brain to distinguish between real and imagined sounds.

Sol. A: Option A is distorted. It fails to mention that the explosions are actually not there. Hence, Option A can be eliminated.

B: When we fall asleep, the reticular formation of the brainstem (a part of our brain involved in consciousness) typically starts to inhibit our ability to move, see and hear things. When we experience a “bang” in our sleep this might be because of a delay in this process. Instead of the reticular formation shutting down the auditory neurons, they might fire at once.

From the above excerpt, we can infer Option B to be the correct answer.

C: Option C is incorrect as it terms sleep paralysis as a 'paranormal activity'.

D: The syndrome is not because the brain is unable to distinguish reality from imaginary, but because some auditory neurons fire out of turn. Hence, Option D can be eliminated too.

8. Which of the following events is similar to the one cited as an explanation for precognitive dreams?

- A. A person was likely to think more about an event he/she subconsciously knew would happen.
- B. A person drew a diamond out of a box containing many other marbles, in spite of this event's probability being one in a million.
- C. While tossing a coin ten thousand times, a person got the seemingly unlikely outcome of twenty heads in a row.
- D. As age increased, the ability to forecast future events increased in people of all races and genders.

Sol. Finally, what might scientists make of precognitive dreams? We might dream of a friend we haven't seen for years only to have them call us the very next day. French thinks science can provide an explanation for this too. Referencing work by John Allen Paulos that focuses on probabilities, he explains how such an occurrence may be surprising on any single day, but over time, quite likely to occur.

To explain the event of precognitive dreams, French cites probability. He says that though an event seems unlikely to occur, the chances of it happening increase as time passes and the number of trials increases.



E.g. We dream every day. Though it is highly unlikely that our dream comes true the first time we dream, as we keep dreaming over years and do so thousands of times, it becomes highly likely that at least one of them comes true soon after we watch that dream.

Hence, the event should relate to an unlikely event occurring as the number of trials, and hence the probability of the unlikely event increases. Option C is such an event, and hence, is the correct answer.

A: It is a different explanation to precognitive dreams and not the one French cites. Hence, Option A can be eliminated.

B: Option B talks about an unlikely event occurring by chance, and not by the increase in the number of trials. Hence, Option B can be eliminated.

D: Option D talks about forecasting the future, which is unrelated to the probabilistic explanation that French gave. Hence, Option D can be eliminated too.

Instructions

The passage below is accompanied by a set of questions. Choose the best answer to each question.

When *News from Nowhere* was first published, it had many of the trappings of a classic utopia, including that it appeared practically unattainable. But today we have different technological potential: the idea of commons-based production need not be a mere pipe dream. The ‘commons’ is a social system that refers to resources managed and shared according to the rules and the norms defined by the productive community. It is an old idea that was not lost with the European land enclosures of the 16th century. Today, commons are produced, enclosed, and reclaimed, arguably more than ever in the past century.

In a sense, the world has caught up with Morris. At the beginning of the 21st century, a new world is emerging. Not since Marx identified the manufacturing plants of Manchester as the blueprint for the new capitalist society has there been a deeper transformation of the fundamentals of our socioeconomic life. A new commons-based mode of production, enabled by information and communication technology (ICT), what we now call digitization, redefines how we (can) produce, consume and distribute. This pathway is exemplified by interconnected collaborative initiatives that produce a wide range of artifacts, from encyclopedias and software to agricultural machines, wind turbines, satellites, and prosthetics.

As recently as two decades ago, most people would have thought it absurd to countenance a free and open encyclopedia, produced by a community of dispersed enthusiasts primarily driven by other motives than profit-maximization, and the idea that this might displace the corporate-organized *Encyclopaedia Britannica* and *Microsoft Encarta* would have seemed preposterous. Similarly, very few people would have thought it possible that the top 500 supercomputers and the majority of websites would run on software produced in the same way, or that non-coercive cooperation using globally shared resources could produce artifacts as effectively as those produced by industrial capitalism, but more sustainably. It would have been unimaginable that such things should have been created through processes that were far more pleasant than the work conditions that typically result in such products.

Commons-based production goes against many of the assumptions of mainstream, standard-textbook economists. Individuals primarily motivated by their interest to maximize profit, competition, and private property are the Holy Grail of innovation and progress - more than



that: of freedom and liberty themselves. One should never forget these two everlasting ‘truths’ if one wants to understand the economy and the world, we are told. These are the two premises of the free-market economics that have dominated the discourse until today.

So, is GNU/Linux, the free and open-source software that drives those 500 supercomputers, an exception that proves the rule? The legal scholar Yochai Benkler at Harvard University was one of the first to observe that such commons-based projects are by now too common to be considered anomalies. Already a decade ago, Benkler argued in *The Wealth of Networks* (2006) that a new mode of production was emerging that would shape how we produce and consume information. He called this mode ‘commons-based peer production’ and claimed that it can deliver better artifacts while promoting another aspect of human nature: social cooperation. Digitization does not change the human person (in this respect), it just allows her to develop in ways that had previously been blocked, whether by chance or design.

9. Which of the following can be inferred about *News from Nowhere*?

- A. It was primarily concerned with a commons-based production.
- B. It was considered impractical by many at the time of its publication.
- C. Today's technology can achieve the utopian ideals of the book.
- D. The book dealt with socialism at its core.

Sol. A: Though one of the ideas propagated in the book, we cannot say that the book was primarily concerned with commons-based production only. It is possible that the book described a utopian society of the future and such production was one of the ideas that gained prominence. Thus, Option A cannot be inferred.

B: When *News from Nowhere* was first published, it had many of the trappings of a classic utopia, including that it appeared practically unattainable

From the above excerpt, Option B can be directly inferred. Hence, it is the correct answer.

C: Option C is a distortion. The author merely hints at the potential of today's technology, while Option C draws a conclusion with certainty. Thus, Option C cannot be inferred.

D: Option D is outside the scope of the passage.

10. "In a sense, the world has caught up with Morris."

The statement refers to the fact that:

- A. A new world order is emerging with the beginning of the 21st century.
- B. Morris' ideals are being implemented in some form today.
- C. The world has finally realized the weight behind Morris' idea of commons.
- D. A deep societal transformation has caused a greater acceptance of Morris.

Sol. The second paragraph of the passage opens with the line mentioned in the passage, which indicates that the world has started to accept Morris in some form. Then the author describes how the technology today has enabled the implementation of Morris' idea of commons



production. Thus, catching up to Morris indicated that the world has begun implementing the ideals of Morris in certain ways. Thus, Option B is the correct answer.

A: Distortion. The author talks about a new world emerging, which refers to significant changes/development taking place. Option A, on the other hand, talks about a new world order, referring to new power dynamics globally.

C: The author does not mention that the whole world has become more accepting, but that certain developments show that Morris' ideals are gaining prominence. Option C is incorrect.

D: Option D is a distortion of what has been presented in the passage and can be eliminated.

11. The products generated by commons-based production differed from the conventional corporate products in all the following ways EXCEPT:

A. The individuals working on such projects were aiming beyond the maximization of personal gains.

B. The individuals involved in commons-based production had better working conditions as compared to conventional working conditions for corporate products.

C. The individuals working on such projects cooperated with one another without being forced to do so.

D. The individuals working on such projects received no benefits but still, innovation and progress were achieved.

Sol A: Commons-based production goes against many of the assumptions of mainstream, standard-textbook economists. Individuals primarily motivated by their interest to maximize profit, competition, and private property are the Holy Grail of innovation and progress...

From the above excerpt, we can see that the commons-based production broke away from the conventional motivation of maximising profit and private property. Option A can be eliminated.

B: It would have been unimaginable that such things should have been created through processes that were far more pleasant than the work conditions that typically result in such products.

Option B can be eliminated too.

C: Similarly, very few people would have thought it possible that the top 500 supercomputers and the majority of websites would run on software produced in the same way, or that non-coercive cooperation using globally shared resources could produce artifacts as effectively as those produced by industrial capitalism, but more sustainably.

Option C can be eliminated too.

D: It has not been mentioned that the workers received no benefits. It can be inferred that they worked for the collective benefit of everyone. Hence, Option D is the answer.

12. The main purpose of the final paragraph is to show that:

A. commons-based production is gaining prominence, breaking the mainstream assumptions.

B. commons-based production is not an anomaly but a norm in today's world.



- C. social cooperation has allowed commons-based production to bloom into a prosperous sector.
- D. digitization has allowed humans to evolve in ways like never before.

Sol. The author begins the last paragraph with a question: are the successful and innovative products of commons-based production anomalies or not. The author then tries to answer the question, by showing using examples that they are not anomalies but are gaining more prominence by the day. Thus, Option A is the correct answer.

- B: Though one of the major points, it is not the main point as explained above.
- C: Social cooperation is one of the points mentioned in the paragraph but not the main point. Hence, Option C can be eliminated.
- D: Digitization is one of the points mentioned in the paragraph, but not the main point here. Option D can be eliminated too.

Instructions

The passage below is accompanied by a set of questions. Choose the best answer to each question.

A great deal of ink has been spilled exploring why [dystopian] narratives are so appealing. But another important question is: So what? Is dystopian fiction likely to affect anyone’s real-world political attitudes? If so, then how? And how much should we care about its impact? In our research, we set out to answer these questions using a series of experiments.

Before we began, we knew many political scientists would likely be skeptical. After all, it seems unlikely that fiction - something known to be ‘made up’ - could be capable of influencing people’s real-world outlooks. Yet a growing body of research shows that there is no ‘strong toggle’ in the brain between fiction and nonfiction. People often incorporate lessons from fictional stories into their beliefs, attitudes, and value judgments, sometimes without even being aware that they are doing so...

...To test the impact of dystopian fiction on political attitudes, we randomly assigned subjects from a sample of American adults to one of three groups. The first group read an excerpt from The Hunger Games and then watched scenes from the 2012 movie adaptation. The second group did the same, except with a different dystopian series - Veronica Roth’s Divergent. It features a futuristic US in which society has split into factions dedicated to distinct values; those whose capabilities cross faction lines are viewed as a threat. In the third group - the no-media control group - subjects were not exposed to any dystopian fiction prior to answering questions about their social and political attitudes.

What we found was striking. Even though they were fictional, the dystopian narratives affected subjects in a profound way, recalibrating their moral compasses. Compared with the no-media control group, subjects exposed to the fiction were 8 percentage points more likely to say that radical acts such as violent protest and armed rebellion could be justifiable. They also agreed more readily that violence is sometimes necessary to achieve justice (a similar increase of about 8 percentage points).

Why might dystopian fiction have these startling effects? Perhaps a simple priming mechanism was at work. The violent action scenes could easily have triggered excitement in a way that



made our subjects more willing to justify political violence. Violent video games, for instance, can heighten aggressive cognitions, and dystopian fiction often contains violent imagery with rebels fighting against the powers that be.

To test this hypothesis, we conducted a second experiment, again with three groups, and this time with a sample of college students around the US. The first group was exposed to The Hunger Games and, as before, we included a second, no-media control group. The third group, however, was exposed to violent scenes from the Fast and Furious movie franchise (2001-), similar in length and type to the violence in the Hunger Games excerpts.

Once again, dystopian fiction shaped people's ethical judgments. It heightened their willingness to justify radical political action compared with the no-media controls, and the increases were similar in magnitude to what we found in the first experiment. But the equally violent and high-adrenaline action scenes from Fast and Furious had no such effect. So violent imagery alone could not explain our findings.

13. All of the following coincide with the author's claims in the passage EXCEPT

- A. People might be inclined to draw political life lessons from a narrative about an imaginary political world.
- B. Dystopian fiction has the potential to profoundly influence a viewer's conscience, including their perception towards violence and justice.
- C. People exposed to dystopian fiction develop skewed moral beliefs wherein they justify violence without even being aware of it.
- D. Those exposed to dystopian narratives are more likely to see radical and violent political acts as legitimate.

Sol. Option A: The author believes in this claim and attempts to substantiate it through the passage. He further showcases his support via the following excerpt: { Yet a growing body of research shows that there is no 'strong toggle' in the brain between fiction and nonfiction. People often incorporate lessons from fictional stories into their beliefs, attitudes, and value judgments, sometimes without even being aware that they are doing so... }

Option B: This idea is emphasized in the following excerpt: {Even though they were fictional, the dystopian narratives affected subjects in a profound way, recalibrating their moral compasses. }

Option C: We cannot infer the statement in Option C from the passage. 'Skewed moral beliefs' and justifying violence in all forms, not just political, have not been suggested by the passage.

Option D: The assertion here is in tune with the experimental observation: {Compared with the no-media control group, subjects exposed to the fiction were 8 percentage points more likely to say that radical acts such as violent protest and armed rebellion could be justifiable. They also agreed more readily that violence is sometimes necessary to achieve justice (a similar increase of about 8 percentage points). }



14. Which of the following best captures the skepticism of political scientists regarding the influence of dystopian narratives?

- A. Non-fiction narratives are more impactful than dystopian stories.
- B. A person's moral conscience is rigid, so dystopian fiction cannot influence it.
- C. Made-up stories are unlikely to affect a person's worldview.
- D. There is no 'strong toggle' in the brain between fiction and nonfiction.

Sol. The answer to the question can be found in the following excerpt: "Before we began, we knew many political scientists would likely be skeptical. After all, it seems unlikely that fiction - something known to be 'made up' - could be capable of influencing people's real-world outlooks." Option C correctly captures this.

Options A, B, and D have not been implied or discussed.

15. What explains the 'startling effects' observed in the first experiment?

- A. the presence of violent imagery could have triggered excitement in a way that made the subjects more willing to justify political violence
- B. the ethical content of the dystopian narratives might emphasize the shift in the subject's attitude towards ideals such as violence and justice
- C. the striking societal construct in the dystopian movies appealed to the subjects making them adopt a more ethically radical stance
- D. the primary reason behind the startling observation is not conclusively identified in the passage.

Sol. The author tries to identify the possible reason behind the 'startling effect' in the following manner: "Why might dystopian fiction have these startling effects? **Perhaps** a simple priming mechanism was at work. The violent action scenes could easily have triggered excitement in a way that made our subjects more willing to justify political violence." He then discusses another follow-up experiment that invalidates this hypothesis. Thus, there is more to the observations than meets the eye, and the author is yet to present a conclusive justification of these observations. Hence, the correct answer is Option D.

Options B and C have not been discussed in the passage (no mention of 'ethical content' or 'striking societal construct'). While the author presents the hypothesis involving violent imagery, he soon discards this idea. Therefore, this reason does not justify the observation of the first experiment. Hence, Option A can be eliminated.

16. The final paragraph

- A. clarifies how the presence of violent imagery alone does not justify the impact of dystopian narratives on people's ethical judgments.
- B. explains how the responses in the second experiment, indicating the willingness to justify radical political action, matched with the responses in the first experiment.



C. highlights how vehemently the subjects in the second experiment defended violence and radical political action compared to those in the first experiment.

D. emphasizes how dystopian fiction heavily influences people's ethical decisions, especially when it contains violent imagery.

Sol. Pay heed to the following excerpt: "Once again, dystopian fiction shaped people's ethical judgments. It heightened their willingness to justify radical political action compared with the no-media controls, and the increases were similar in magnitude to what we found in the first experiment. **But the equally violent and high-adrenaline action scenes from Fast and Furious had no such effect. So violent imagery alone could not explain our findings.**"

In the final paragraph, the author clarifies his earlier hypothesis on the role of violent imagery in the shift in moral judgments of the test subjects. He states how the observations of the second experiment refute this earlier hypothesis. Hence, Option A is the correct choice.

17. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

An organised and coherent memory of a traumatic event aids recovery from PTSD as it helps an individual to understand why the event occurred, and to constrain the meaning of the event to the appropriate context. Updating a disjointed memory of a traumatic car accident to include details you had not attended to at the time (eg, you had been obeying the road rules) or that you did not know at the time (eg, the other driver was drunk) can help adjust an unhelpful meaning you made from the event (driving is always dangerous; I will hurt others if I am in a car) to something more adaptive and representative of the situation (cars are dangerous only when driven irresponsibly).

A. The memory of a person plays an important role in combating mental disorders like PTSD; an accurate memory of events helps prevent people from reaching incorrect conclusions about traumatic events.

B. Updating a disjointed memory of a traumatic event could help in the recovery from PTSD as remembering the details of the event could correct any unhelpful conclusions one might have derived from the event.

C. The way to beat PTSD is to remember the details of the trauma comprehensively and understand the correct context in which the event occurred; doing so might enable the person to absolve themselves of any blame.

D. The flexibility of human memory allows us to update our memories periodically and this can help cure disorders such as PTSD when given proper therapy.

Sol. The main points of the paragraph are:

1. A proper recounting of the traumatic experience can help the recovery from PTSD.
2. An accurate account of the event would help the person understand why it occurred and help them correct any incorrect or unhelpful conclusions they might have drawn about the event.

Option B comes the closest to capturing these points, and hence, is the correct answer.

A: The initial part of Option A is a distortion. The author does not brand PTSD as a mental disorder.



C: The author advises a person to absolve oneself of unreasonable blame. If a person was actually responsible for the experience, then we cannot say what the author's position will be. Option C can be eliminated.

D: Option D mentions the flexibility of human memory and periodic updating, which are not the main points of the passage. Option D can be eliminated too.

18. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

1. Parasite, for instance, begins with a family of swindlers who target a rich family, but their plot turns deadly with the explosion of seething anger from class resentment.
2. When interpreters of Korean cultural products such as films and TV shows mention han, they are referring to the works' intense emotionality.
3. Squid Game features the sad desperation of people whose lives are in such shambles that they willingly risk death in a series of sadistic games for a slim chance at salvation.
4. Seen from the perspective of han, such emotions seem to be the common theme running throughout all the works.

Sol. A brief reading of the sentences suggests that the paragraph is about the concept of Han in Korean cinema. 2 sets the context by introducing Han to the reader. 1, 3, in that order, introduce the examples of Korean cinema that are examples of Han. 4 then acts as a concluding sentence, generalising the presence of Han emotions in the two works mentioned to the whole Korean cinema. Thus, the correct sequence is 2134.

19. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

1. Most of the population dwelled in the shadow of the Citadel, farming wheat and corn across a plain that sloped gently toward a bay four miles to the south.
2. By the time this ramp was built, Aslan told me, this city on a hill had grown into a trading center of 5,000 to 10,000 people—far larger and more powerful than the insignificant settlement some historians argue was here at the time.
3. Before me lay a ramp of sandstone slabs from that time, sweeping upward at a steep angle past a field of stone foundation walls toward the heart of the ancient city.
4. We stopped before the South Gate, the main entrance into the Citadel, likely the sanctuary of the royal family and other elite during the late Bronze Age around 3,000 years ago.

Sol. A brief reading of the sentences suggests that the paragraph describes the author looking at a historical artefact. 4 sets the context of the discussion and should be the opening sentence. 3 then describes what the author witnessed at the moment. 2 then provides more detail on the artefact as revealed by the author's companion. 2 introduces the population of the ancient city and 1 adds details of where and how they lived. Hence, the correct sequence will be 4321.



20. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

1. As the New Yorker noted, the two sculptures shared an ironic historical link: Douglass was once enslaved in Talbot County.
2. Representatives from Easton's local NAACP chapter cited the Confederate statue's central location in a May 2021 lawsuit calling for its removal.
3. Talbot County installed a monument depicting Frederick Douglass, the famed Black abolitionist, orator and writer, a few yards away from the Confederate statue in 2011.
4. What's more, one person honoured by the Talbot Boys sculpture, Admiral Franklin Buchanan, was related by marriage to Douglass' enslavers.

Sol. A brief reading of the sentences suggests that the paragraph is about the history behind two statues situated close to each other. 3 introduces the topic at hand and sets the context. 14 forms a pair which then delves into the shared history of the two statues mentioned in 3. 2 then provides information about the recent happenings in the context of the statues. Hence, the correct order will be 3142.

21. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.

1. Yet in acting to defend or elaborate these values, CSOs often become the targets of policies and measures trying to limit the space in which they operate.
2. The work of civil-society organisations (CSOs), often seen (or made to be seen) as controversial, is an essential ingredient of democracy, just as are free speech and elections free from interference.
3. Civil society is thus critical to realising the values underpinning the European Union, as enshrined in article 2 of the Treaty on European Union.
4. When fundamental rights, democratic principles or the rule of law are eroded or even under attack, CSOs play a key role in raising awareness, advocating for their protection and mobilising in their defence.
5. What makes a democracy vibrant is public debate: ideas are articulated and confront each other. And one of the important sources of this articulation of ideas is civil society.

Sol. A brief reading of the sentences suggests that the paragraph must be about civil society organizations and their contributions to democracy. 5 is an apt opening sentence, that uses a general statement to introduce the importance of civil society. 2 then further builds upon this fact by highlighting the contribution of CSOs. 4 further strengthens this by introducing the important functions of CSOs. Out of 1 and 3, 1 is an apt ending sentence, that connects this paragraph and the next. 3 introduces a completely new topic of EU, which makes it tangent to the discussion and out of context.



22. Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out.

1. It affects a person's mood, and thereby their evaluation and experience of what they encounter.
2. Among the other disadvantages associated with poor sleep are obesity, infection, psychological illness, attention deficit, and weak memory.
3. Two in five UK doctors have reported falling asleep at the wheel, and some are known to have died.
4. Increased risk of accident is one of the more dramatic effects of short and irregular sleep.
5. Less privileged groups tend to have less regular sleep, less control over its timing, less motivation to protect it, and less capacity to set the norms by which society lives.

Sol. A brief reading of the sentences suggests that the paragraph is about the deficiency of sleep and its ill effects. 43 is a mandatory pair, which highlights the increased risk of accidents on low sleep. 2 and 1 are on the same note, highlighting other ill consequences of low sleep. 5, though relevant to the discussion, talks about the dispersion of this sleep deficiency across communities, which will not fit in this paragraph. Thus, 5 is out of the context here.

23. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

It is not just that wages have been squeezed: simply existing in the UK has become inordinately expensive. This is partly because we have gone further than almost anywhere else in turning essential goods and services into financial assets. Because people literally cannot do without them, owning these assets is a reliable way to extract huge rents while doing very little. By putting the means of a decent life in the hands of private gatekeepers whose only concern is to maximise their rents, we have built an economy that systematically inflates costs for consumers while also driving down wages.

- A. The UK is a perfect example of capitalism where even the necessities have been privatised to serve the rich.
- B. Essential and non-essential goods and services should be considered separately when it comes to privatisation to ensure fairness.
- C. Living in the UK is inordinately expensive as its economic system inflates the cost of essential services while driving down wages.
- D. The cost of living in the UK is inordinately high as essential services have been privatised and converted into financial assets.

Sol. The passage emphasises the issues with the economic system in the UK (i) the wages are being squeezed and (ii) the cost of essential goods and services is being systematically inflated. Option C captures both these points appropriately and hence, is the correct choice.

Option A strays from the topic and comes across as a criticism of the economy in the UK; there is no mention of capitalism or privatisation to 'serve the rich.' Hence, Option A can be eliminated.



Option B comes across as a suggestion; the author does not advocate for any policy changes in the paragraph. Instead, he simply relates the state of affairs in the UK.

Option D comes close to capturing the central idea; however, it misses out on Point (i) stated earlier - a decrease in wages. The paragraph highlights that the cost of living is high while at the same time, wages are low. Both of these forces together make it difficult to live in the UK.

24. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Popular discourse about evil is an example of what the American philosopher Charles Stevenson called 'emotivism' - a term later popularised by A.J. Ayer. Under this view, calling something evil is nothing but an emotional expression about some incredibly horrible act or person. Similarly, our cultural notions of evil would be simply collective emotions of repulsion or disgust. When we look at the Rwandan genocide, for instance, we are so appalled by the sheer magnitude of the butchery that we can't help but call the Interahamwe 'evil'. The depth of our feelings is so great that we cast the perpetrators out of the human race and declare that there is just good and evil, and that's all there is to it.

A. Emotivism points out the fact that human emotions towards inhumane acts are so powerful that certain acts are labelled as evil.

B. There is no such thing as evil, but some acts and people are so morally repulsive that they warrant being called evil in the popular discourse.

C. The act of calling someone evil is an emotional expression of repulsion and disgust and these emotions fuel our need to cast out the perpetrators from the human race and define a clear-cut dichotomy of good and evil.

D. The use of the term evil indicates an emotional expression against a horrendous act or person and these emotions collectively fuel our cultural notions of evil.

Sol. The author highlights two critical points: (1) the popular notion of evil is an emotional expression about some incredibly horrible act or person, and (2) these notions collectively form our cultural expressions of evil (as repulsion or disgust). Option D captures these two points correctly.

Option A misses out on both the points; it vaguely presents emotivism as a 'powerful response' to horrendous acts and fails to highlight the subjective nature of the expression.

Option B is incorrect because the author does not claim that there is no such thing as evil. While the author agrees that there might not be a consensus on the definition of evil, he adds that our 'cultural notions of evil would be simply collective emotions of repulsion or disgust.'

Option C is not discussed or implied; the author does not mention casting out perpetrators or the need for a proper definition of good and evil.

Hence, Option D is the correct choice.



Instructions

The Companion Film is hosting a film directors' round table in Hotel Marriott. A total of 8 directors were invited to the round table discussion. The seating was arranged on a circular table with eight chairs in a symmetrical fashion.

Four of the directors were seated such that they were facing the centre of the table. The other four were seated such that they were facing away from the center. No two directors who were facing the same side were seated adjacent to each other. The directors who directed the films of the same genre were facing the same direction.

The directors who were invited to the roundtable discussion were: Liso, Raghav, Vishal, Christopher, Denis, Sanjay, Tarantino, and Martin.

Each of them directed a different movie among Luca, Home, Conan, Jane, Dark, Gone, Alone, and Sin. Four of these movies belonged to the thriller genre and the other four belonged to the Action genre.

The following details have been mentioned about the seating arrangement :

- 1) Raghav and Christopher were seated next to each other such that Christopher sits to the right of Raghav. The person who sits two places to the left of Sanjay directed LUCA.
- 2) The director of JANE and GONE are seated adjacent to each other.
- 3) One of two directors seated closest to Christopher directed SIN.
- 4) Tarantino and Denis directed films in the same genre. Sanjay did not direct ALONE.
- 5) CONAN and DARK belong to the action genre. Directors who directed the films ALONE and SIN were seated next to the director who directed CONAN.
- 6) Martin did not direct a film in the action genre. Sanjay and Martin were facing each other.
- 7) The directors of JANE and DARK are seated in chairs positioned in diametrically opposite positions.

25. If Raghav directed SIN what was the film directed by Sanjay?

- A. LUCA
- B. JANE
- C. DARK
- D. GONE

Sol. From statement 5, Conan and Dark belong to the action genre. Since the directors who made Alone and Sin are sitting adjacent to the person directing Conan, they both belong to the thriller genre.

From statement 7, the directors of Jane and Dark sit diametrically opposite each other. Thus, they both belong to the action genre.

From Statement 2, Jane and Gone are adjacent to each other. Thus, Gone belongs to the thriller genre.



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From statement 6, Sanjay and Martin belong to the thriller genre. Since the director of Luca is sitting two places from Sanjay, Luca belongs to the thriller genre. Hence, Home will belong to the action genre.

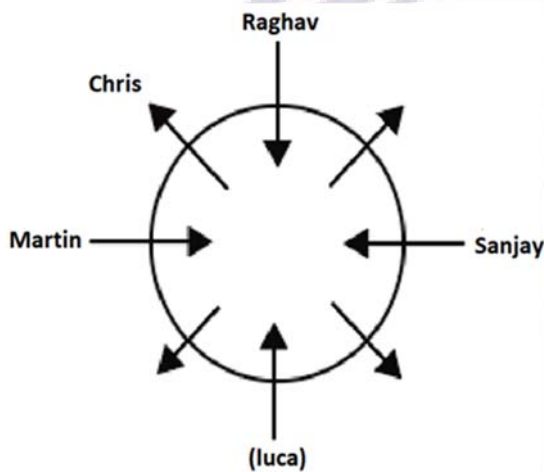
Action Movies	Thriller Movies
Conan	Sin
Dark	Alone
Jane	Gone
Home	Luca

Since Sanjay and Martin face each other and belong to the thriller genre, we can infer that those who directed thriller movies face inwards and those directing action movies face outwards.

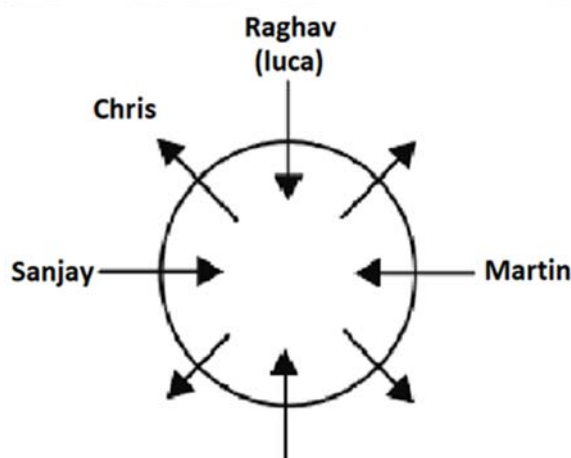
From statement 3, the person next to Christopher directed Sin. Hence, Christopher must have directed an action movie and, thus, faced outwards.

Thus, the two possible arrangements are

Case 1:



Case 2:

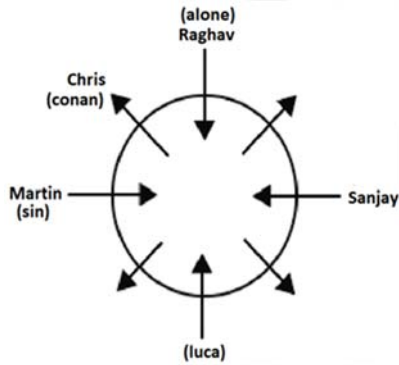


From statement 3, one of the directors sitting next to Christopher directed Sin.

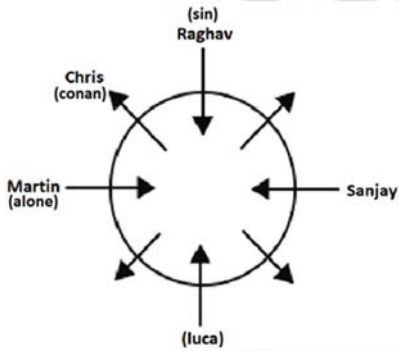
From statement 5, the directors of Alone and Sin were seated next to Conan, and from statement 4, Sanjay did not direct Alone.

Adding this data to the above figures, we get the following three cases.

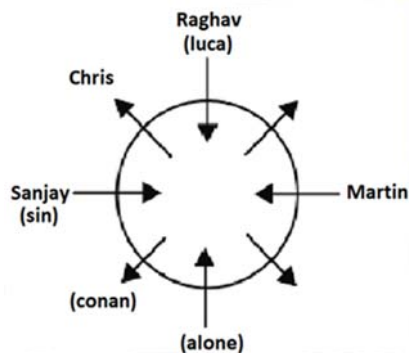
Case 1:



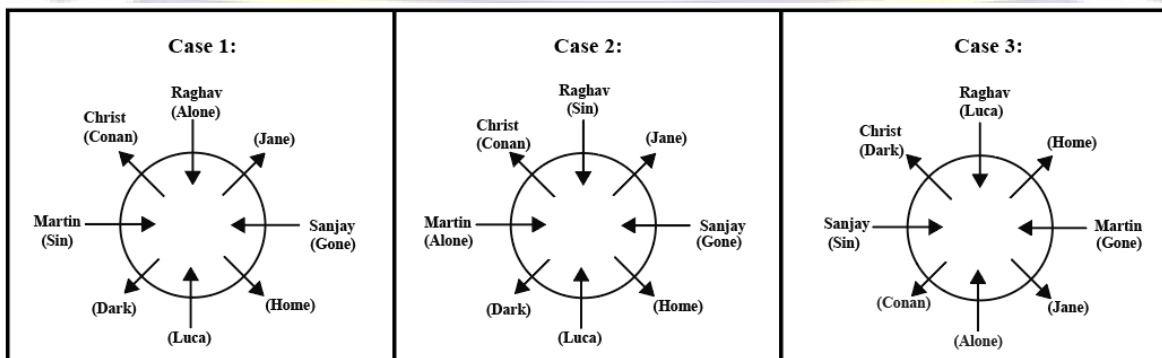
Case 2:



Case 3:



From statements 2 and 7, the directors of Jane and Gone are adjacent, and that of Jane and Dark are diametrically opposite. Thus, the above cases become:





In the question, we are given that Raghav directed Sin. Thus, we have to consider case 2. Hence, the film directed by Sanjay is GONE, and option D is the required answer.

26. If Vishal directed Alone, who among the following could have possibly directed Jane?

- A. Denis
- B. Tarantino
- C. Liso
- D. All the above

Sol. From statement 5, Conan and Dark belong to the action genre. Since the directors who made Alone and Sin are sitting adjacent to the person directing Conan, they both belong to the thriller genre.

From statement 7, the directors of Jane and Dark sit diametrically opposite each other. Thus, they both belong to the action genre.

From Statement 2, Jane and Gone are adjacent to each other. Thus, Gone belongs to the thriller genre.

From statement 6, Sanjay and Martin belong to the thriller genre. Since the director of Luca is sitting two places from Sanjay, Luca belongs to the thriller genre. Hence, Home will belong to the action genre.

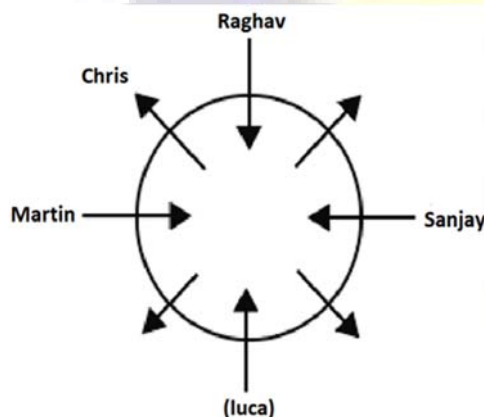
Action Movies	Thriller Movies
Conan	Sin
Dark	Alone
Jane	Gone
Home	Luca

Since Sanjay and Martin face each other and belong to the thriller genre, we can infer that those who directed thriller movies face inwards and those directing action movies face outwards.

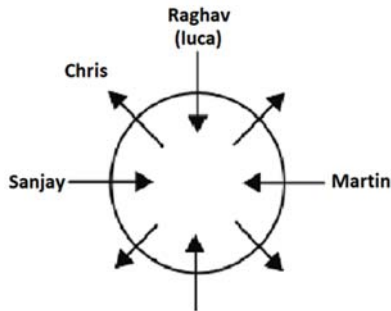
From statement 3, the person next to Christopher directed Sin. Hence, Christopher must have directed an action movie and, thus, faced outwards.

Thus, the two possible arrangements are

Case 1:

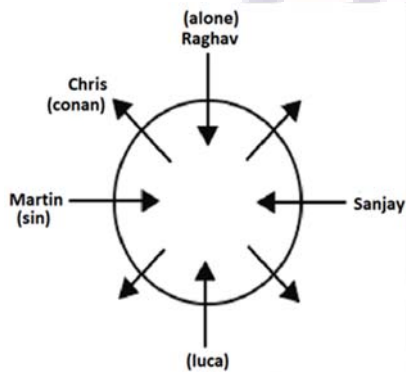


Case 2:

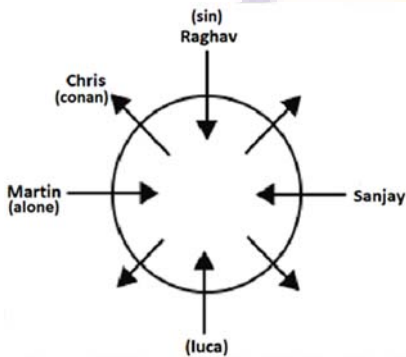


From statement 3, one of the directors sitting next to Christopher directed Sin.
 From statement 5, the directors of Alone and Sin were seated next to Conan, and from statement 4, Sanjay did not direct Alone.
 Adding this data to the above figures, we get the following three cases.

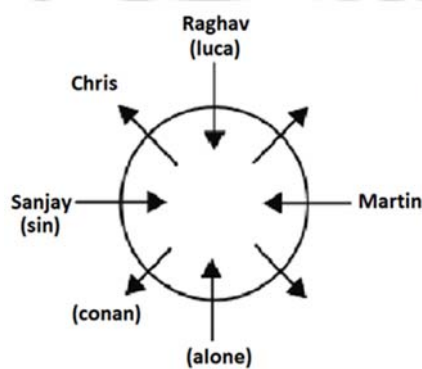
Case 1:



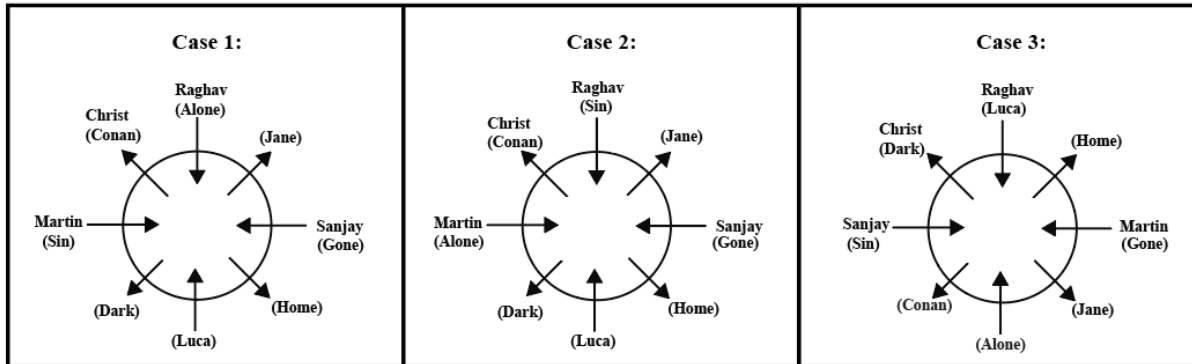
Case 2:



Case 3:



From statements 2 and 7, the directors of Jane and Gone are adjacent, and that of Jane and Dark are diametrically opposite. Thus, the above cases become:



If Vishal directed the film Alone which is possible only in case 3, then the films Home, Jane and Conan could have been possibly be directed by any among Denis, Tarantino and Liso because no information has been provided on how they were seated.

27. If Raghav directed LUCA, then which of the following can be the film directed by the person who was sitting diametrically opposite to Raghav?

- A. GONE
- B. ALONE
- C. HOME
- D. More than one of the above.

Sol. From statement 5, Conan and Dark belong to the action genre. Since the directors who made Alone and Sin are sitting adjacent to the person directing Conan, they both belong to the thriller genre.

From statement 7, the directors of Jane and Dark sit diametrically opposite each other. Thus, they both belong to the action genre.

From Statement 2, Jane and Gone are adjacent to each other. Thus, Gone belongs to the thriller genre.

From statement 6, Sanjay and Martin belong to the thriller genre. Since the director of Luca is sitting two places from Sanjay, Luca belongs to the thriller genre. Hence, Home will belong to the action genre.

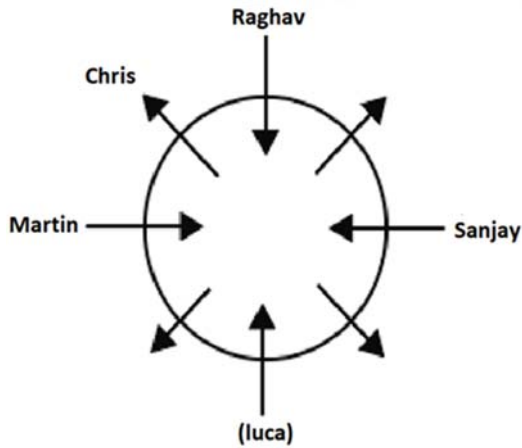
Action Movies	Thriller Movies
Conan	Sin
Dark	Alone
Jane	Gone
Home	Luca

Since Sanjay and Martin face each other and belong to the thriller genre, we can infer that those who directed thriller movies face inwards and those directing action movies face outwards.

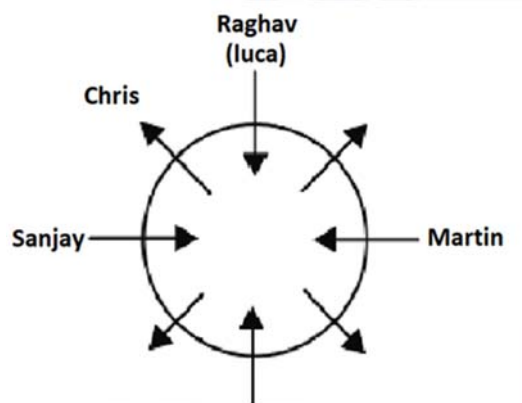
From statement 3, the person next to Christopher directed Sin. Hence, Christopher must have directed an action movie and, thus, faced outwards.

Thus, the two possible arrangements are

Case 1:



Case 2:

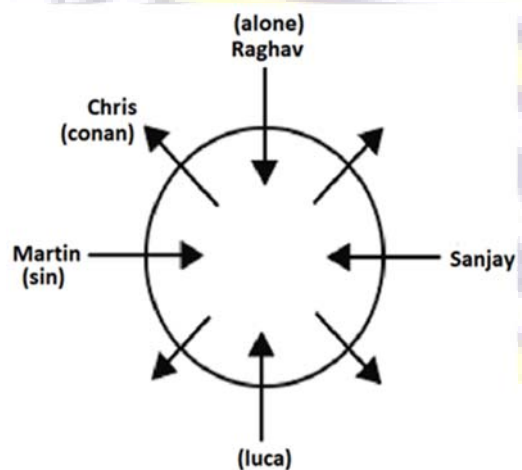


From statement 3, one of the directors sitting next to Christopher directed Sin.

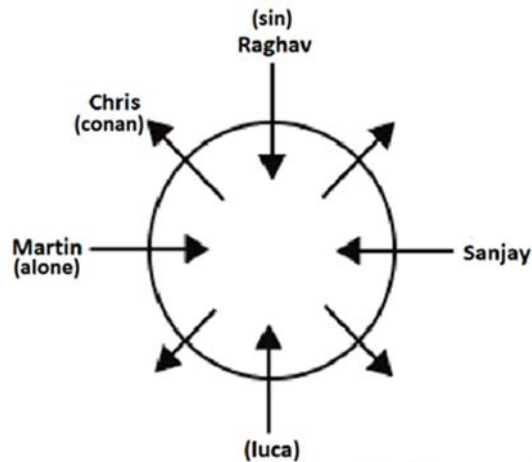
From statement 5, the directors of Alone and Sin were seated next to Conan, and from statement 4, Sanjay did not direct Alone.

Adding this data to the above figures, we get the following three cases.

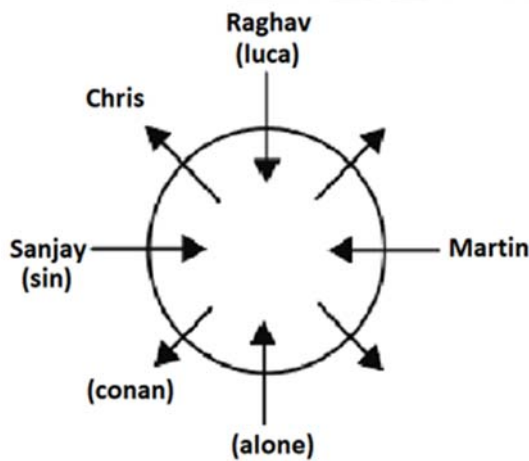
Case 1:



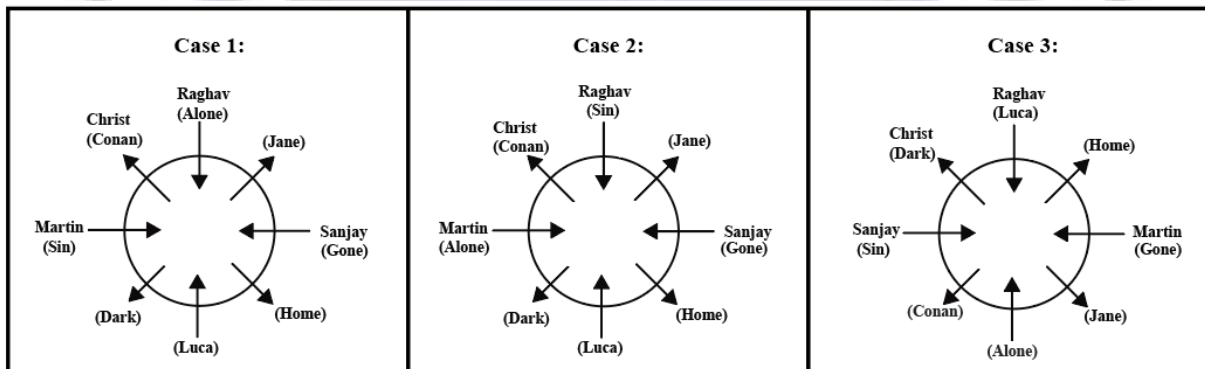
Case 2:



Case 3:



From statements 2 and 7, the directors of Jane and Gone are adjacent, and that of Jane and Dark are diametrically opposite. Thus, the above cases become:



These are the three possible cases.

If Raghav has directed LUCA then the person sitting opposite Raghav must have directed ALONE as per the third case.



28. If additionally, it has been given that Raghav directed the film SIN; Denis and Tarantino were placed in seats that were equidistant from Liso's position, what was the name of the film directed by Vishal?

- A. JANE
- B. LUCA
- C. HOME
- D. Cannot be uniquely determined.

Sol. From statement 5, Conan and Dark belong to the action genre. Since the directors who made Alone and Sin are sitting adjacent to the person directing Conan, they both belong to the thriller genre.

From statement 7, the directors of Jane and Dark sit diametrically opposite each other. Thus, they both belong to the action genre.

From Statement 2, Jane and Gone are adjacent to each other. Thus, Gone belongs to the thriller genre.

From statement 6, Sanjay and Martin belong to the thriller genre. Since the director of Luca is sitting two places from Sanjay, Luca belongs to the thriller genre. Hence, Home will belong to the action genre.

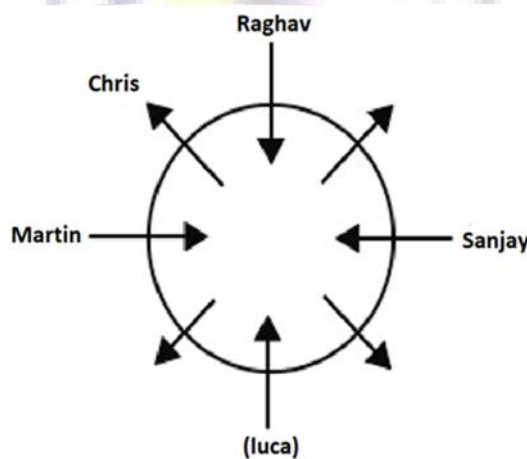
Action Movies	Thriller Movies
Conan	Sin
Dark	Alone
Jane	Gone
Home	Luca

Since Sanjay and Martin face each other and belong to the thriller genre, we can infer that those who directed thriller movies face inwards and those directing action movies face outwards.

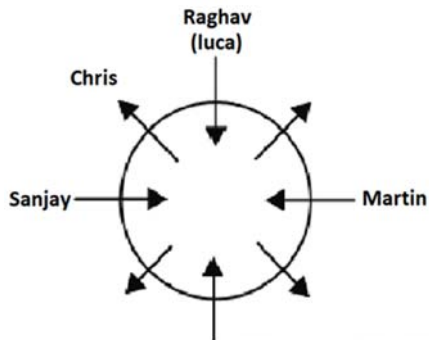
From statement 3, the person next to Christopher directed Sin. Hence, Christopher must have directed an action movie and, thus, faced outwards.

Thus, the two possible arrangements are

Case 1:



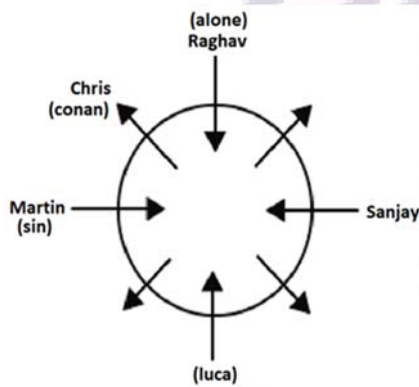
Case 2:



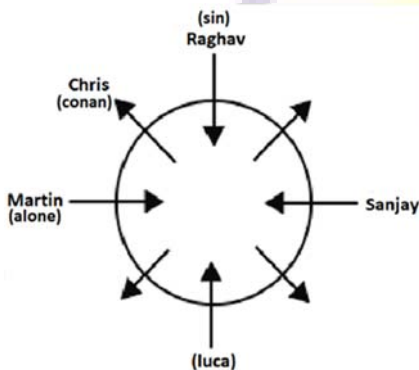
From statement 3, one of the directors sitting next to Christopher directed Sin.
 From statement 5, the directors of Alone and Sin were seated next to Conan, and from statement 4, Sanjay did not direct Alone.

Adding this data to the above figures, we get the following three cases.

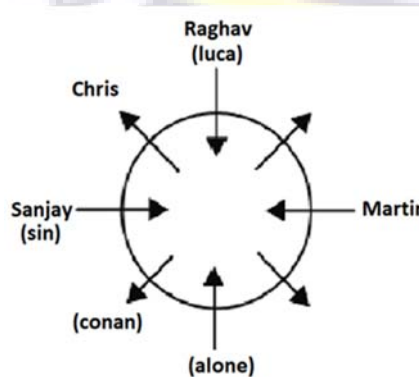
Case 1:



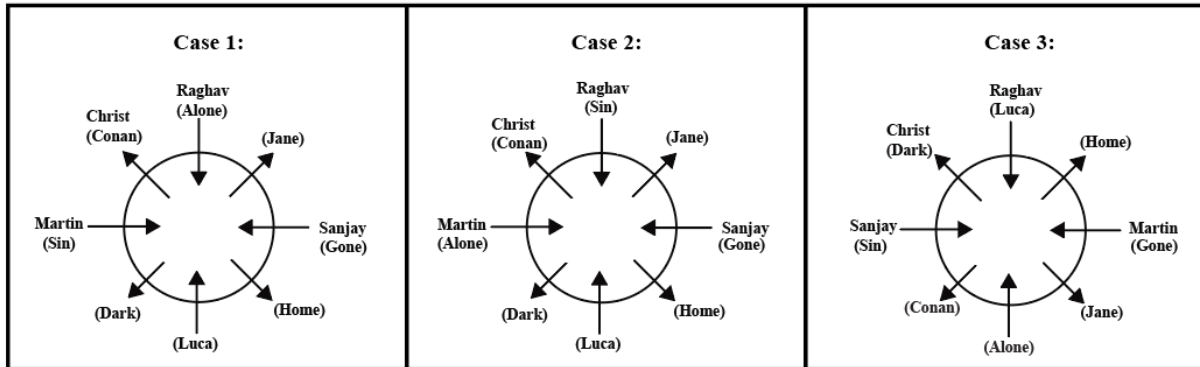
Case 2:



Case 3:



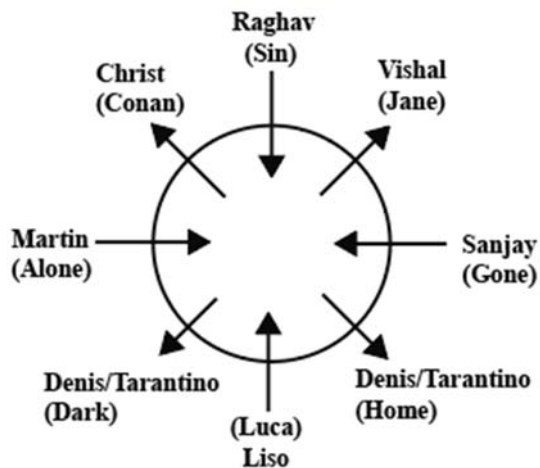
From statements 2 and 7, the directors of Jane and Gone are adjacent, and that of Jane and Dark are diametrically opposite. Thus, the above cases become:



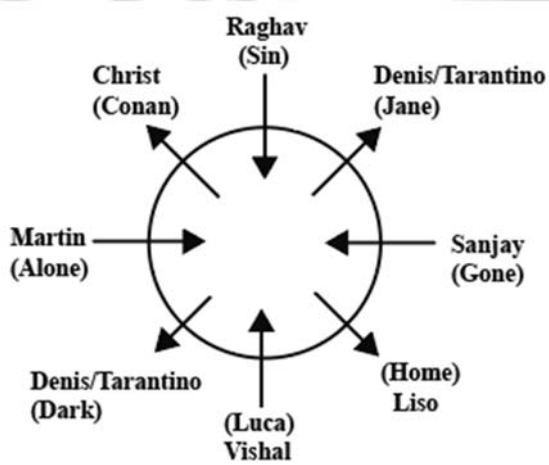
It has been mentioned in the question that Raghav has directed the film SIN. Hence case 2 must have been the possible case.

There can be a total of four different arrangements which are represented by :

Case 1 :



Case 2 :



Hence the answer cannot be uniquely determined.

29. If a person who directed JANE was sitting next to Vishal, then who was sitting two places to the left of Vishal?

- A. Martin
- B. Sanjay
- C. Raghav
- D. Christ

Sol. From statement 5, Conan and Dark belong to the action genre. Since the directors who made Alone and Sin are sitting adjacent to the person directing Conan, they both belong to the thriller genre.

From statement 7, the directors of Jane and Dark sit diametrically opposite each other. Thus, they both belong to the action genre.

From Statement 2, Jane and Gone are adjacent to each other. Thus, Gone belongs to the thriller genre.

From statement 6, Sanjay and Martin belong to the thriller genre. Since the director of Luca is sitting two places from Sanjay, Luca belongs to the thriller genre. Hence, Home will belong to the action genre.

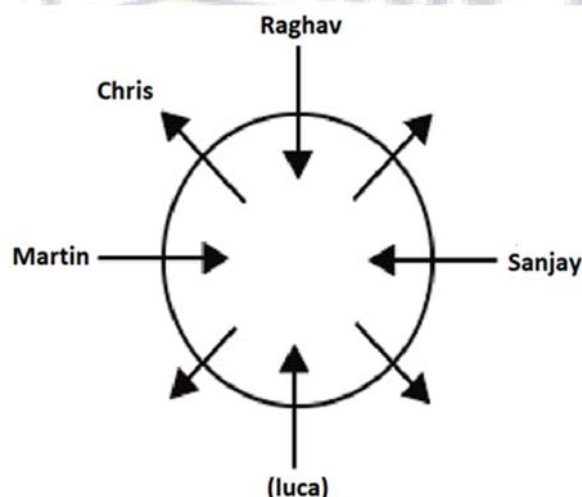
Action Movies	Thriller Movies
Conan	Sin
Dark	Alone
Jane	Gone
Home	Luca

Since Sanjay and Martin face each other and belong to the thriller genre, we can infer that those who directed thriller movies face inwards and those directing action movies face outwards.

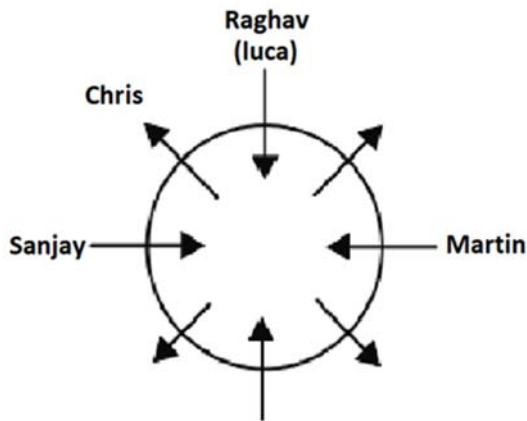
From statement 3, the person next to Christopher directed Sin. Hence, Christopher must have directed an action movie and, thus, faced outwards.

Thus, the two possible arrangements are

Case 1:



Case 2:

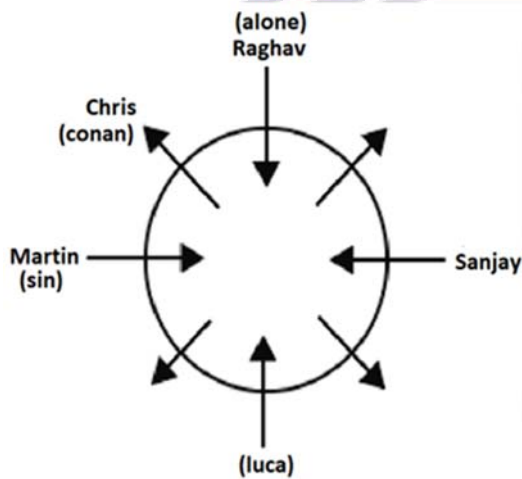


From statement 3, one of the directors sitting next to Christopher directed Sin.

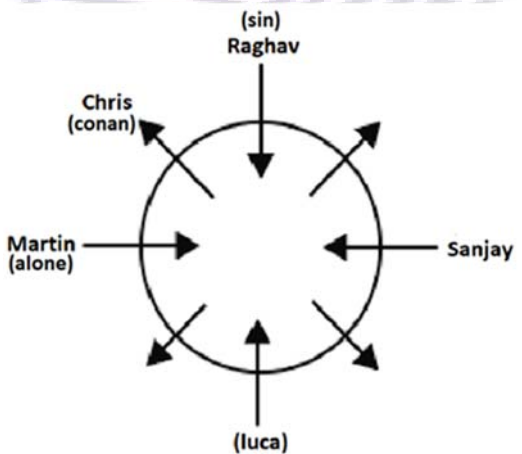
From statement 5, the directors of Alone and Sin were seated next to Conan, and from statement 4, Sanjay did not direct Alone.

Adding this data to the above figures, we get the following three cases.

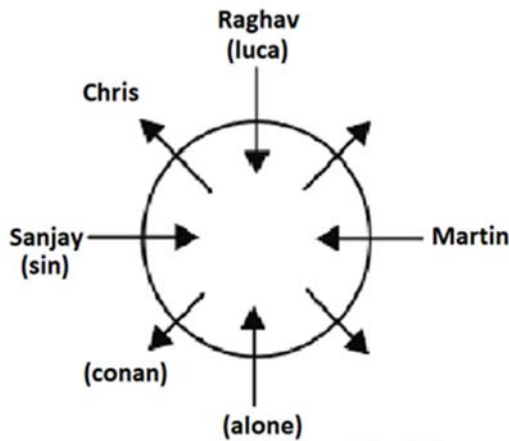
Case 1:



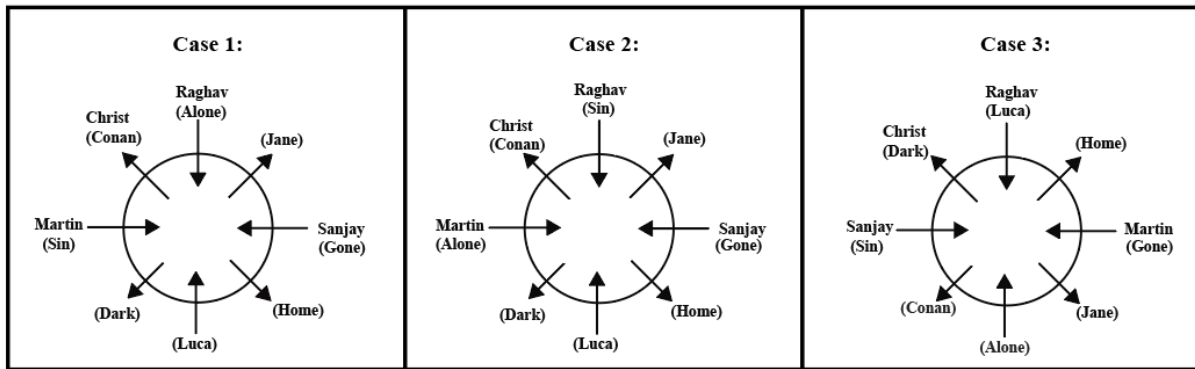
Case 2:



Case 3:



From statements 2 and 7, the directors of Jane and Gone are adjacent, and that of Jane and Dark are diametrically opposite. Thus, the above cases become:



For the given condition to be true, case 3 needs to be considered with Vishal directing ALONE. Thus, the person sitting two places to the left of Vishal will be Sanjay. Hence, the answer is option B.

30. If additionally it has been given that Vishal directed an action film, what is the total number of distinct seating arrangements possible?

Sol. From statement 5, Conan and Dark belong to the action genre. Since the directors who made Alone and Sin are sitting adjacent to the person directing Conan, they both belong to the thriller genre.

From statement 7, the directors of Jane and Dark sit diametrically opposite each other. Thus, they both belong to the action genre.

From Statement 2, Jane and Gone are adjacent to each other. Thus, Gone belongs to the thriller genre.

From statement 6, Sanjay and Martin belong to the thriller genre. Since the director of Luca is sitting two places from Sanjay, Luca belongs to the thriller genre. Hence, Home will belong to the action genre.

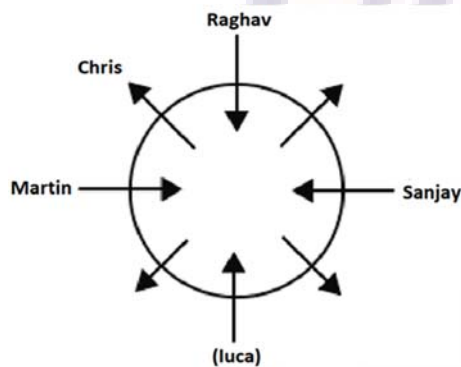
Action Movies	Thriller Movies
Conan	Sin
Dark	Alone
Jane	Gone
Home	Luca

Since Sanjay and Martin face each other and belong to the thriller genre, we can infer that those who directed thriller movies face inwards and those directing action movies face outwards.

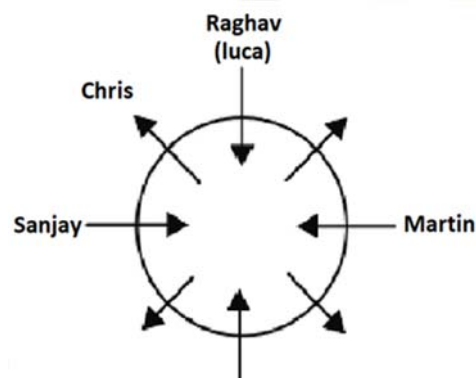
From statement 3, the person next to Christopher directed Sin. Hence, Christopher must have directed an action movie and, thus, faced outwards.

Thus, the two possible arrangements are

Case 1:



Case 2:

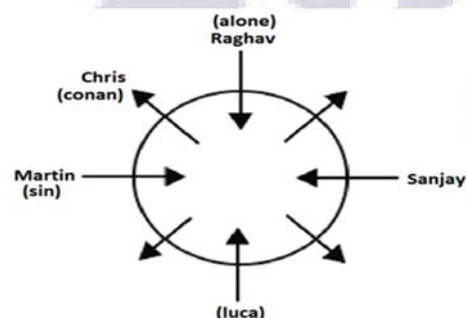


From statement 3, one of the directors sitting next to Christopher directed Sin.

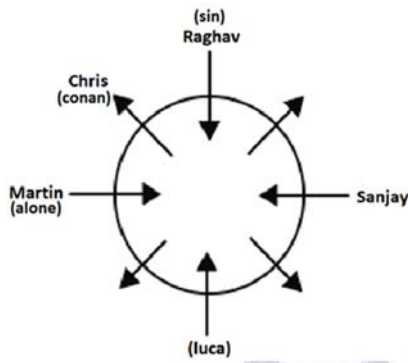
From statement 5, the directors of Alone and Sin were seated next to Conan, and from statement 4, Sanjay did not direct Alone.

Adding this data to the above figures, we get the following three cases.

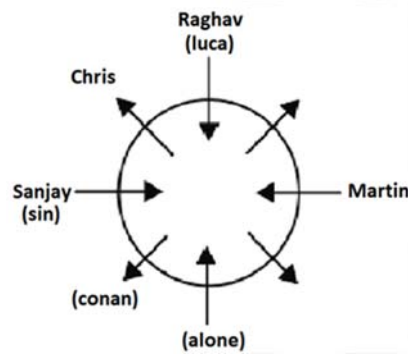
Case 1:



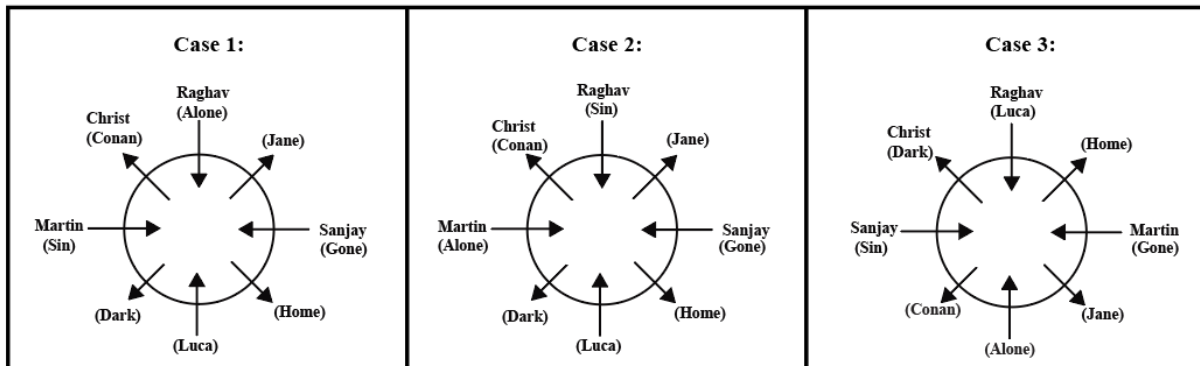
Case 2:



Case 3:



From statements 2 and 7, the directors of Jane and Gone are adjacent, and that of Jane and Dark are diametrically opposite. Thus, the above cases become:



We are not aware of the seating of 4 directors in all three cases :

The four directors are Liso, Denis, Tarantino and Vishal.

3 of them directed Action films and the other one a thriller.

Since it has been mentioned that both Denis and Tarantino directed films in the same genre, both of them must have directed films in the action genre since it has been noted that Vishal also directed an action film.

Then Liso must have directed a thriller.

We can confirm the location where Liso can be seated in all the cases.

But Tarantino, Denis and Vishal can be placed anywhere in the three available seats.

Hence a total of $3! = 6$ arrangements are possible for each case.



A total of $3 \times 6 = 18$ cases are possible.

Instructions

A $7 \times 7 \times 7$ cube is painted with same colour on opposite sides viz. red, blue and green. The cube is then cut into smaller cubes of unit volume.

31. How many unit cubes are painted with both red and blue?

Sol. The unit cubes which have exactly 3 faces painted are the ones at the corners of the big cube. Irrespective of the dimensions of the bigger cube, this number is always 8.

Therefore, number of unit cubes with exactly 3 faces painted = 8

All these 8 unit cubes are painted with both red and blue.

Apart from these, there are 2 face coloured unit cubes on edges. We will have four edges with 5 cubes each painted with both red and blue. Therefore, there are 20 unit cubes painted with only red and blue.

Total number of unit cubes painted with red and blue = $20 + 8 = 28$

Therefore, answer is option 28.

32. If all the single face painted unit cubes are painted with the same colour on opposite side, then how many faces of all unit cubes are painted with green?

Sol. Total number of unit cubes = 343

The unit cubes which have exactly one face covered by paint are the ones which reside in the interior region on the faces (cubes not touching the boundary). There are 6 faces in each cube. In this case, the number of cubes with 1 face painted is $5 \times 5 \times 6 = 150$

Therefore, number of unit cubes exactly 1 face painted = $6 \times 25 = 150$

The unit cubes which have exactly 2 faces covered by paint reside on the edges of the cube (cubes which are at the corners do not belong to this category). In this case, it is $12 \times 5 = 60$.

Therefore, number of unit cubes with exactly 2 faces painted = $12 \times 5 = 60$

The unit cubes which have exactly 3 faces painted are the ones at the corners of the big cube. Irrespective of the dimensions of the bigger cube, this number is always 8.

Therefore, number of unit cubes with exactly 3 faces painted = 8

Out of 150 unit cubes painted on single face, there are 50 unit cubes painted with green on single face. After painting opposite side also with green paint, total number of faces painted with green in this case are $50 \times 2 = 100$



Number of unit cubes with exactly 2 faces painted are 60 out of which cubes which painted with red and green are 20 and blue and green are 20. Therefore, total number of faces painted with green in this case are $20 + 20 = 40$

There are 8 3 face painted unit cubes. On all these unit cubes there is only one face painted with green. Therefore, total number of faces painted with green in this case are 8.

Total number of faces of all unit cubes painted with green = $100 + 40 + 8 = 148$

Therefore, answer is 148.

33. If all the zero face painted unit cubes are painted with same colour on opposite sides viz. blue, pink and yellow, then how many faces of all unit cubes are unpainted?

- A. 1090
- B. 1014
- C. 1308
- D. 1240

Sol. Total number of unit cubes = 343

The unit cubes which have exactly one face covered by paint are the ones which reside in the interior region on the faces (cubes not touching the boundary). There are 6 faces in each cube. For $7 \times 7 \times 7$ cube, the number of cubes with 1 face painted is $5 \times 5 \times 6 = 150$

Therefore, number of unit cubes exactly 1 face painted = $6 \times 25 = 150$

The unit cubes which have exactly 2 faces covered by paint reside on the edges of the cube (cubes which are at the corners do not belong to this category). For $7 \times 7 \times 7$ cube, it is $12 \times 5 = 60$.

Therefore, number of unit cubes with exactly 2 faces painted = $12 * 5 = 60$

The unit cubes which have exactly 3 faces painted are the ones at the corners of the big cube. Irrespective of the dimensions of the bigger cube, this number is always 8.

Therefore, number of unit cubes with exactly 3 faces painted = 8

The unit cubes which have no face painted are the cubes which cannot be seen from outside. For $7 \times 7 \times 7$ cube it is 125.

Therefore, number of unit cubes with zero faces painted = 125

All the unit cubes with zero faces painted are now painted with same colour on opposite sides, this means there is no unpainted face on cubes which are zero face painted initially.

Number of unit cubes exactly 1 face painted are 150, which means these cubes are not painted on remaining 5 faces. Therefore, number of unpainted face in this case are $5 \times 150 = 750$

Number of unit cubes exactly 2 face painted are 60, which means these cubes are not painted on remaining 4 faces. Therefore, number of unpainted face in this case are $4 \times 60 = 240$

Number of unit cubes exactly 3 face painted are 8, which means these cubes are not painted on remaining 3 faces. Therefore, number of unpainted face in this case are $3 \times 8 = 24$

Therefore, total number of faces unpainted on all unit cubes = $750 + 240 + 24 = 1014$



Answer is option B.

34. If all the zero face painted unit cubes are painted with same colour on opposite sides viz. blue, pink and yellow, then how many faces of all unit cubes are not painted with blue?

- A. 1510
- B. 1610
- C. 1710
- D. 1810

Sol. Total number of faces of all unit cubes = $343 \times 6 = 2058$

Number of zero face painted unit cubes = 125

These 125 zero face painted unit cubes are now painted with blue, pink and yellow on opposite sides which means each cubes has 2 faces painted with blue. Therefore, number of faces painted with blue in this case are $125 \times 2 = 250$

Out of 150 unit cubes painted on single face, there are 50 unit cubes painted with blue on single face. Therefore, number of faces painted with blue in this case are $50 \times 1 = 50$

Number of unit cubes with exactly 2 faces painted are 60 out of which cubes painted with red and blue are 20 and blue and green are 20. Therefore, total number of faces painted with blue in this case are $20 + 20 = 40$

There are 8 3 face painted unit cubes. On all these unit cubes there is only one face painted with blue. Therefore, total number of faces painted with blue in this case are 8.

Therefore, number of faces of all cubes painted with blue = $250 + 50 + 40 + 8 = 348$

Total number of faces of all cubes that are not painted with blue = $2058 - 348 = 1710$

Therefore, answer is option C.

Instructions

Travel enthusiastic Ayra travelled seven places in seven days of a week. She travelled to Ahmedabad, Bhopal, Chennai, Dwarka, Gwalior, Hyderabad and Udaipur on seven different days wearing seven different colours of dresses viz; black, blue, green, pink, red, white and yellow.

1. She wore black dress on Monday.
2. She visited Bhopal wearing yellow dress.
3. She visited Chennai before Hyderabad and Udaipur.
4. She didn't wear blue dress visiting Ahmedabad.
5. After visiting Gwalior, she wore red dress before blue dress.
6. She visited Gwalior wearing white dress and first day of week is Monday.
7. She visited Gwalior a day after she visited Hyderabad.
8. She didn't wear blue or green dress to Udaipur.



- 9. She wore pink dress after wearing yellow dress and before visiting Ahmedabad.
- 10. She visited Bhopal after Gwalior and before Ahmedabad.

35. On which day did Ayra wear pink dress?

- A. Friday
- B. Thursday
- C. Tuesday
- D. Cannot be determined

Sol. From statement 7 and 8, we can say that she visited Gwalior wearing white dress immediately after visiting Hyderabad.

From statement 2 and 12, we can say that she visited Bhopal wearing yellow dress after visiting Gwalior.

From statement 11, we can say that she visited a place wearing pink dress after wearing yellow dress.

From statement 5, we can say that she wore red and blue dress after visiting Gwalior.

From all the above statements, we can conclude that there are atleast four places she visited after Gwalior wearing yellow, pink, red and blue dresses.

From statement 8 we can conclude that she visited Hyderabad before Gwalior and from statement 3 we can conclude that she visited Chennai before Hyderabad. Therefore, she visited two places before Gwalior and 4 places after Gwalior.

Day	Place	Colour
Monday	Chennai	
Tuesday	Hyderabad	
Wednesday	Gwalior	
Thursday		
Friday		
Saturday		
Sunday		

From statement 1, we can say that she visited Chennai on Monday wearing black dress, this implies she visited Hyderabad on Tuesday wearing green dress.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday		
Friday		
Saturday		
Sunday		

From statement 11, we can say that she did not wear pink dress on last day of the week i.e. on Sunday.

We can also infer that she did not wear pink dress on Saturday. If she wore pink dress on Saturday, she should wear blue dress on Sunday and visit Ahmedabad but statement 4 contradicts this condition. Therefore, she wore pink dress on Friday.



From statement 11, we can conclude that she wore yellow dress on Thursday.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday		Pink
Saturday		
Sunday		

From statement 5, we can say she wore red and blue dresses on Saturday and Sunday respectively.

From statement 4 and 11, we can conclude that she visited Ahmedabad on Saturday wearing red dress.

From statement 10, we can conclude that she visited Udaipur on Friday wearing Pink dress and Dwaraka on Sunday wearing Blue dress.

Final arrangement:

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday	Udaipur	Pink
Saturday	Ahmedabad	Red
Sunday	Dwarka	Blue

Ayra wore pink dress on Friday. Therefore, answer is option A.

36. Which colour dress did Ayra wear when she visited Hyderabad?

- A. Green or Pink
- B. Green or Pink or Blue
- C. Green
- D. Pink

Sol. From statement 7 and 8, we can say that she visited Gwalior wearing white dress immediately after visiting Hyderabad.

From statement 2 and 12, we can say that she visited Bhopal wearing yellow dress after visiting Gwalior.

From statement 11, we can say that she visited a place wearing pink dress after wearing yellow dress.

From statement 5, we can say that she wore red and blue dress after visiting Gwalior.

From all the above statements, we can conclude that there are atleast four places she visited after Gwalior wearing yellow, pink, red and blue dresses.



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From statement 8 we can conclude that she visited Hyderabad before Gwalior and from statement 3 we can conclude that she visited Chennai before Hyderabad. Therefore, she visited two places before Gwalior and 4 places after Gwalior.

Day	Place	Colour
Monday	Chennai	
Tuesday	Hyderabad	
Wednesday	Gwalior	
Thursday		
Friday		
Saturday		
Sunday		

From statement 1, we can say that she visited Chennai on Monday wearing black dress, this implies she visited Hyderabad on Tuesday wearing green dress.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday		
Friday		
Saturday		
Sunday		

From statement 11, we can say that she did not wear pink dress on last day of the week i.e. on Sunday.

We can also infer that she did not wear pink dress on Saturday. If she wore pink dress on Saturday, she should wear blue dress on Sunday and visit Ahmedabad but statement 4 contradicts this condition. Therefore, she wore pink dress on Friday.

From statement 11, we can conclude that she wore yellow dress on Thursday.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday		Pink
Saturday		
Sunday		

From statement 5, we can say that she wore red and blue dresses on Saturday and Sunday respectively.

From statement 4 and 11, we can conclude that she visited Ahmedabad on Saturday wearing red dress.

From statement 10, we can conclude that she visited Udaipur on Friday wearing Pink dress and Dwaraka on Sunday wearing Blue dress.



Final Arrangement:

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday	Udaipur	Pink
Saturday	Ahmedabad	Red
Sunday	Dwarka	Blue

Ayra wore green colour dress when she visited Hyderabad. Therefore, answer is option C.

37. Find out the odd pair

- A. Udaipur - Ahmedabad
- B. Chennai - Hyderabad
- C. Gwalior - Bhopal
- D. Dwarka - Chennai

Sol. From statement 7 and 8, we can say that she visited Gwalior wearing white dress immediately after visiting Hyderabad.

From statement 2 and 12, we can say that she visited Bhopal wearing yellow dress after visiting Gwalior.

From statement 11, we can say that she visited a place wearing pink dress after wearing yellow dress.

From statement 5, we can say that she wore red and blue dress after visiting Gwalior.

From all the above statements, we can conclude that there are atleast four places she visited after Gwalior wearing yellow, pink, red and blue dresses.

From statement 8 we can conclude that she visited Hyderabad before Gwalior and from statement 3 we can conclude that she visited Chennai before Hyderabad. Therefore, she visited two places before Gwalior and 4 places after Gwalior.

Day	Place	Colour
Monday	Chennai	
Tuesday	Hyderabad	
Wednesday	Gwalior	
Thursday		
Friday		
Saturday		
Sunday		

From statement 1, we can say that she visited Chennai on Monday wearing black dress, this implies she visited Hyderabad on Tuesday wearing green dress.



Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday		
Friday		
Saturday		
Sunday		

From statement 11, we can say that she did not wear pink dress on last day of the week i.e. on Sunday.

We can also infer that she did not wear pink dress on Saturday. If she wore pink dress on Saturday, she should wear blue dress on Sunday and visit Ahmedabad but statement 4 contradicts this condition. Therefore, she wore pink dress on Friday.

From statement 11, we can conclude that she wore yellow dress on Thursday.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday		Pink
Saturday		
Sunday		

From statement 5, we can say she wore red and blue dresses on Saturday and Sunday respectively.

From statement 4 and 11, we can conclude that she visited Ahmedabad on Saturday wearing red dress.

From statement 10, we can conclude that she visited Udaipur on Friday wearing Pink dress and Dwarka on Sunday wearing Blue dress.

Final Arrangement:

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday	Udaipur	Pink
Saturday	Ahmedabad	Red
Sunday	Dwarka	Blue

Option D is odd pair. Ayra didn't visit Dwarka and Chennai on consecutive days.

38. If Ayra visited Gwalior on February 27, 2020, on which date did she visit Dwarka?

- A. March 02, 2020
- B. March 01, 2020
- C. February 28, 2020
- D. March 03, 2020



Sol. From statement 7 and 8, we can say that she visited Gwalior wearing white dress immediately after visiting Hyderabad.

From statement 2 and 12, we can say that she visited Bhopal wearing yellow dress after visiting Gwalior.

From statement 11, we can say that she visited a place wearing pink dress after wearing yellow dress.

From statement 5, we can say that she wore red and blue dress after visiting Gwalior.

From all the above statements, we can conclude that there are atleast four places she visited after Gwalior wearing yellow, pink, red and blue dresses.

From statement 8 we can conclude that she visited Hyderabad before Gwalior and from statement 3 we can conclude that she visited Chennai before Hyderabad. Therefore, she visited two places before Gwalior and 4 places after Gwalior.

Day	Place	Colour
Monday	Chennai	
Tuesday	Hyderabad	
Wednesday	Gwalior	
Thursday		
Friday		
Saturday		
Sunday		

From statement 1, we can say that she visited Chennai on Monday wearing black dress, this implies she visited Hyderabad on Tuesday wearing green dress.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday		
Friday		
Saturday		
Sunday		

From statement 11, we can say that she did not wear pink dress on last day of the week i.e. on Sunday.

We can also infer that she did not wear pink dress on Saturday. If she wore pink dress on Saturday, she should wear blue dress on Sunday and visit Ahmedabad but statement 4 contradicts this condition. Therefore, she wore pink dress on Friday.

From statement 11, we can conclude that she wore yellow dress on Thursday.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday		Pink
Saturday		
Sunday		



From statement 5, we can say she wore red and blue dresses on Saturday and Sunday respectively.

From statement 4 and 11, we can conclude that she visited Ahmedabad on Saturday wearing red dress.

From statement 10, we can conclude that she visited Udaipur on Friday wearing Pink dress and Dwarka on Sunday wearing Blue dress.

Final Arrangement:

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday	Udaipur	Pink
Saturday	Ahmedabad	Red
Sunday	Dwarka	Blue

If Ayra visited Gwalior on February 27, 2020, then she visits Dwarka after four days i.e. on March 02, 2020. Here 2020 is a leap year.

Therefore, answer is option A.

39. Which city did Ayra visit on Friday?

- A. Udaipur
- B. Gwalior
- C. Chennai
- D. Dwarka

Sol. From statement 7 and 8, we can say that she visited Gwalior wearing white dress immediately after visiting Hyderabad.

From statement 2 and 12, we can say that she visited Bhopal wearing yellow dress after visiting Gwalior.

From statement 11, we can say that she visited a place wearing pink dress after wearing yellow dress.

From statement 5, we can say that she wore red and blue dress after visiting Gwalior.

From all the above statements, we can conclude that there are atleast four places she visited after Gwalior wearing yellow, pink, red and blue dresses.

From statement 8 we can conclude that she visited Hyderabad before Gwalior and from statement 3 we can conclude that she visited Chennai before Hyderabad. Therefore, she visited two places before Gwalior and 4 places after Gwalior.



Day	Place	Colour
Monday	Chennai	
Tuesday	Hyderabad	
Wednesday	Gwalior	
Thursday		
Friday		
Saturday		
Sunday		

From statement 1, we can say that she visited Chennai on Monday wearing black dress, this implies she visited Hyderabad on Tuesday wearing green dress.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday		
Friday		
Saturday		
Sunday		

From statement 11, we can say that she did not wear pink dress on last day of the week i.e. on Sunday.

We can also infer that she did not wear pink dress on Saturday. If she wore pink dress on Saturday, she should wear blue dress on Sunday and visit Ahmedabad but statement 4 contradicts this condition. Therefore, she wore pink dress on Friday.

From statement 11, we can conclude that she wore yellow dress on Thursday.

Day	Place	Colour
Monday	Chennai	Black
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Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday		Pink
Saturday		
Sunday		

From statement 5, we can say she wore red and blue dresses on Saturday and Sunday respectively.

From statement 4 and 11, we can conclude that she visited Ahmedabad on Saturday wearing red dress.

From statement 10, we can conclude that she visited Udaipur on Friday wearing Pink dress and Dwarka on Sunday wearing Blue dress.

Final Arrangement:

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday	Udaipur	Pink
Saturday	Ahmedabad	Red
Sunday	Dwarka	Blue

Ayra visited Udaipur on Friday. Therefore, answer is option A.



40. How many cities did Ayra visit after visiting Gwalior and before visiting Udaipur?

Sol. From statement 7 and 8, we can say that she visited Gwalior wearing white dress immediately after visiting Hyderabad.

From statement 2 and 12, we can say that she visited Bhopal wearing yellow dress after visiting Gwalior.

From statement 11, we can say that she visited a place wearing pink dress after wearing yellow dress.

From statement 5, we can say that she wore red and blue dress after visiting Gwalior.

From all the above statements, we can conclude that there are atleast four places she visited after Gwalior wearing yellow, pink, red and blue dresses.

From statement 8 we can conclude that she visited Hyderabad before Gwalior and from statement 3 we can conclude that she visited Chennai before Hyderabad. Therefore, she visited two places before Gwalior and 4 places after Gwalior.

Day	Place	Colour
Monday	Chennai	
Tuesday	Hyderabad	
Wednesday	Gwalior	
Thursday		
Friday		
Saturday		
Sunday		

From statement 1, we can say that she visited Chennai on Monday wearing black dress, this implies she visited Hyderabad on Tuesday wearing green dress.

Day	Place	Colour
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From statement 11, we can say that she did not wear pink dress on last day of the week i.e. on Sunday.

We can also infer that she did not wear pink dress on Saturday. If she wore pink dress on Saturday, she should wear blue dress on Sunday and visit Ahmedabad but statement 4 contradicts this condition. Therefore, she wore pink dress on Friday.

From statement 11, we can conclude that she wore yellow dress on Thursday.

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday		Pink
Saturday		
Sunday		



From statement 5, we can say she wore red and blue dresses on Saturday and Sunday respectively.

From statement 4 and 11, we can conclude that she visited Ahmedabad on Saturday wearing red dress.

From statement 10, we can conclude that she visited Udaipur on Friday wearing Pink dress and Dwaraka on Sunday wearing Blue dress.

Final Arrangement:

Day	Place	Colour
Monday	Chennai	Black
Tuesday	Hyderabad	Green
Wednesday	Gwalior	White
Thursday	Bhopal	Yellow
Friday	Udaipur	Pink
Saturday	Ahmedabad	Red
Sunday	Dwarka	Blue

Ayra visited Bhopal after visiting Gwalior and before visiting Udaipur.

Therefore, the required answer is 1.

Instructions

SIFA Awards Association conducted online voting to choose the best director of the year. There are four nominated contestants Siva, Raja, Vikram and Vamshi. A total of 600 members participated in the voting. The director with the highest number of votes is awarded as the Best Director of the year.

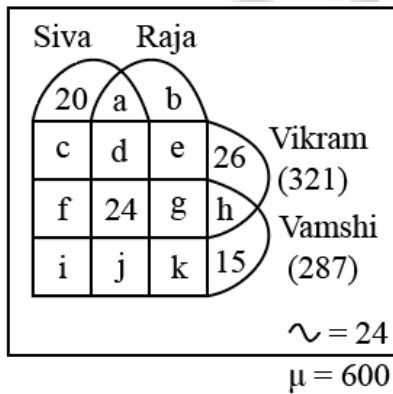
1. The number of members who voted for all four directors is equal to the number of members who voted for none of them. The number of members who voted for more than two directors is 166.
2. The number of votes secured by Vikram and Vamshi are 321 and 287 respectively.
3. The number of members who voted for Siva, Raja and Vikram is 22 greater than the number of members who voted for Siva, Raja and Vamshi. The number of members who voted for Vikram, Vamshi and Siva is equal to the number of members who voted for Vamshi, Raja and Vikram.
4. The number of votes secured by Siva and Vamshi is 146 and the number of votes secured by Siva and Raja is 158.
5. 20 members voted for Siva only. 26 members voted for Vikram only and 15 members voted for Vamshi only. The number of members who voted for more than three directors is 24.
6. The number of members who voted for both Raja and Vikram is 9 more than the number of members who voted for both Siva and Vikram.
7. The number of members who voted for both Vikram and Vamshi is 127, out of which those who voted for only Vikram and Vamshi are 53.



41. How many votes did Siva secure?

- A. 300
- B. 308
- C. 316
- D. 324

Sol. From statement 5, we can say that number of members voted for all four candidates are 24. From statement 1, we can say that number of members voted for none of them is also equal to 24.



From statement 3, we can write as

$$24 + j + 22 = 24 + d$$

$$j + 22 = d \dots\dots\dots (i) \text{ and}$$

$$f = g \dots\dots\dots (ii)$$

From statement 7, we can write as

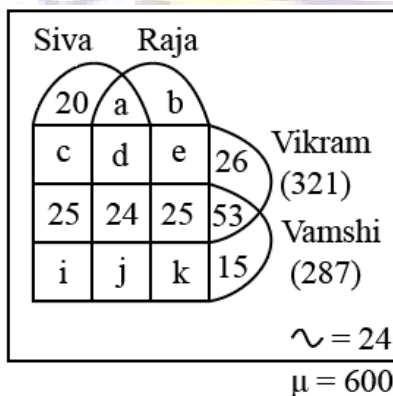
$$f + 24 + g + h = 127 \text{ and } h = 53$$

$$f + g + 77 = 127$$

$$f + g = 50 \dots\dots\dots (iii)$$

Solving (ii) and (iii), we get

$$f = 25 \text{ and } g = 25$$





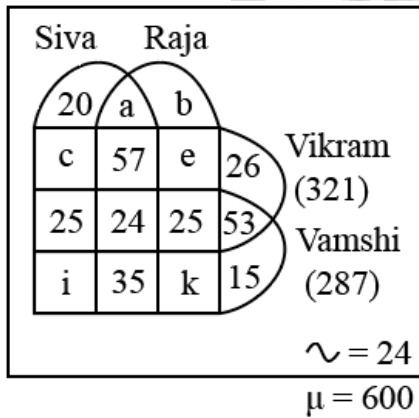
From statement 1, we can say that number of members voted for three candidates and four candidates are 166. We know that 24 members voted for all four directors. Therefore, number of members voted for exactly 3 directors are 142 i.e.

$$d + j + 25 + 25 = 142$$

$$d + j = 92 \dots\dots\dots (iv)$$

Solving (i) and (iv), we get

$$j = 35 \text{ and } d = 57$$



From statement 6, we can say that

$$57 + e + 24 + 25 = c + 57 + 25 + 24 + 9$$

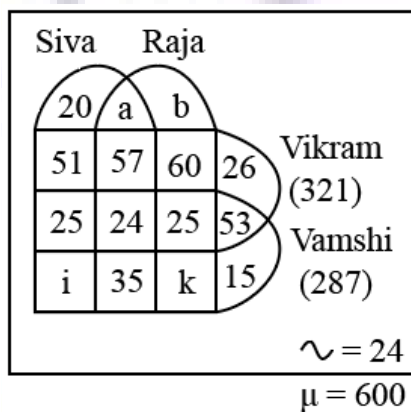
$$e = c + 9 \dots\dots\dots (v)$$

From statement 2, we know that number of votes secured by Vikram are 321 i.e $c + e + 210 = 321$

$$c + e = 111 \dots\dots\dots (vi)$$

Solving (v) and (vi), we get

$$c = 51 \text{ and } e = 60$$



From statement 4 that is number of members voted for Siva and Vamshi are 146, we can write as

$$25 + 24 + 35 + i = 146$$

$$i = 62$$



Given, number of members voted for Siva and Raja are 156 i.e.

$$57 + 24 + 35 + a = 158$$

$$a = 42$$

we know that total number of voted secured by Vamshi are 287, therefore

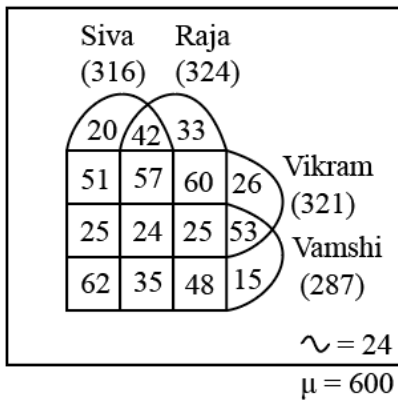
$$239 + k = 287$$

$$k = 48$$

It is given that total 600 members participated in voting, i.e.

$$b + 567 = 600$$

$$b = 33$$

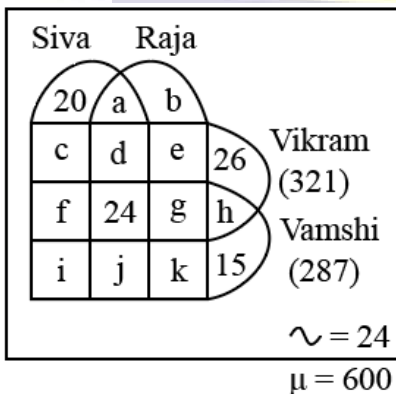


Total number of votes Siva secured = 316

42. Who among four directors received best director of the year award?

- A. Siva
- B. Raja
- C. Vikram
- D. Vamshi

Sol. From statement 5, we can say that number of members voted for all four candidates are 24. From statement 1, we can say that number of members voted for none of them is also equal to 24.





From statement 3, we can write as

$$24 + j + 22 = 24 + d$$

$$j + 22 = d \dots\dots\dots (i) \text{ and}$$

$$f = g \dots\dots\dots (ii)$$

From statement 7, we can write as

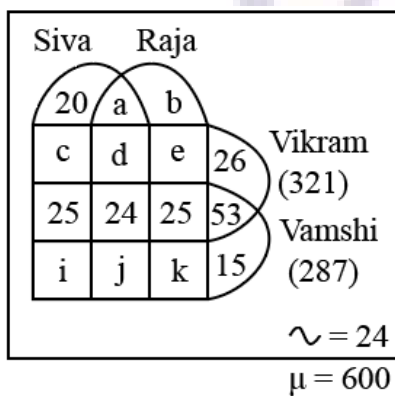
$$f + 24 + g + h = 127 \text{ and } h = 53$$

$$f + g + 77 = 127$$

$$f + g = 50 \dots\dots\dots (iii)$$

Solving (ii) and (iii), we get

$$f = 25 \text{ and } g = 25$$



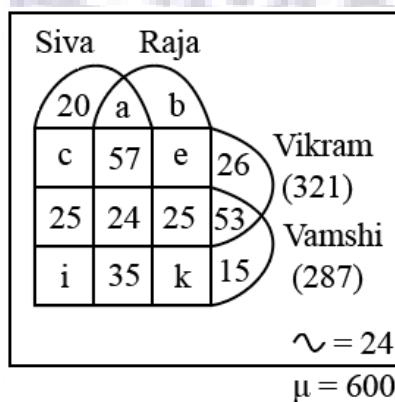
From statement 1, we can say that number of members voted for three candidates and four candidates are 166. We know that 24 members voted for all four directors. Therefore, number of members voted for exactly 3 directors are 142 i.e.

$$d + j + 25 + 25 = 142$$

$$d + j = 92 \dots\dots\dots (iv)$$

Solving (i) and (iv), we get

$$j = 35 \text{ and } d = 57$$



From statement 6, we can say that

$$57 + e + 24 + 25 = c + 57 + 25 + 24 + 9$$

$$e = c + 9 \dots\dots\dots (v)$$

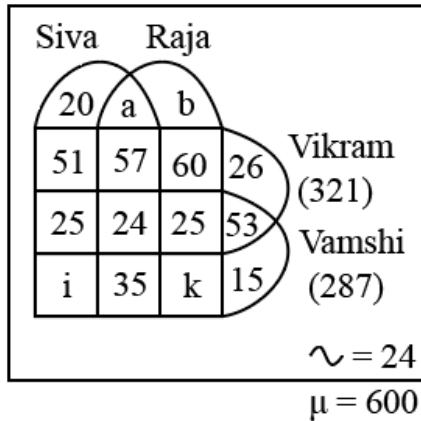


From statement 2, we know that number of votes secured by Vikram are 321 i.e $c + e + 210 = 321$

$c + e = 111$ (vi)

Solving (v) and (vi), we get

$c = 51$ and $e = 60$



From statement 4 that is number of members voted for Siva and Vamshi are 146, we can write as

$25 + 24 + 35 + i = 146$

$i = 62$

Given, number of members voted for Siva and Raja are 156 i.e.

$57 + 24 + 35 + a = 158$

$a = 42$

we know that total number of voted secured by Vamshi are 287, therefore

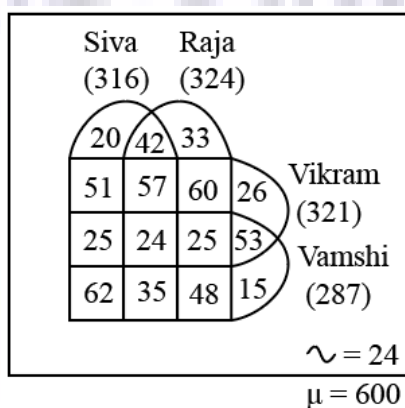
$239 + k = 287$

$k = 48$

It is given that total 600 members participated in voting, i.e.

$b + 567 = 600$

$b = 33$

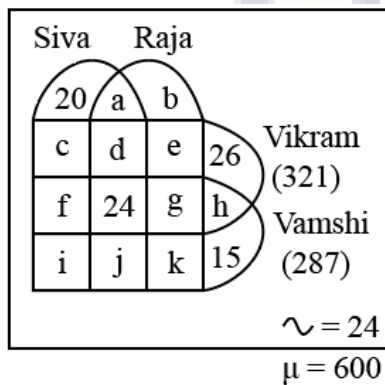


To find who received best director of the year we need to find who have secured maximum number of votes. Raja secured maximum number of votes. Therefore, Raja received best director of the year award.

43. How many members voted for only Raja?

- A. 13
- B. 23
- C. 33
- D. 43

Sol. From statement 5, we can say that number of members voted for all four candidates are 24. From statement 1, we can say that number of members voted for none of them is also equal to 24.



From statement 3, we can write as

$$24 + j + 22 = 24 + d$$

$$j + 22 = d \dots\dots\dots (i) \text{ and}$$

$$f = g \dots\dots\dots (ii)$$

From statement 7, we can write as

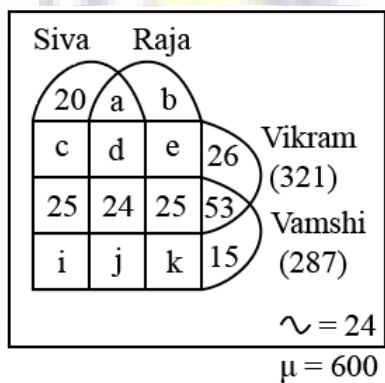
$$f + 24 + g + h = 127 \text{ and } h = 53$$

$$f + g + 77 = 127$$

$$f + g = 50 \dots\dots\dots (iii)$$

Solving (ii) and (iii), we get

$$f = 25 \text{ and } g = 25$$





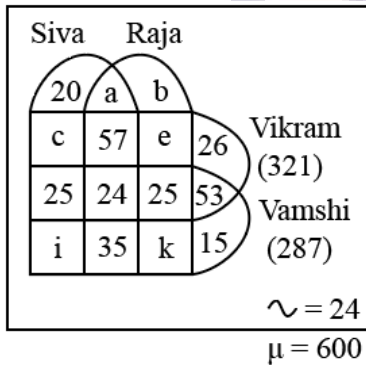
From statement 1, we can say that number of members voted for three candidates and four candidates are 166. We know that 24 members voted for all four directors. Therefore, number of members voted for exactly 3 directors are 142 i.e.

$$d + j + 25 + 25 = 142$$

$$d + j = 92 \dots\dots\dots (iv)$$

Solving (i) and (iv), we get

$$j = 35 \text{ and } d = 57$$



From statement 6, we can say that

$$57 + e + 24 + 25 = c + 57 + 25 + 24 + 9$$

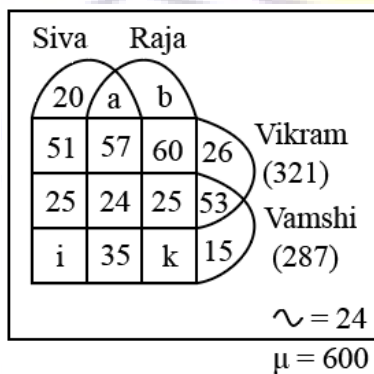
$$e = c + 9 \dots\dots\dots (v)$$

From statement 2, we know that number of votes secured by Vikram are 321 i.e $c + e + 210 = 321$

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Solving (v) and (vi), we get

$$c = 51 \text{ and } e = 60$$



From statement 4 that is number of members voted for Siva and Vamshi are 146, we can write as

$$25 + 24 + 35 + i = 146$$

$$i = 62$$

Given, number of members voted for Siva and Raja are 156 i.e.

$$57 + 24 + 35 + a = 158$$



$a = 42$

we know that total number of voted secured by Vamshi are 287, therefore

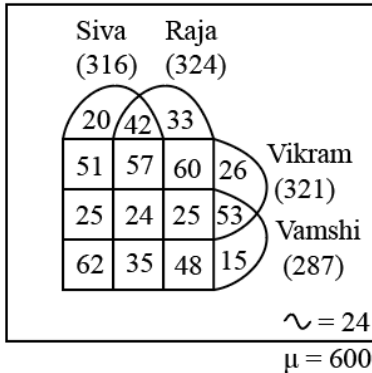
$239 + k = 287$

$k = 48$

It is given that total 600 members participated in voting, i.e.

$b + 567 = 600$

$b = 33$



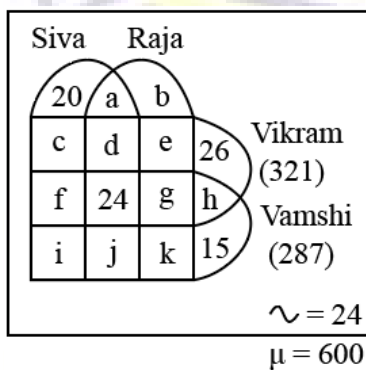
Number of members voted for only Raja are 33.

Therefore, answer is option C.

44. How many members voted for only Vamshi and Raja?

- A. 48
- B. 60
- C. 72
- D. 84

Sol. From statement 5, we can say that number of members voted for all four candidates are 24. From statement 1, we can say that number of members voted for none of them is also equal to 24.





From statement 3, we can write as

$$24 + j + 22 = 24 + d$$

$$j + 22 = d \dots\dots\dots (i) \text{ and}$$

$$f = g \dots\dots\dots (ii)$$

From statement 7, we can write as

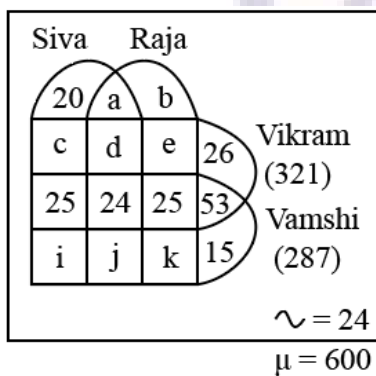
$$f + 24 + g + h = 127 \text{ and } h = 53$$

$$f + g + 77 = 127$$

$$f + g = 50 \dots\dots\dots (iii)$$

Solving (ii) and (iii), we get

$$f = 25 \text{ and } g = 25$$



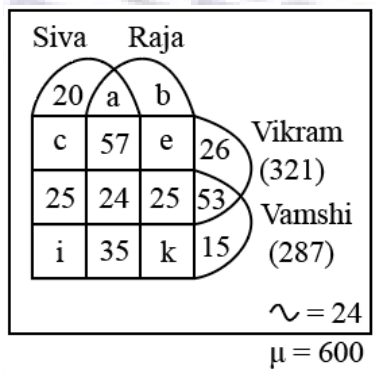
From statement 1, we can say that number of members voted for three candidates and four candidates are 166. We know that 24 members voted for all four directors. Therefore, number of members voted for exactly 3 directors are 142 i.e.

$$d + j + 25 + 25 = 142$$

$$d + j = 92 \dots\dots\dots (iv)$$

Solving (i) and (iv), we get

$$j = 35 \text{ and } d = 57$$



From statement 6, we can say that

$$57 + e + 24 + 25 = c + 57 + 25 + 24 + 9$$

$$e = c + 9 \dots\dots\dots (v)$$



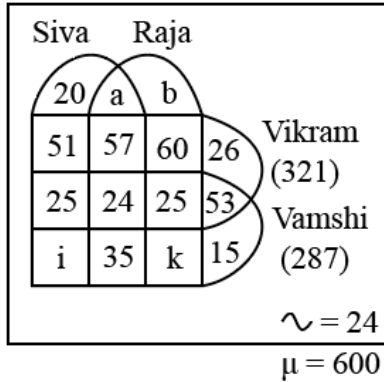
SIVA SIVANI INSTITUTE OF MANAGEMENT

From statement 2, we know that number of votes secured by Vikram are 321 i.e $c + e + 210 = 321$

$$c + e = 111 \dots\dots\dots (vi)$$

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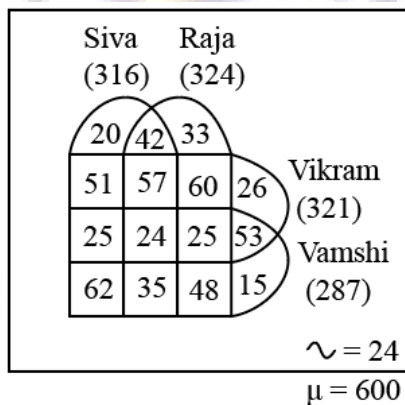
$$239 + k = 287$$

$$k = 48$$

It is given that total 600 members participated in voting, i.e.

$$b + 567 = 600$$

$$b = 33$$



Number of members voted for only Vamshi and Raja are 48.

Therefore, answer is option A.



45. If $[\log_{10} 2 + \log_{10} 2^2 + \dots + \log_{10} 2^n] = 1$, how many values can n take?

[n] is the greatest integer function of n.

Sol. $[\log_{10} 2 + \log_{10} 2^2 + \dots + \log_{10} 2^n] = 1$

$[\log_{10} 2 + 2\log_{10} 2 + \dots + n \log_{10} 2] = 1$

$[(1 + 2 + \dots + n) \log_{10} 2] = 1$

$[\log_{10} 2^{(1+2+\dots+n)}] = 1$

$10 \leq 2^{(1+2+\dots+n)} < 100$

If n = 2, $2^{1+2} = 2^3 = 8 < 10$

If n = 3, $2^{1+2+3} = 2^6 = 64$

If n = 4, $2^{1+2+3+4} = 2^{10} = 1024 > 100$

Hence, for only one value of n, is the equation possible.

46. If $f(x) = x^2 - 4x + 4$, find out the sum of roots of the equation $f(f(x)) = 9$.

A. $2\sqrt{5}$

B. 0

C. 4

D. $4\sqrt{3}$

Sol. $f(f(x)) = 9$

Let $f(y) = 9$

$y^2 - 4y + 4 = 9 \rightarrow y^2 - 4y - 5 = 0 \rightarrow (y - 5)(y + 1) = 0$

$y = 5$ or $y = -1$

Hence, $f(x) = 5$ or $f(x) = -1$

$x^2 - 4x + 4 = 5$ or $x^2 - 4x + 4 = -1$

$x^2 - 4x - 1 = 0$ or $x^2 - 4x + 5 = 0$

$x^2 - 4x + 5 = 0$ has no roots.

The other equation has the roots

$2 \pm \sqrt{5}$

Sum of roots = 4.



47. A tank is connected to some inlet pipes(each of the same work capacity) and some outlet pipes(each of the same work capacity). If 10 inlet pipes are opened at 10:00 AM, at a time when the tank was empty, they could fill the tank by 5:00 PM on the same day. However, if one outlet pipe was also opened at 11:00 AM, the tank was filled at 7:00 PM. If 125 inlet pipes are opened, what should be the number of outlet pipes that are opened to keep the level of water in the tank constant?

- A. 80
- B. 120
- C. 100
- D. 50

Sol. 10 inlet pipes take 7 hours to fill the tank. Now, let each pipe do 1 unit of work(or fill one unit of the tank) in one hour. Then the total capacity = 70 units.

Now, if they are on till 7:00 PM, then they do 90 units

$$90 - 8x = 70$$

$$8x = 20$$

$$x = 2.5$$

Here x is the capacity of an outlet pipe.

Hence, the capacity of an outlet pipe is 2.5 times the capacity of an inlet pipe. Hence, for 125 inlet pipes, we need $125/2.5 = 50$ outlet pipes.

48. In a race of 300 meters, A has to give B a headstart of 50 meters to finish the race simultaneously, and B has to give C a headstart of 100 metres to finish the race simultaneously. In a track that is 10% shorter than the original track, how much headstart should A give to C to end the race simultaneously?

- A. 100 metres
- B. 120 metres
- C. 140 metres
- D. 150 metres

Sol. The ratio of the speed of A to the speed of B = $\frac{300}{300-50} = \frac{300}{250} = \frac{6}{5}$

The ratio of the speed of B to the speed of C = $\frac{300}{300-100} = \frac{300}{200} = \frac{3}{2}$

Hence the speed of A to the speed of C is in the ratio = $\frac{6 \cdot 3}{2 \cdot 5} = \frac{18}{10} = \frac{9}{5}$

Hence, the new track is of length $300 \times 0.9 = 270$ and by the time A covers the entire track, C can cover only 150 metres. Hence C definitely needs a headstart of 120 metres.



49. If I_n represents the sum of all internal angles of a convex polygon with n sides and E_n represents the sum of all the external angles of a polygon with n sides, and $I_n - E_n = 900^\circ$, find out the number of diagonals of the polygon.

- A. 27
- B. 36
- C. 30
- D. 45

Sol. $I_n = (n - 2) 180$

$E_n = 360$

$I_n - E_n = (n - 2) 180 - 360 = (n - 4) 180^\circ$

$(n - 4) 180^\circ = 900^\circ$

$n - 4 = 5$

$n = 9$

Number of diagonals of a convex polygon of 9 sides = ${}^9C_2 - 9 = \frac{9 \times 8}{2} - 9 = 27$

50. Find the ratio of the time(in year) in which a sum of money triples itself at a certain rate of simple interest and the time(in year) in which the same money becomes five times at one-third the rate of simple interest (in the first case).

- A. 6:1
- B. 1:6
- C. 12:1
- D. 1:12

Sol. Case 1: $SI = PTR$

$2P = PTR$

$2 = TR$

Case 2: $SI = PTR$

$4P = PtR/3$

$12P = PtR$

$12 = tR$

$T:t = 1:6$

51. What is the probability that if we pick a number from the list of all 3 digit numbers, the number will have at least one prime digit?

- A. 4/5
- B. 173/900
- C. 727/900
- D. 1/3



Sol. Total number of 3-digit numbers = $9 \times 10 \times 10 = 900$

We will calculate the number of numbers with no prime in it.

Digits allowed $\rightarrow 0, 1, 4, 6, 8, 9$

The hundreds digit can take values 1, 4, 6, 8, 9. [5 values]

The ten's place can take values 0, 1, 4, 6, 8, 9. [6 values]

The one's place can take values 0, 1, 4, 6, 8, 9. [6 values]

Total possible numbers = $36 \times 5 = 180$.

Hence, numbers where prime digits appear once at least = $900 - 180 = 720$

Probability = $720/900 = 4/5$

52. In an examination, a professor scores students in a very strict way. For every right response, the student gets +1. The wrong responses are penalized in the following way. The total number of wrong responses are counted and the square of this quantity is deducted from the total marks scored from the right responses. The final score is this deducted score. Each question needs to be answered. If a student ends up scoring zero, what can be the total number of questions in the paper?

- A. 121
- B. 64
- C. 120
- D. 132

Sol. Let the number of questions be n , and the count of incorrect answers be m .

Hence, the number of correct answers = $n - m$

$$n - m - m^2 = 0$$

$$n = m + m^2$$

$$n = m(m + 1)$$

Hence, n has to be the product of two consecutive natural numbers.

Option D is the correct choice among the given four alternatives.

53. The average age of a family is 25 years. If two people of an average age of 30 replace the youngest member of the family, the average age of the family is increased by 4. If the eldest member, whose age is 45 years, of the family, leaves the group, the average age decreases by 4. Find the average age of the current family when the youngest member was born.

- A. 22 years
- B. 18 years
- C. 21 years
- D. 16 years



Sol. Initial average = 25 years

Elder member's age = 45 years

Since average age decreases by 4,

The new average = 21 years

Let the total members in the family is x .

$$\text{New Average} = \frac{25x-45}{(x-1)}$$

$$21 = \frac{(25x-45)}{(x-1)}$$

$$25x-45=21x-21$$

$$x = 6$$

Let the age of youngest member is y .

Since average age increases by 4,

Thus, new average = 29 years

Total family members = 7

$$\text{New average} = \frac{(25 \times 6 + 60 - y)}{7}$$

$$29 = \frac{(150 + 60 - y)}{7}$$

$$203 = 210 - y$$

$$y = 7 \text{ years.}$$

Thus, y was born 7 years before.

Since average age have to be found when y was born,

Total family members = 6

$$\text{Average age} = \frac{(150 - 7 \times 6)}{6}$$

$$= (25-7)$$

$$= 18 \text{ years.}$$

54. In a paper, there are a hundred questions of one marks each. A correct answer fetches +1 and an incorrect or unattempted answer fetches 0. Raja attempts 30% of the paper correctly and ends up with a score 25% less than the passing score. In an advanced version of the examination, the passing score drops by 50% but you are penalized -0.5 for every wrong answer. Raja attempts the same number of questions correctly. How many questions did he get wrong to just pass the paper?

- A. 30
- B. 50
- C. 40
- D. 20

Sol. Raja gets +30.

Now, $30 = 75\%$ of passing score $= \frac{3}{4}$ passing score.

Passing score = 40.

New passing score = 20

Raja gets +30 from positives.

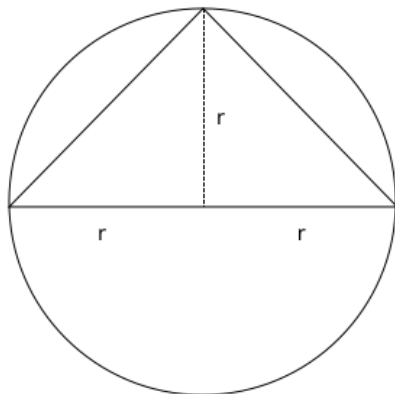
He must get -10 from negative answers.

Hence, he scored -0.5 in $10/0.5 = 20$ questions.

55. If the area of the largest (in terms of area) right-angled triangle inscribed in a circle C decreases by 51% when the radius of the circle is decreased by p%, what is the value of p? Round off to the nearest integer.

- A. 30
- B. 25
- C. 49
- D. 35

Sol. The following figure shows a right-angled triangle inscribed in a circle.



Let the radius of the circle be r . Hence, the largest right-angled triangle will have the hypotenuse as the diameter and the remaining two sides equal. Hence, it is isosceles as well.

$$\text{Area} = \frac{1}{2} (2r)(r) = r^2$$

Now let the new radius be r_1

Hence, the new area $= r_1^2$

$$\text{Since } r_1^2 = \frac{100-51}{100} r^2$$

$$r_1^2 = \frac{49}{100} r^2$$

$$r_1 = \frac{7}{10} r$$

$$\frac{r-r_1}{r} = \frac{r-\frac{7}{10}r}{r} = \frac{3}{10}$$

Hence, there is a 30% reduction in r 's value.

56. A point P is given on the x-y plane such that P has the coordinates (1,2). P' is the reflection of P across $x = y$ and P'' is the reflection of P across $x + y = 0$. Find out the shortest distance between P and the line segment P'P''.

- A. $\frac{4}{\sqrt{5}}$
- B. $\frac{3}{\sqrt{5}}$
- C. $\frac{9}{2\sqrt{5}}$
- D. $\frac{7}{2\sqrt{5}}$

Sol. P' is obtained by interchanging the coordinates of P.

$$P' = (2,1)$$

P'' is obtained by adding a negative coefficient of 1 to the coordinates of P.'

$$P'' = (-2,-1)$$

Line joining P' and P'' will have a slope of $\frac{1-(-1)}{2-(-2)} = \frac{2}{4} = \frac{1}{2}$

The equation of the line is:

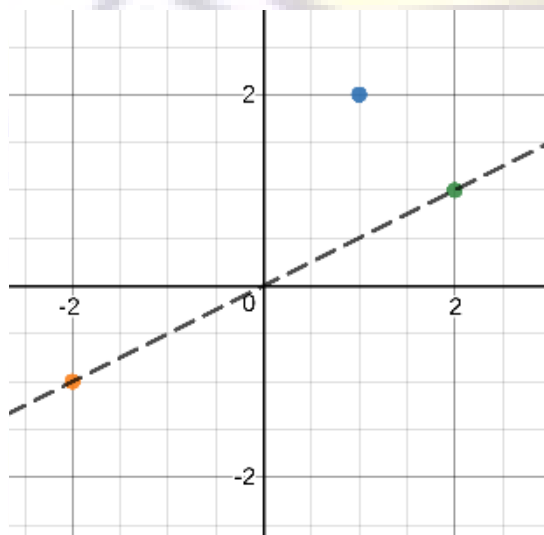
$$y - y_1 = \frac{1}{2}(x - x_1)$$

Since it passes through 2,1,

$$2(y - 1) = (x - 2)$$

$$2y = x$$

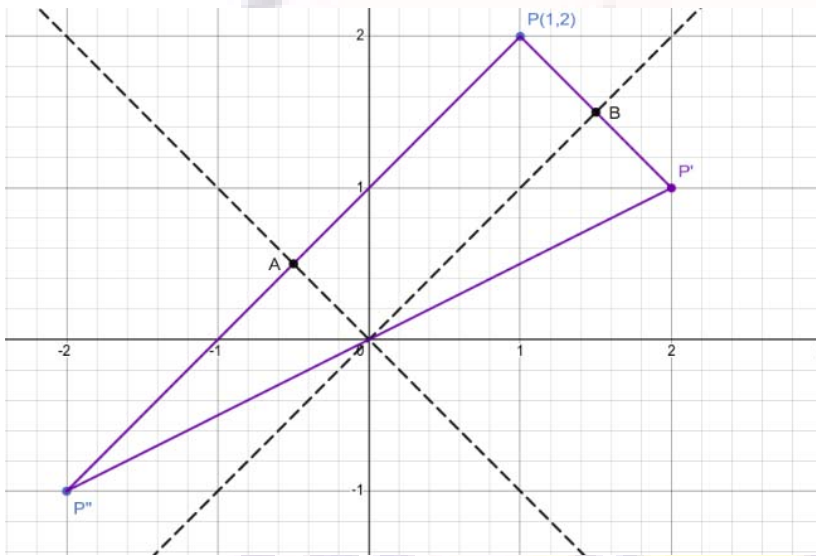
$$x - 2y = 0.0$$



$$\text{Distance} = \frac{|1-2 \cdot 2|}{\sqrt{1^2+2^2}} = \frac{3}{\sqrt{5}}$$

Alternate Explanation:

Since point P' and P'' are the reflections of point P along the lines $x = y$ and $x + y = 0$ respectively, a rough graph can be plotted as follows:



Now, point A is the intersection of the line segment joining PP'' with the line $x + y = 0$ and B is the intersection of PP' with $x = y$

As PA is perpendicular to the line $y + x = 0$ (since P'' is the reflection of P along $y + x = 0$),

And perpendicular distance from a point to line $= \frac{|ax_1+by_1+c|}{\sqrt{(a^2+b^2)}}$

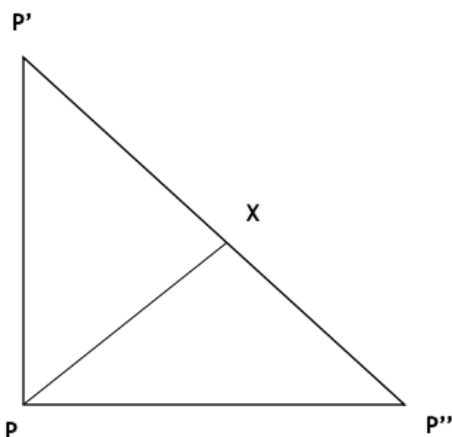
$$PA = \frac{|2+1|}{\sqrt{(2)}} = \frac{3}{\sqrt{2}}$$

Similarly $PB = \frac{1}{\sqrt{2}}$

Now, as P' and P'' are the reflection of P, $2PA = PP''$ and $PP' = 2PB$

$$PP' = \sqrt{2} \text{ and } PP'' = 3\sqrt{2}$$

Now, consider the right triangle PP'P'',



$$P'P'' = \sqrt{(P'P)^2 + (P''P)^2} = \sqrt{20} = 2\sqrt{5}$$



Here PX is the perpendicular to side P'P''.

Since Δ P'PP'' is similar to Δ P'XP(right triangles with a same angle),

$$\frac{XP}{P'P} = \frac{PP''}{P'P''}$$

$$XP = \frac{3\sqrt{2} \times \sqrt{2}}{2\sqrt{5}}$$

$$XP = \frac{3}{\sqrt{5}}$$

Since perpendicular distance from a point to a line is the shortest distance,
The correct option is B.

57. A sphere of radius R is molten to form n spheres of radius r each such that no amount of metal is left over. It is known that

$$4 < \frac{R}{r} < 5$$

How many values can n take?

Sol. Let the total volume of the larger cube be V.

$$V = \frac{4}{3}\pi R^3$$

$$\text{Number of smaller spheres} = \frac{V}{\frac{4}{3}\pi r^3} = \frac{\frac{4}{3}\pi R^3}{\frac{4}{3}\pi r^3} = \frac{R^3}{r^3}$$

$$\text{Now, } n = \frac{R^3}{r^3} = \left(\frac{R}{r}\right)^3$$

$$4 < \frac{R}{r} < 5$$

$$4^3 < \left(\frac{R}{r}\right)^3 < 5^3$$

$$64 < \left(\frac{R}{r}\right)^3 < 125$$

n can take 60 different values.

58. A boat takes 20 minutes to travel a certain distance downstream and takes 40 minutes to travel the same distance upstream. If the speed of the boat is doubled and the speed of the stream is reduced by 50%, in how much time would the boat cover the same distance upstream?

- A. $15 \frac{6}{11}$ minutes
- B. $14 \frac{6}{11}$ minutes
- C. $13 \frac{6}{11}$ minutes
- D. $12 \frac{6}{11}$ minutes



Sol. Let the speed of the boat be x and the speed of the stream be y .

Hence, speed upstream = $x - y$ and speed downstream = $x + y$.

Since the time taken to travel downstream is $1/2$ times the time taken to travel upstream, the speed downstream is 2 times that upstream.

Hence, $x + y = 2(x - y)$

$x = 3y$.

Let us consider all speeds in terms of y .

Downstream speed = $x + y = 4y$

Upstream speed = $x - y = 3y - y = 2y$

If with a speed of $4y$, it takes 20 minutes, then with a speed of y , it will take 80 minutes.

Now, new upstream speed = $2x - y/2 = 5.5y$

New time taken = $80/5.5 = 16/1.1 = 160/11 = 14\frac{6}{11}$ minutes

59. Find out the number of integral values x , where $|x| < 101$ that satisfy the following

$$\frac{x^2+2x}{(x-3)^2(x+5)^3(x-7)^4} < 0$$

Sol.
$$\frac{x^2+2x}{(x-3)^2(x+5)^3(x-7)^4} < 0$$

We first need to break the numerator to express it in forms of $(x-a)(x-b)$

$$\frac{x(x+2)}{(x-3)^2(x+5)^3(x-7)^4} < 0$$

Now, we need to find out the roots (boundary points).

The roots are 0, -2, -5, +3, and +7.

Also, now we need to divide the number line into all the regions considering the above mentioned points as boundary points.

$x > 7$ - Check for sign in this region. It comes as positive.

$3 < x < 7$ - Since the common point between and the previous region is 7, and the power of $(x-7)$ is even, the sign is positive.

$0 < x < 3$ - Sign is positive

$-2 < x < 0$ - Here the sign is negative

$-5 < x < -2$ - The sign is positive

$x < -5$ - The sign is negative

Hence, we now need to find out the negative points.

-1, -6, -7,

$100 - 4 = 96$ points,.



60. A books dealer buys a certain number of QA books and a certain number of DILR books. The number of DILR books bought exceeds the number of QA books bought by 50. Also, the price of a QA book and the price of a DILR book are in the ratio of 2:3. If the dealer had paid a total of Rs 13200 for the QA books and Rs 36300 for the DILR books, what is the difference (in rupees) between the cost of a QA and a DILR book?

Sol. Let the number of QA books that he bought be x . Hence, the number of DILR books bought = $x + 50$.

Now, let the price of the QA and the DILR books individually be $2y$ and $3y$.

Hence, $2xy = 13200$

$xy = 6600$

$3(x+50)y = 36300$

$x+50 = 12100/y$

$x + 50 = 12100/(6600/x)$

$x + 50 = 11/6 x$

$5/6 x = 50$

$x = 60$

Hence $y = 110$.

The difference = $y = 110$.

61. 210 men working at 90% efficiency are equivalent to 2 machines working at 75% efficiency. If 3 machines and 122 men can finish a piece of work in 30 days, in how many days can 10 men finish the piece of work working at 125% efficiency?

Sol. $210 \times 9/10$ men = $2 \times 3/4$ machines

189 men = 1.5 machines

126 men = 1 machine

Hence, $(3 \text{ machines} + 122 \text{ men}) \times 30 = (3 \times 126 + 122) = 15000$ man hours.

Hence 10 men at 125% efficiency is equal to 12.5 men.

$15000/12.5 = 1200$ days.

62. There are two varieties of mangoes A and B, costing Rs 120/kg and Rs 96/kg respectively, in the ratio of 2:5. A shopkeeper marks up the price of one of the varieties by 50% and then offers a 25% discount, and for the other one, he marks up the price by 66.67% and then offers a discount of 20%. If it is known that he sells all the mangoes, what could have been his maximum profit percentage[round up to the next largest integer]?

A. 26

B. 30

C. 27

D. 29

Sol. Let there be 2 kg of Type A mangoes and 5 kg of Type B mangoes.

Now, the total cost price is fixed.

Total cost price = $120 \times 2 + 96 \times 5 = 240 + 480 = 720$.

For one variety: $SP = CP \times \frac{3}{2} \times \frac{3}{4} = \frac{9}{8} CP$



For the other variety: $SP = CP \times \frac{5}{3} \times \frac{4}{5} = \frac{4}{3} CP$

Case 1: $SP = \frac{9}{8} \times 240 + \frac{4}{3} \times 480 = 270 + 640 = 910$

Case 2: $SP = \frac{4}{3} \times 240 + \frac{9}{8} \times 480 = 320 + 540 = 860$

We will consider CASE 1 because the SP is more.

Profit = 190

Profit % = $\frac{190}{720} \times 100 = 26.388 \% = 27 \%$

63. If n^2 has 105 factors, what is the minimum possible number of factors of n ?

Sol. If we consider $n^2 = a^{104}$,

$n = a^{52}$

n has 53 factors

$105 = 3 \times 5 \times 7$

n^2 is in the form of $a^2b^4c^6$

$n = ab^2c^3$

n has $2 \times 3 \times 4 = 24$ factors

$105 = 15 \times 7$

n^2 is in the form of $a^{14}b^6$

$n = a^7b^3$

n has $8 \times 4 = 32$ factors

$105 = 21 \times 5$

n^2 is in the form of $a^{20}b^4$

$n = a^{10}b^2$

n has $11 \times 3 = 33$ factors

$105 = 35 \times 3$

n^2 is in the form of $a^{34}b^2$

$n = a^{17}b$

n has $18 \times 2 = 36$ factors

Hence, minimum number of factors = 24.

64. There are two alcohol solutions A and B such that A is a 43% alcohol solution and B has 53 parts alcohol for every 47 parts water. If we mix the two solutions to get another alcohol solution, that has at least 50% alcohol, which of the following can be the ratios in which the A and B can be mixed?

A. 7:3

B. 3:4

C. 1:3

D. More than one



Sol. By the concept of alligations, we can say that to get a 50% solution, we need A and B in the ratio of

$$(53-50):(50-43) = 3:7$$

Now if we increase the proportion of A, then it will bring the final concentration to less than 50%, but if we increase B, we get a value more than the required fifty percentage alcohol solution; hence, we can have a ratio less than 3:7 but not more than it. Hence, option c is right.

Alternate Explanation:

The ratio of alcohol percentage and water percentage in A and B are 43:53 and 57:47, respectively.

Now let the solutions be mixed in the ratio X:Y.

Since alcohol content should be more than 50%, the alcohol content will be more than the water content.

$$\text{Or } 43X + 53Y > 57X + 47Y$$

$$\text{Or } \frac{X}{Y} < \frac{3}{7}$$

$$\text{Or } \frac{X}{Y} < 0.428$$

Only option C has a ratio of X and Y less than 0.42.

Thus, the correct option is C.

65. A function $f(x) = \frac{x^2-1}{x^2} \times f(x-1)$ for $x > 1$, and another function $g(x) = x - 1$. If $f(1) = 1$, find the value of $g(f(3)) \times g(f(7)) \times 49$?

Sol. $f(2) = \frac{4-1}{4} \times 1 = \frac{3}{4}$

$$f(3) = \frac{9-1}{9} \times \frac{3}{4} = \frac{2}{3}$$

Similarly,

$$f(4) = \frac{5}{8}, f(5) = \frac{3}{5}, f(6) = \frac{7}{12} \text{ and } f(7) = \frac{4}{7}$$

$$g(f(3)) = g\left(\frac{2}{3}\right) = \frac{2}{3} - 1 = \frac{-1}{3}$$

$$g(f(7)) = g\left(\frac{4}{7}\right) = \frac{4}{7} - 1 = \frac{-3}{7}$$

$$\text{Thus, } g(f(3)) \times g(f(7)) \times 49 = \left(-\frac{1}{3}\right) \left(-\frac{3}{7}\right) (49) = 7$$

66. If an unbiased dice is rolled thrice and a, b, and c come up in the first, second and third roll, what is the probability that $a \geq b \geq c$?

- A. 7/27
- B. 8/27
- C. 1/3
- D. 1/6



Sol. The total number of outcomes is $6 * 6 * 6 = 216$.

Case 1: 6 comes in the first throw.

Any number from 1 to 6 can come in the second throw.

When 6 comes in the second throw, any number from 1 to 6 can come in the third throw.

Count = 6

When 5 comes in the second throw, any number from 1 to 5 can come in the third throw.

Count = 5

.....

When 1 comes in the second throw, only 1 can come in the third throw.

Total count = $1 + 2 + 3 + 4 + 5 + 6 = 21$.

Case 2: 5 comes in the first throw.

Any number from 1 to 5 can come up in the second throw.

When 5 comes in the second throw, any number from 1 to 5 can come in the third throw.

Count = 5

When 4 comes in the second throw, any number from 1 to 4 can come in the third throw.

Count = 4

Total count = $1 + 2 + 3 + 4 + 5 = 15$

.....

Total number of possible cases = $21 + 15 + 10 + 6 + 3 + 1 = 56$

Probability = $\frac{56}{216} = \frac{7}{27}$

Alternate explanation:

It is mentioned that a, b, and c come up in the first, second and third roll. There are four cases possible

Case 1: $a > b > c$

In this case, we need to select three numbers and can arrange them in one way. Therefore, number of ways = 6C_3

Case 2: $a = b > c$

In this case, we need to select two numbers and can arrange them in one way. Therefore, number of ways = 6C_2

Case 3: $a > b = c$

In this case, we need to select two numbers and can arrange them in one way. Therefore, number of ways = ${}^6C_2 = 15$

Case 4: $a = b = c$

In this case, we need to select one number. Therefore, number of ways = ${}^6C_1 = 6$

Probability = $\frac{20+15+15+6}{216} = \frac{56}{216} = \frac{7}{27}$