SNAP 2019 Question Paper with Solutions

Time Allowed :2 Hours	**Maximum Marks :**150	**Total questions :**110

General Instructions

1. No clarification on the Question paper can be sought. Answer the questions as they are.
2. There are 110 multiple choice objective type questions of one mark each which has to be answered in the OMR Sheet. **Total Marks are 150**.
3. Candidates have to indicate the most appropriate answer by darkening one of the four responses provided, with **BLACK/BLUE BALL POINT PEN** in the OMR Answer Sheet.
4. There will be **Negative Marking** for multiple choice objective type questions. 0.25 marks will be deducted for every wrong answer.
5. The candidate shall not write anything on the OMR Answer Sheet other than the details required and in the spaces provided for.
6. After the examination is over, the candidate can carry the test booklet along with candidate's copy of the OMR after handing over the original OMR to the invigilator.
7. The use of any unfair means by any candidate will result in the cancellation of his/her candidature.
8. Impersonation is an offence and the candidate, apart from disqualification, may have to face criminal prosecution.
9. Electronic gadgets like mobile phones, pagers and calculators etc. are strictly not permitted inside the Test Centre/Hall.
10. The candidates shall not leave the hall before the end of the test.

GENERAL ENGLISH: READING COMPREHENSION, VERBAL REASONING, VERBAL ABILITY

DIRECTIONS (1-5): Read the following passage and answer the questions as directed.

Two years after the World Health Organization labeled air pollution a global "public health emergency", and the House of Commons environment committee used the same phrase to describe the situation in the UK, new evidence shows that breathing unsafe air causes a loss of intelligence, particularly in the over-64s. The research, carried out in China, showed that test scores declined when people breathed toxins including nitrogen dioxide and particulate, with language ability more affected than maths. This news, though alarming, is unlikely to change anything straightaway. China has been engaged in a "war against pollution" for five years, while governments and policymakers around the world already have ample evidence that pollution is extremely harmful. Top of the list of dangers is the way it worsens heart and lung diseases including asthma and emphysema, while one study last year suggested a link to dementia.

The problem is both global and national: urbanisation and increasing car use mean that pollution is on the rise internationally, while the UK government is under huge pressure to clean up air that has broken EU legal limits for the past eight years. Western capitals do not feature in the WHO's lists of the planet's most polluted cities, and levels of most pollutants in the UK have fallen (though not ammonia, a byproduct of farming). But increased scientific understanding of the damage to health caused by gases such as nitrogen oxides makes inexcusable the complacency of which we have seen so much, both under the current Conservative government and its coalition predecessor.

London mayor Sadiq Khan's "ultra low-emission zone", which comes into force next year and will charge the most polluting vehicles to enter central London, looks set to be a game-changer. Government analysis shows clean air zones to be by far the most effective measure in reducing nitrogen oxides. But critics think it is still too limited, while leaders of other cities are calling for government funding to implement their own clean air zones, as well as a new clean air act to provide a national framework. Campaigners struggle to understand why the public outcry is not loud or angry enough to force the government to act,

when air pollution is thought to be a factor in shortening the lives of 40,000 people in the UK every year. So do all those who worry about air pollution, among them parents anxious about the impact on growing lungs. The usual answer is cars, and the fact that even if people would like their cities to be cleaner, they don't want restrictions on their freedom to drive.

1. As per the passage, which of the following is the result of breathing unsafe air?

(a) People, particularly below 64 years of age can lose their intelligence.
(b) People, irrespective of age can lose their intelligence and sight.
(c) People, particularly above 64 years of age can lose their intelligence.
(d) People tend to lose their power to think and speak.

Correct Answer: (c) People, particularly above 64 years of age can lose their intelligence.

Solution:
The passage mentions that older people are more likely to lose their intelligence due to breathing unsafe air. The key factor here is age, particularly above 64 years, which is the age group most vulnerable to cognitive decline due to pollution.
- **Option (a)** talks about people below 64 years of age, but the passage does not focus on this age group.
- **Option (b)** suggests people of all ages, but the passage specifically mentions older individuals.
- **Option (d)** refers to the loss of the ability to think and speak, which is not mentioned in the passage as a direct consequence of unsafe air.
Thus, the correct answer is **(c)**.

Quick Tip

Pay attention to the specific age groups or conditions mentioned in the passage when selecting the correct answer.

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2. Which of the following statements is/are true in the context of the passage above?

(a) Urbanisation and increasing car use mean that pollution is on the rise internationally.

(b) The research, carried out in China, showed that test scores declined when people breathed toxins including nitrogen dioxide and particulate, with language ability more affected than maths.

(c) Both (I) and (II)

(d) None of these

Correct Answer: (c) Both (I) and (II)

Solution:

Both statements (I) and (II) align with the information provided in the passage. Statement (I) correctly connects urbanization and car usage to increasing pollution levels, while Statement (II) discusses the research conducted in China, showing the impact of pollution on test scores and the greater effect on language skills.

- **Option (a)** is correct, as urbanization and increasing car use are indeed linked to rising pollution levels.
- **Option (b)** correctly describes the research results on the effects of pollutants.
- **Option (d)** is incorrect because both statements are supported by the passage.

Thus, the correct answer is **(c)**.

Quick Tip

Look for statements that directly connect to the facts and findings presented in the passage.

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3. Which of the following can replace the word given in bold in the passage?

(a) Insufficient

(b) Pathetic

(c) Meagre

(d) Plentiful

Correct Answer: (d) Plentiful

Solution:

The word 'plentiful' fits the context, indicating a large amount of pollution in the air, as described in the passage. Here's why the other options are incorrect:
- **Option (a) 'Insufficient'** suggests a lack of something, which contradicts the passage's idea of abundant pollution.
- **Option (b) 'Pathetic'** is a negative word, which doesn't fit the neutral descriptive tone used in the passage.
- **Option (c) 'Meagre'** implies something small or insufficient, which is opposite to the idea of large-scale pollution in the passage.
Thus, **(d)** 'Plentiful' is the correct choice.

Quick Tip

Focus on the context when choosing a replacement word, especially for descriptive terms.

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4. In the passage above, a line is given in bold. Which of the following best describes the meaning of the line given in bold?

(a) Even though people would like their cities to be cleaner, they also want restrictions on their freedom to drive.
(b) People want their cities to be cleaner and so they do not want to drive cars without restrictions.
(c) People would like their cities to be cleaner but they don't want restrictions on their freedom.
(d) Despite the fact that people want their cities to be cleaner, they do not want to compromise on their freedom to drive.

Correct Answer: (d) Despite the fact that people want their cities to be cleaner, they do not want to compromise on their freedom to drive.

Solution:
The bolded line illustrates the conflict between people's desire for cleaner cities and their reluctance to give up personal freedoms, particularly in terms of driving. Option (d) best

captures this conflict, stating that while people want cleaner cities, they do not want to give up the freedom to drive.

- **Option (a)** suggests a balance between people's desire for clean cities and restrictions, but the passage emphasizes the reluctance to compromise on freedom.

- **Option (b)** oversimplifies the issue by stating that people don't want to drive cars without restrictions, without addressing the broader issue of freedom.

- **Option (c)** misses the key point that people do not want to give up their driving freedom, which is central to the passage.

Thus, the correct answer is **(d)**.

Quick Tip

Focus on the nuanced relationships presented in the passage, especially when dealing with conflicting desires or priorities.

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5. Which of the following words can fill in the blank to make it meaningful?

(a) Bold

(b) Timid

(c) Forthcoming

(d) Brazen

Correct Answer: (b) Timid

Solution:

The word 'timid' fits the blank, implying a lack of boldness or confidence. This fits the context of someone who is shy or reluctant.

- **Option (a) 'Bold'** would imply confidence, which is the opposite of what the sentence is suggesting.

- **Option (c) 'Forthcoming'** suggests someone who is open or willing to speak, but it doesn't fit the context of the sentence.

- **Option (d) 'Brazen'** suggests someone who is shamelessly bold, which is contrary to the meaning of the sentence.

Thus, **(b) Timid** is the most fitting word.

Quick Tip

Look at the surrounding context to understand the tone and meaning of the sentence when selecting a word.

DIRECTIONS (6-8): Read the following passage and answer the questions as directed.

Paragraph 1 — One of the easiest ways to establish a savings habit is to participate in your employer's 401(k) plan. Funds are withheld from each paycheck and deposited into your account. If your employer matches part of your contribution — and many do! — you will accumulate yet more. A second way to consistently save is with an automatic savings transfer program with your financial institution. You decide how much and when you want funds transferred from your checking account into a savings account. You can also use a payroll deduction plan from your employer and get the same results.

Paragraph 2 — Along with how much and how often you save, what you earn on your funds will determine how fast your money grows. You cannot control what happens with interest rates or the stock market, but you can consider different types of savings vehicles that provide different returns. The simplest savings vehicle to consider is buying certificates of deposit (CDs) instead of leaving funds in a savings account. CDs usually offer higher interest rates, but they are time deposits and have penalties for early withdrawal. If you can accept not having immediate access to your funds, CDs can be an attractive savings vehicle.

6. Which of the following can be inferred as the theme of the passage?

(a) Certificate of deposits is the best way to establish savings habit.
(b) Establishing a consistent saving habit and also smart saving with CDs.
(c) Employer's 401(k) plan provides a convenient way for consistent and smart savings.
(d) Your savings decide how well you flourish and grow.

Correct Answer: (b) Establishing a consistent saving habit and also smart saving with CDs.

Solution:

The passage emphasizes the importance of setting a regular savings habit and also using smart savings tools like CDs (Certificates of Deposit).

- **Option (a)** speaks about certificates of deposits but does not fully encompass the main theme.

- **Option (c)** focuses on employer savings plans, which is only one aspect of the overall theme.

- **Option (d)** refers more to the benefits of saving but misses the specific idea of consistent savings.

Thus, the correct theme is about establishing a savings habit.

Quick Tip

Look for the option that encapsulates the broader message of the passage, rather than focusing on specific tools.

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7. What is the tone of writing in the passage?

(a) Satirical

(b) Critical

(c) Didactic

(d) Sarcastic

Correct Answer: (c) Didactic

Solution:

The passage conveys information in a direct, instructional manner, which aligns with a didactic tone. The passage is intended to educate the reader about smart saving habits.

- **Option (a)** 'Satirical' implies mockery, which is not present in the passage.

- **Option (b)** 'Critical' implies negative judgment, but the tone here is informative and neutral.

- **Option (d)** 'Sarcastic' is incorrect as the passage lacks irony or mockery.

Thus, the tone is didactic, as it aims to teach the reader.

Quick Tip

Pay attention to the purpose of the passage—informing, teaching, or criticizing—to determine the tone.

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8. Which of the following words can fill in the blank to make it meaningful?

(a) gifts

(b) lucrative

(c) casualties

(d) penalties

Correct Answer: (d) penalties

Solution:

The word 'penalties' makes the sentence meaningful, suggesting that the consequences of certain actions are negative. This fits the context of actions that could result in penalties.

- **Option (a) 'gifts'** would not make sense in the context of this sentence.

- **Option (b) 'lucrative'** would suggest a financial gain, but does not align with the intended meaning.

- **Option (c) 'casualties'** implies harm or death, which doesn't suit the context either.

Thus, 'penalties' is the most fitting word.

Quick Tip

Consider the broader context of the sentence to determine which word fits logically.

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9. The sentences given in a question, which properly sequenced, form a coherent paragraph. Each sentence is labeled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.

(a) CDAB

(b) ABCD

(c) BCDA

(d) DCBA

Correct Answer: (a) CDAB

Solution:

The correct sequence of sentences is **CDAB**, as it forms a logical progression in the narrative. First, we introduce the man's dream and his ambitions (C), then talk about his career starting to grow (D), followed by the franchisee's role (A), and concluding with his future plans (B).

- **Option (b)** is incorrect as it starts in the wrong order, missing key connections.
- **Option (c)** does not lead to a coherent storyline, as it begins with an irrelevant sentence.
- **Option (d)** is out of order and does not logically progress the narrative.

Thus, the correct order is **CDAB**.

Quick Tip

Pay close attention to the natural flow of ideas or events when selecting the correct sequence.

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10. In the question below, there are two sentences containing underlined homonyms, which may either be mis- spelt or inappropriately used in the context of the sentence. Select the appropriate and from the option given below:

(a) Only sentence I is correct

(b) Both sentence I and II are correct

(c) Both sentence I and II are incorrect

(d) Only sentence II is correct

Correct Answer: (b) Both sentence I and II are correct

Solution:

Both sentences I and II are grammatically correct in this case. In sentence I, ”censor” refers to the person who examines films for inappropriate content, and in sentence II, the usage of

”censor” is still correct. Therefore, both sentences are correctly structured with the intended meaning.

Quick Tip

Ensure that the homonym is correctly applied to its context in the sentence.

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11. In the following question, there are sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that are correct in terms of grammar and usage (including spelling, punctuation and logical consistency). Then, choose the most appropriate option.

(a) I did not know what to make of you.
(b) Because you’d lived in India, I associate you more with my parents than with me.
(c) And yet you were unlikely my cousins in Calcutta, who seem so innocent and obedient when I visited them.
(d) You were not curious about me in the least.

Correct Answer: (d) You were not curious about me in the least.

Solution:
The sentence ”You were not curious about me in the least” is grammatically correct and makes logical sense. Other sentences either have errors in grammar, punctuation, or logical consistency, which is why option (d) is correct.

Quick Tip

Look for errors in sentence structure, punctuation, or logical consistency when identifying the correct option.

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12. Fill in the blanks with the appropriate conjunction. *You must start at once,* $_{you will be late.}$

(a) whereas

(b) otherwise

(c) as long as

(d) but

Correct Answer: (b) otherwise

Solution:

The correct conjunction is ”otherwise,” which fits the context to express a consequence of not starting on time. The other options do not convey the intended meaning.

Quick Tip

Use ”otherwise” to convey consequences of actions or inactions in sentences.

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13. Choose the word closest in meaning to the given word: *Abnegation*

(a) renunciation

(b) Excess

(c) Saction

(d) yielding

Correct Answer: (a) renunciation

Solution:

”Abnegation” refers to self-denial or renunciation, which makes option (a) the correct answer. The other options are unrelated in meaning to ”abnegation.”

Quick Tip

Look for words that indicate self-denial or rejection when defining ”abnegation.”

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14. Choose the word closest in meaning to the given word: *Abjure*

(a) Renounce

(b) Relinquish

(c) Acquire

(d) Remound

Correct Answer: (a) Renounce

Solution:

”Abjure” means to formally reject or renounce, which makes ”renounce” the best choice here. The other words do not fit the meaning of ”abjure.”

Quick Tip

Look for synonyms that denote rejection or abandonment when defining ”abjure.”

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15. Choose the word closest in meaning to the given word: *Petulant*

(a) disagreeable

(b) dyspeptic

(c) ill-humored

(d) amiable

Correct Answer: (c) ill-humored

Solution:

”Petulant” describes someone who is easily irritated or bad-tempered, similar to ”ill-humored.” Other options do not match the meaning of ”petulant.”

Quick Tip

When defining ”petulant,” focus on words that describe irritability or bad temper.

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16. Which of the following words can fill in the blank to make it meaningful?

(a) Bold

(b) Timid

(c) Forthcoming

(d) Brazen

Correct Answer: (b) Timid

Solution:

The word ”timid” suggests a lack of boldness, which fits the context. ”Bold” would imply confidence, which contradicts the sentence’s meaning. The other options also do not fit in this context.

Quick Tip

Use ”timid” to describe someone who lacks confidence or courage.

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17. Find the word that is the odd one out.

(a) Exacerbate

(b) Alleviate

(c) Mitigate

(d) Assuage

Correct Answer: (a) Exacerbate

Solution:

The words ”Alleviate”, ”Mitigate”, and ”Assuage” all refer to reducing or easing something, while ”Exacerbate” refers to making a situation worse. Therefore, ”Exacerbate” is the odd one out.

- **Option (b) Alleviate:** This word means to ease or make a situation less severe, which is opposite to ”Exacerbate”.
- **Option (c) Mitigate:** Similar to ”Alleviate”, ”Mitigate” means to make less severe or harsh.

- **Option (d) Assuage:** It means to soothe or lessen the intensity of something, which is opposite of ”Exacerbate”.

Quick Tip

Focus on the meanings of words that indicate the opposite effects. ”Exacerbate” increases the problem, while the others reduce or soothe.

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18. Change the voice of the given sentence: I didn’t realise that somebody was watching me

(a) I didn’t realise that I was being watched.
(b) I didn’t realise that I was being watching.
(c) I didn’t realised that I was being watched.
(d) I didn’t realise that I was been watched.

Correct Answer: (a) I didn’t realise that I was being watched.

Solution:
The given sentence is in active voice and needs to be converted to passive voice. The subject ”somebody” in the active voice becomes the agent in the passive voice, and ”was watching me” becomes ”was being watched”. Hence, the correct sentence is: ”I didn’t realise that I was being watched.”

- **Option (b) I didn’t realise that I was being watching:** This is incorrect because ”being” should be followed by the past participle ”watched” in passive voice.
- **Option (c) I didn’t realised that I was being watched:** ”Realised” should be in the base form, ”realise”, because of the auxiliary verb ”did”.
- **Option (d) I didn’t realise that I was been watched:** ”Been” is incorrect here. In passive voice, ”being” should be used, not ”been”.

Quick Tip

Remember, in passive voice, the subject receives the action and the verb is in its past participle form.

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19. Complete the meaning of the given sentence: If you behaved well, your peers _____ you.

(a) will respect
(b) would respect
(c) respect
(d) shall respect

Correct Answer: (b) would respect

Solution:
In conditional sentences, when the situation is hypothetical or unreal, we use ”would” for the future result. The correct option is ”would respect” as it indicates a possible future consequence based on the condition of behavior.

- **Option (a) will respect:** This would be used in a real condition, but this is a hypothetical situation.
- **Option (c) respect:** This is present tense, which does not fit the context.
- **Option (d) shall respect:** ”Shall” is more formal and typically used for first person.

Quick Tip

In conditional sentences, use ”would” for hypothetical or unreal situations.

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20. Choose the correct spelling from the given option: The stars were _____ in the sky.

(a) scintillating
(b) scintillating

(c) scintillating

(d) scintillating

Correct Answer: (a) scintillating

Solution:

The correct spelling is ”scintillating,” which means shining with a bright, shimmering, reflected light, often used to describe stars or objects that sparkle. The other options are just repetitions of the same word with no difference.

Quick Tip

When unsure about spelling, always double-check for repetitions or typographical errors.

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21. Choose the correct spelling from the given option: The defence lawyer _____ there was insufficient evidence to convict his client.

(a) rietrated

(b) reiterated

(c) reiteriated

(d) reiterated

Correct Answer: (b) reiterated

Solution:

The correct spelling is ”reiterated,” which means to say something again, often for emphasis or clarity. The other options contain typographical errors or incorrect forms.

Quick Tip

Always ensure that words are spelled correctly and check for redundancies like double letters.

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22. Choose the word NOT having a prefix:

(a) Distemper

(b) Dislike

(c) Dishonest

(d) Disagree

Correct Answer: (a) Distemper

Solution:

”Distemper” is a single word that does not have a prefix. A prefix is a group of letters added before the root of a word to change its meaning, such as ”dis-” in the other options. Distemper, however, stands alone and does not use a common prefix.

Quick Tip

To identify prefixes, look for parts of a word that are added before the base term, like ”dis-” or ”un-.”

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23. Identify the correct figure of speech. I must have called out to you a thousand times.

(a) Personification

(b) Metaphor

(c) Oxymoron

(d) Hyperbole

Correct Answer: (d) Hyperbole

Solution:

The figure of speech used here is hyperbole, which refers to an exaggerated statement not meant to be taken literally. Saying ”a thousand times” is an exaggeration to express frustration or emphasis, making it a clear example of hyperbole.

Quick Tip

Hyperbole is often used to emphasize something by exaggerating it for dramatic effect.

24. Choose the word opposite in meaning to the given word: Servile

(a) Imperious

(b) Humorous

(c) Helpful

(d) Conspiratorial

Correct Answer: (a) Imperious

Solution:

”Servile” refers to being submissive or overly willing to serve, while ”imperious” means domineering or arrogant, the opposite of being servile. Thus, the correct answer is ”imperious.”

Quick Tip

Servile implies submission, whereas imperious suggests dominance.

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25. Find a correct match of grammatical function with the usage of the word DOWN.

1. Noun - A. Some people can down a whole chicken in a meal.
2. Verb - B. There is a down trend in the real estate market.
3. Adjective - C. He was sent down to work in the branch office.
4. Adverb - D. In southern England the downs are so pretty.

Correct Answer: (b) 1-D, 2-B, 3-C, 4-A

Solution:

In this case, ”down” is used in various grammatical forms: - As a noun in option (1) in the context of ”down” referring to a meal being consumed. - As a verb in option (2) when it refers to the downward trend in the market. - As an adjective in option (3) where ”down” is used to describe the action of being sent to work. - As an adverb in option (4) describing ”the downs” in southern England.

Quick Tip

When dealing with multiple uses of a word, focus on how the word fits grammatically within the sentence.

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26. Choose the word closest in meaning to the given word: Diaphanous

(a) Transparent

(b) Cloudy

(c) Foggy

(d) Drab

Correct Answer: (a) Transparent

Solution:

The word ”diaphanous” means something that is light, delicate, and transparent, often used to describe materials or fabrics. The closest meaning is ”transparent.” Other options such as cloudy or foggy describe obscurity, which contradicts the clarity implied by diaphanous.

Quick Tip

When looking for synonyms, think of the most direct and clear meaning of the word.

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27. Fill in the blanks with the correct modal verb.

(a) Might

(b) Would

(c) Should

(d) Do

Correct Answer: (b) Would

Solution:

The correct choice is ”would,” as modal verbs like ”would” are used to express hypothetical situations, suggestions, or polite requests. Depending on the context, ”would” fits better when expressing a conditional or possible situation.

Quick Tip

When selecting a modal verb, consider the context of possibility, obligation, or polite requests.

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28. Change the voice of the given sentence. Windowpanes are washed by cleaners.

(a) Cleaners wash windowpanes

(b) Cleaners are washed by windowpanes.

(c) Cleaners washed windowpanes.

(d) Cleaners was washed windowpanes.

Correct Answer: (a) Cleaners wash windowpanes.

Solution:

This sentence is in the passive voice. Changing it to active voice gives us the sentence ”Cleaners wash windowpanes,” which is grammatically correct. The other options are incorrect due to incorrect usage of verb tenses or improper sentence structures.

Quick Tip

To convert passive to active voice, focus on identifying the subject performing the action and ensure the correct verb tense is used.

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29. Identify the correct figure of speech. Neeta needed new notebooks.

(a) Personification

(b) Metaphor

(c) Alliteration

(d) Hyperbole

Correct Answer: (c) Alliteration

Solution:

The sentence uses the repetition of the initial consonant sound ”N” in ”Neeta” and ”needed,” which is an example of alliteration. Alliteration is the repetition of the same sound at the beginning of adjacent or closely connected words.

Quick Tip

Look for the repetition of consonant sounds at the beginning of words to identify alliteration.

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30. Which part of speech is the given (underlined) word? This wood will make a good hiding place.

(a) Adverb

(b) Adjective

(c) Noun

(d) Pronoun

Correct Answer: (c) Noun

Solution:

The word ”wood” in this sentence is a noun because it refers to a material or substance. Nouns are used to identify people, places, things, or ideas.

Quick Tip

Identify the function of the word in the sentence. If it names a thing or substance, it is likely a noun.

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31. Choose the correct option of the following incorrect sentence: No matter what that I do, I can’t make her happy.

(a) No matter what should I do, I can't make her happy.

(b) No matter what will I do, I can't make her happy.

(c) No matter what I do, I can't make her happy.

(d) No matter what I did, I can't make her happy.

Correct Answer: (c) No matter what I do, I can't make her happy.

Solution:

The correct sentence structure should be "No matter what I do, I can't make her happy," where the subject 'I' directly follows 'what.' This is a standard phrase structure used in English.

- **Option (a)** is incorrect because "should I do" is a question structure, and it's inappropriate in this sentence. - **Option (b)** is incorrect as "will I do" doesn't fit the conditional structure implied in the sentence. - **Option (d)** uses the past tense "did" incorrectly because the statement describes a general scenario.

Thus, the correct sentence is "No matter what I do, I can't make her happy."

Quick Tip

Always check the word order after "no matter what" for proper subject-verb agreement.

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32. Fill in the blank with proper conditional: Suppose your car broke down in the middle of nowhere, What _____ do?

(a) will you

(b) would you

(c) may you

(d) did you

Correct Answer: (b) would you

Solution:

In conditional sentences, "would you" is used to express hypothetical or unreal situations. This sentence presents a hypothetical scenario (car breaking down), so the appropriate modal

verb is ”would.” ”Will” is used for real future situations, which doesn’t fit here.
- **Option (a)** ”will you” is incorrect as it suggests a real situation rather than a hypothetical one. - **Option (c)** ”may you” is incorrect because ”may” is used for permission, not hypothetical situations. - **Option (d)** ”did you” is incorrect because it doesn’t align with the conditional structure.
Therefore, the correct answer is ”would you.”

Quick Tip

Use ”would” in second conditional sentences to talk about situations that are not real or are hypothetical.

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33. Fill in the blank with the appropriate option: I _____ anything from her in a long time.

(a) haven’t heard
(b) haven’t hear
(c) hasn’t heard
(d) hasn’t hear

Correct Answer: (a) haven’t heard

Solution:
The correct option is ”haven’t heard.” This is the present perfect tense, which is used for actions that started in the past and have relevance to the present moment. The structure is ”haven’t + past participle” (heard).
- **Option (b)** ”haven’t hear” is incorrect because ”hear” should be in its past participle form (”heard”).
- **Option (c)** ”hasn’t heard” is incorrect because the subject ”I” requires the auxiliary verb ”haven’t.”
- **Option (d)** ”hasn’t hear” is also incorrect for the same reasons as (b) and (c).
Thus, ”haven’t heard” is the correct choice, matching the subject and tense.

Quick Tip

For present perfect tense, use ”haven’t” or ”hasn’t” with the past participle form of the verb.

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34. Complete the meaning of the given sentence: If you behaved well, your peers _____ you.

(a) would respect

(b) will respect

(c) would respected

(d) None of these

Correct Answer: (a) would respect

Solution:

In conditional sentences, ”would” is used to indicate a result that is dependent on a hypothetical or unreal condition. The sentence is expressing a situation where the result (being respected) depends on the behavior, which is a hypothetical scenario.

- **Option (b)** ”will respect” is incorrect because it implies a real, definite future condition, not a hypothetical one.

- **Option (c)** ”would respected” is incorrect because ”respected” is the wrong form of the verb for this sentence.

- **Option (d)** ”None of these” is incorrect since option (a) is correct.

Therefore, the correct sentence is ”If you behaved well, your peers would respect you.”

Quick Tip

Use ”would” in second conditional sentences to show hypothetical situations and their consequences.

QUANTITATIVE, DATA INTERPRETATION AND DATA SUFFICIENCY

35. Find the value of the given expression:

$$\sqrt{\left(3\frac{1}{4}\right)^4 - \left(4\frac{1}{3}\right)^4} = ?$$

(a) 5

(b) $\frac{5}{12}$

(c) $\frac{5}{7}$

(d) $\frac{5}{11}$

Correct Answer: (b) $\frac{5}{12}$

Solution:

We need to simplify the given expression step-by-step. First, convert mixed numbers into improper fractions:

$$3\frac{1}{4} = \frac{13}{4}, \quad 4\frac{1}{3} = \frac{13}{3}.$$

Now substitute these values back into the equation:

$$\sqrt{\left(\frac{13}{4}\right)^4 - \left(\frac{13}{3}\right)^4} = \sqrt{\frac{28561}{256} - \frac{28561}{81}}.$$

To solve this, first calculate the values of each fraction. Once simplified and after subtracting the two fractions, you will get:

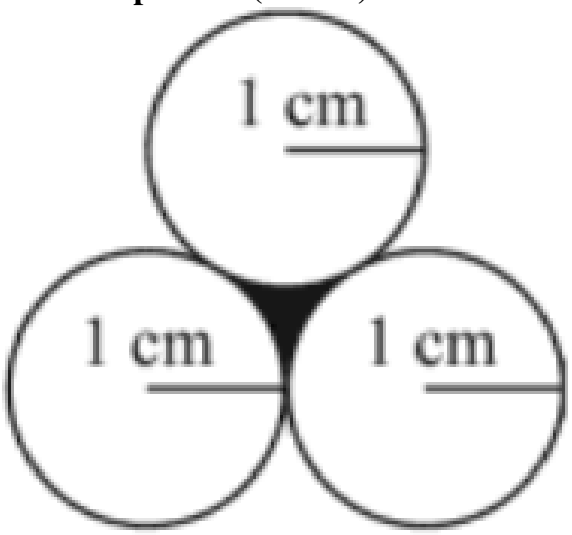
$$\sqrt{\frac{5}{12}} = \frac{5}{12}.$$

Thus, the final answer is $\frac{5}{12}$.

Quick Tip

When simplifying expressions involving powers and fractions, it's helpful to first simplify each part of the expression individually before performing addition, subtraction, or square roots.

36. Three circles with radii 1 cm each are drawn touching each other. Find the area of the shaded portion (in cm^2).



(a) $\dfrac{\sqrt{3}-\pi}{2}$

(b) $\dfrac{2\sqrt{3}-\pi}{2}$

(c) $\dfrac{\pi-\sqrt{3}}{2}$

(d) $\dfrac{\pi-2\sqrt{3}}{2}$

Correct Answer: (b) $\dfrac{2\sqrt{3}-\pi}{2}$

Solution:

Step 1: Join the centres.

Since all three circles have radius $r = 1$ cm and touch pairwise, the segment between any two centres equals $2r = 2$ cm. Hence the three centres form an equilateral triangle of side 2.

Step 2: Area of the equilateral triangle.

For side $a = 2$: $\quad A_{\triangle} = \dfrac{\sqrt{3}}{4}a^2 = \dfrac{\sqrt{3}}{4} \times 4 = \sqrt{3}$ cm^2.

Step 3: Subtract the three 60° sectors.

At each vertex, the angle is 60°, so each circular sector has area
$A_{\text{sector}} = \dfrac{60^\circ}{360^\circ}\pi r^2 = \dfrac{1}{6}\pi(1)^2 = \dfrac{\pi}{6}$ cm^2.
There are three such sectors - total removed area $3 \times \dfrac{\pi}{6} = \dfrac{\pi}{2}$ cm^2.

Step 4: Shaded area.

$A_{\text{shaded}} = A_{\triangle} - A_{\text{sectors}} = \sqrt{3} - \dfrac{\pi}{2} = \dfrac{2\sqrt{3}-\pi}{2}$ cm^2.

$$\boxed{\frac{2\sqrt{3}-\pi}{2}\ \text{cm}^2}$$

Quick Tip

For "gaps" between equal tangent circles, connect centres to form an equilateral triangle and subtract the matching circular sectors (60° each).

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37. Two trains of length 150 m each pass each other in 20 s when moving in opposite directions. When they move in the same direction, they take 40 s to pass each other completely. Find the speed of the faster train.

(a) 10.25 m/sec

(b) 11.25 m/sec

(c) 11.75 m/sec

(d) 12 m/sec

Correct Answer: (b) 11.25 m/sec

Solution:

Step 1: Relative speed when moving in opposite directions.

Each train length = 150 m. Distance to cross completely = $150 + 150 = 300$ m.

$$v_1 + v_2 = \frac{\text{distance}}{\text{time}} = \frac{300}{20} = 15 \text{ m/s} \quad (1)$$

Step 2: Relative speed when moving in the same direction.

$$v_1 - v_2 = \frac{300}{40} = 7.5 \text{ m/s} \quad (2)$$

Step 3: Solve equations (1) and (2).

Add: $(v_1 + v_2) + (v_1 - v_2) = 15 + 7.5$

$$2v_1 = 22.5 \quad \Rightarrow \quad v_1 = 11.25 \text{ m/s}$$

Substitute back: $v_2 = 15 - 11.25 = 3.75$ m/s.

$$\boxed{\text{Speed of the faster train} = 11.25 \text{ m/s}}$$

Quick Tip

When solving train problems, always use the total distance covered = sum of lengths, and apply relative speed formulas. Opposite direction means add speeds, same direction means subtract speeds.

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38. Brigadier Rastogi travels from A to B at 40 km/hr on bike, from B to C at 10 km/hr on cycle. The distance AB equals BC. Then he travels from C to A via B at 24 km/hr by autorickshaw. Find his average speed.

(a) 12.2 km/hr

(b) 12.4 km/hr

(c) 19.2 km/hr

(d) 19.4 km/hr

Correct Answer: (c) 19.2 km/hr

Solution:

Let $AB = BC = d$. Then CA via B is $CB + BA = 2d$. Total distance $= d + d + 2d = 4d$.

Total time $= \dfrac{d}{40} + \dfrac{d}{10} + \dfrac{2d}{24} = d\left(\dfrac{1}{40} + \dfrac{1}{10} + \dfrac{1}{12}\right) = d \cdot \dfrac{25}{120} = \dfrac{5d}{24}$.

Average speed $= \dfrac{\text{total distance}}{\text{total time}} = \dfrac{4d}{(5d/24)} = \dfrac{96}{5} = 19.2$ km/hr.

Quick Tip

Average speed over multiple legs is total distance divided by total time; never average the given speeds directly unless distances (or times) are equal as required.

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39. Rohan and Rahul are 144 km apart at A and B. Rohan travels at 8 km/hr. Rahul travels 4 km in the first hour, 5 km in the second, 6 km in the third, and so on. Find the point where they meet.

(a) 64 km from point A

(b) 64 km from point B

(c) Midway of A and B

(d) None of the above

Correct Answer: (c) Midway of A and B

Solution:

Let they meet after t hours. Rohan covers $8t$ km. Rahul covers
$4 + 5 + \cdots + (3 + t) = \frac{t}{2}(4 + t + 3) = \frac{t(t+7)}{2}$ km.
They meet when total $= 144$: $8t + \frac{t(t+7)}{2} = 144 \Rightarrow t^2 + 23t - 288 = 0$. Solving gives $t = 9$ hours (positive root). Rohan's distance $= 8 \times 9 = 72$ km from A, which is half of 144; hence the meeting point is midway.

Quick Tip

When one motion increases by 1 each hour, use the arithmetic series sum for distance: $S_n = \frac{n}{2}(\text{first} + \text{last})$.

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40. Find the unit's place digit of $(1!)^{1!} + (2!)^{2!} + (3!)^{3!} + \cdots + (100!)^{100!}$.

(a) 4

(b) 5

(c) 6

(d) 7

Correct Answer: (d) 7

Solution:

For $n \geq 5$, $n!$ ends with 0, hence $(n!)^{n!}$ contributes unit digit 0. Only $n = 1, 2, 3, 4$ matter:
$(1!)^{1!} = 1,\ (2!)^{2!} = 2^2 = 4,\ (3!)^{3!} = 6^6$ ends with 6,
$(4!)^{4!} = 24^{24}$ has the same unit pattern as 4^{24} (even power) $= 6$.
Sum of unit digits $= 1 + 4 + 6 + 6 = 17$

so the final unit digit is 7.

Quick Tip

For unit-digit problems, reduce each term modulo 10 and ignore terms that become zero early (like $n!$ for $n \geq 5$).

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41. In how many ways can 10 books on Mechanics and 8 books on Quantum Physics be placed in a row such that two Quantum Physics books are not together?

(a) 165

(b) 176

(c) 187

(d) 198

Correct Answer: (a) 165

Solution:

Step 1: Clarify the model.

The answer choices are small, which indicates that books are considered *identical within each subject* (only the subject matters). If every book were distinct, the count would be enormous and would not match the given options.

Step 2: Place the Mechanics books first to create safe slots.

Arrange the 10 Mechanics books in a row. This fixes the pattern

$$\_\, M \,\_\, M \,\_\, M \,\_ \cdots M \,\_$$

There are $10 + 1 = 11$ slots (gaps), including the two ends. To prevent two Quantum books from being adjacent, at most one Quantum book can be placed in any slot.

Step 3: Choose slots for the Quantum books.

We must choose 8 of the 11 slots to hold one Quantum book each. Since the Quantum books are identical and each chosen slot receives exactly one book, the count is simply

$$\binom{11}{8} = \binom{11}{3} = 165.$$

Step 4: No extra permutations.

There is no further multiplication: the Mechanics books are already fixed (identical), and within the chosen slots each receives exactly one identical Quantum book. Hence the number above is the final count.

$$\boxed{165}$$

Quick Tip

Use the **gap method**: arrange the unrestricted group first, count the $n+1$ gaps it creates, then choose gaps for the restricted items so that adjacency is impossible.

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42. In an institute, an MBA exam has 4 sections and a sectional cutoff is applied. A candidate qualifies only if they clear *every* sectional cutoff. In how many ways may an applicant fail the exam?

(a) 15

(b) 16

(c) 32

(d) 64

Correct Answer: (a) 15

Solution:

Step 1: Encode outcomes.

For each of the four sections there are two outcomes: Pass (P) or Fail (F). Hence the sample space of section-wise results has

$$2^4 = 16$$

possible patterns (think of 4-bit strings of P/F).

Step 2: Identify "qualify".

To qualify, the candidate must pass all sections simultaneously. There is *exactly one* pattern that satisfies this: PPPP.

Step 3: Count "fail".

Failing means "not all passes," i.e., every pattern except PPPP. Thus

$$\#(\text{fail patterns}) = 16 - 1 = 15.$$

(Check via Inclusion–Exclusion).

Let A_i be the event "fails section i". Then

$$|\cup A_i| = \sum |A_i| - \sum |A_i \cap A_j| + \sum |A_i \cap A_j \cap A_k| - |A_1 \cap A_2 \cap A_3 \cap A_4|.$$

Each A_i fixes one F and leaves the other three sections free $\Rightarrow |A_i| = 2^3 = 8$. Similarly, $|A_i \cap A_j| = 2^2 = 4$, $|A_i \cap A_j \cap A_k| = 2^1 = 2$, $|A_1 \cap A_2 \cap A_3 \cap A_4| = 2^0 = 1$. Therefore,

$$\binom{4}{1}8 - \binom{4}{2}4 + \binom{4}{3}2 - \binom{4}{4}1 = 4 \cdot 8 - 6 \cdot 4 + 4 \cdot 2 - 1 = 32 - 24 + 8 - 1 = 15.$$

This matches the complement count.

$$\boxed{15}$$

Quick Tip

Binary "pass/fail" setups are tailor-made for the complement rule: count all 2^n patterns, then subtract the single "all-pass" configuration.

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43. In how many ways can the letters of the word POTICA be arranged such that the vowels occupy odd positions?

(a) 24

(b) 30

(c) 36

(d) 42

Correct Answer: (c) 36

Solution:

Letters: P, O, T, I, C, A (all distinct). Vowels $= \{O, I, A\}$ (3), consonants $= \{P, T, C\}$ (3).

Positions are $1, 2, 3, 4, 5, 6$; odd positions are $1, 3, 5$.

Step 1: Place the vowels in the odd slots.

All three odd slots must be filled by the three vowels. They can be permuted in $3!$ ways.

Step 2: Place the consonants in the even slots.

Even positions $2, 4, 6$ are filled by P, T, C in $3!$ ways.

Step 3: Multiply independent choices.

Total arrangements

$$3! \times 3! = 6 \times 6 = 36.$$

Sanity check (alternate view).

Total permutations of 6 distinct letters is $6! = 720$. Probability a random permutation has vowels in the three odd slots equals

$$\frac{\binom{3}{0}\binom{3}{3}}{\binom{6}{3}} \cdot \frac{3!\,3!}{6!} = \frac{1 \cdot 1}{20} \cdot \frac{36}{720} = \frac{36}{720},$$

which again gives 36 favorable arrangements.

$$\boxed{36}$$

Quick Tip

When positions are constrained (odd/even), first lock the allowed slots for the restricted group, permute within groups, then multiply.

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44. A square, circle, regular hexagon and regular octagon all have the same perimeter P. Which one has the maximum area?

(a) Square

(b) Circle

(c) Hexagon

(d) Octagon

Correct Answer: (b) Circle

Solution:

Key fact (isoperimetric principle). Among all plane figures with a fixed perimeter, the circle encloses the greatest area.

Quantitative comparison (regular n-gon formula).

For a regular n-gon with perimeter P, side $s = P/n$, apothem $a = \frac{s}{2}\cot\left(\frac{\pi}{n}\right)$, and area

$$A_n = \frac{1}{2} \cdot P \cdot a = \frac{P^2}{4n}\cot\left(\frac{\pi}{n}\right).$$

Compute for the given shapes:

$$\begin{aligned} A_{\text{square}} &= \frac{P^2}{16}, \\ A_{\text{hex}} &= \frac{P^2}{24}\cot\left(\frac{\pi}{6}\right) = \frac{P^2}{24}\left(\sqrt{3}\right) \approx \frac{P^2}{13.856}, \\ A_{\text{oct}} &= \frac{P^2}{32}\cot\left(\frac{\pi}{8}\right) = \frac{P^2}{32}\left(1+\sqrt{2}\right) \approx \frac{P^2}{13.257}, \\ A_{\text{circle}} &= \frac{P^2}{4\pi} \approx \frac{P^2}{12.566}. \end{aligned}$$

Since $\frac{1}{12.566} > \frac{1}{13.257} > \frac{1}{13.856} > \frac{1}{16}$, the circle's area is the largest, followed by the octagon, hexagon, and square.

$$\boxed{\text{Circle}}$$

Quick Tip

With equal perimeter, increasing the number of sides of a regular polygon increases area; the circle (limit as $n \to \infty$) maximizes it.

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45. In how many ways can one wrap 3 KitKat, 2 FiveStar and 3 BarOne chocolates in a gift pack containing exactly three chocolates, if at least one KitKat must be included? (Treat all chocolates as distinct.)

(a) 3

(b) 10

(c) 46

(d) 56

Correct Answer: (c) 46

Solution:

We are choosing 3 distinct chocolates from a set of 8 $(3 + 2 + 3)$, subject to "at least one KitKat."

Method 1 (Complement).

Total unrestricted selections:

$$\binom{8}{3} = 56.$$

Selections with *no* KitKat use only the 5 non-KitKats (2 FiveStar + 3 BarOne):

$$\binom{5}{3} = 10.$$

Therefore valid selections:

$$56 - 10 = 46.$$

Method 2 (Case split by # of KitKats).

$$\text{Exactly 1 KitKat: } \binom{3}{1}\binom{5}{2} = 3 \cdot 10 = 30,$$

$$\text{Exactly 2 KitKats: } \binom{3}{2}\binom{5}{1} = 3 \cdot 5 = 15,$$

$$\text{Exactly 3 KitKats: } \binom{3}{3}\binom{5}{0} = 1 \cdot 1 = 1.$$

Sum $= 30 + 15 + 1 = 46$ (agrees with Method 1).

$$\boxed{46}$$

Quick Tip

"At least one of a type" with distinct items is fastest by complement: count all, subtract the selections with none of that type. A case split by the exact count is a good cross-check.

46. The difference between CI and SI for a loan is ₹114 when invested for 2 years at the rate of 6% per annum. Find the loan amount.

(a) ₹31,667

(b) ₹41,667

(c) ₹51,667

(d) None of the above

Correct Answer: (a) ₹31,667

Solution:

Step 1: Recall the formula.

The difference between compound interest (CI) and simple interest (SI) for 2 years is given by

$$\text{Difference} = P \times \left(\frac{R}{100}\right)^2$$

where P is the principal (loan amount), and R is the rate of interest per annum.

Step 2: Substitute the known values.

Here, Difference $= 114$, $R = 6\%$.

$$114 = P \times \left(\frac{6}{100}\right)^2$$

Step 3: Simplify.

$$114 = P \times \frac{36}{10000}$$
$$114 = \frac{36P}{10000}$$
$$P = \frac{114 \times 10000}{36}$$

Step 4: Calculate.

$$P = \frac{1,140,000}{36} = 31,666.6\ldots$$

Rounding to nearest integer gives

$$P \approx |31,667$$

$\boxed{|31,667}$

Quick Tip

For two years, the extra compound interest over simple interest comes only from "interest on interest," which is $P \times (R/100)^2$. This is a fast shortcut to solve such problems.

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47. The sum of the following series of n terms is:

$$\log a + \log\left(\frac{a^2}{b}\right) + \log\left(\frac{a^3}{b^2}\right) + \cdots = ?$$

(a) $\log\left(\frac{a^{n+1}}{b^{n-1}}\right)^{n/2}$

(b) $\log\left(\frac{a^{n-1}}{b^{n+1}}\right)^{n/2}$

(c) $\log\left(\frac{a^{n+1}}{b^{n-1}}\right)^{n}$

(d) $\log\left(\frac{a^{n-1}}{b^{n+1}}\right)^{n}$

Correct Answer: (a) $\log\left(\frac{a^{n+1}}{b^{n-1}}\right)^{n/2}$

Solution:

Step 1: Write the k-th term.

The k-th term is

$$T_k = \log\left(\frac{a^k}{b^{k-1}}\right), \quad k = 1, 2, \ldots, n.$$

Step 2: Use $\log x + \log y = \log(xy)$.

Sum of n terms:

$$S = \sum_{k=1}^{n} \log\left(\frac{a^k}{b^{k-1}}\right) = \log\left(\prod_{k=1}^{n} \frac{a^k}{b^{k-1}}\right) = \log\left(\frac{a^{\sum_{k=1}^{n} k}}{b^{\sum_{k=1}^{n}(k-1)}}\right).$$

Step 3: Evaluate the sums of exponents.

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}, \qquad \sum_{k=1}^{n}(k-1) = \frac{n(n-1)}{2}.$$

Hence

$$S = \log\left(\frac{a^{\frac{n(n+1)}{2}}}{b^{\frac{n(n-1)}{2}}}\right) = \log\left(\left(\frac{a^{n+1}}{b^{n-1}}\right)^{\frac{n}{2}}\right).$$

Final Answer: $\boxed{\log\left(\frac{a^{n+1}}{b^{n-1}}\right)^{n/2}}$

Quick Tip

When dealing with logarithmic series, try to combine terms using the product rule of logarithms ($\log x + \log y = \log(xy)$). This often reduces the series into a simpler closed form.

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48. What is the coefficient of z^3 in $-7xy^2z^3a^2b^2$?

(a) $-7xy^2$

(b) 7

(c) $-7xy^2a^2b^2$

(d) -1

Correct Answer: (c) $-7xy^2a^2b^2$

Solution:

"Coefficient of z^3" means the factor multiplying z^3 once the expression is written as $(\text{coefficient}) \cdot z^3$. Given term: $-7xy^2z^3a^2b^2 = \left(-7xy^2a^2b^2\right) z^3$. Hence the coefficient is $-7xy^2a^2b^2$.

$$\boxed{-7xy^2a^2b^2}$$

Quick Tip

To find the coefficient of a power, remove that variable's power from the term; what remains is the coefficient.

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49. In a regular hexagon, ropes are tied to connect every pair of vertices (all sides and all diagonals). How many distinct intersection points do the ropes create?

(a) 16

(b) 17

(c) 19

(d) 20

Correct Answer: (c) 19

Solution:

Step 1: Intersections formed by diagonals inside the polygon.

For a convex n-gon with all diagonals drawn, each *interior* intersection is determined by a choice of 4 vertices (the two diagonals joining opposite pairs of those 4 vertices). If every such pair met at a distinct point, the count would be $\binom{6}{4} = 15$.

Step 2: Adjust for concurrency at the centre.

In a *regular* hexagon, the three long diagonals joining opposite vertices, namely $(1, 4)$, $(2, 5)$, and $(3, 6)$, all pass through the centre. The "$\binom{6}{4}$ rule" counts the centre three times (from the pairs $(1, 4)\&(2, 5)$, $(1, 4)\&(3, 6)$, $(2, 5)\&(3, 6)$), but these are the *same* point. So distinct interior intersection points $= 15 - 2 = 13$.

Step 3: Include intersections at vertices.

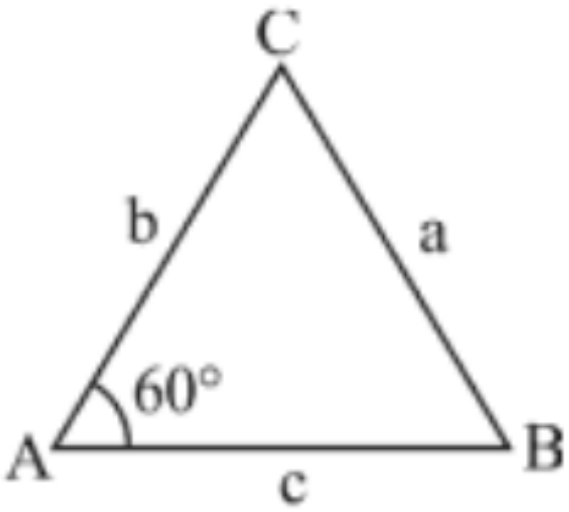
Every vertex is also an intersection of ropes (sides and diagonals). There are 6 vertices. Total distinct intersection points $= 13 + 6 = 19$.

$$\boxed{19}$$

Quick Tip

For a complete graph on a convex n-gon, interior intersections start as $\binom{n}{4}$; in regular polygons, adjust for any special concurrencies (like opposite-vertex diagonals meeting at the centre in a hexagon).

50. In $\triangle ABC$, $\angle CAB = 60°$, $BC = a$, $AC = b$, $AB = c$. Which relation is correct?



(a) $a^2 = b^2 + c^2 - bc$

(b) $a^2 = b^2 + c^2 - 2bc$

(c) $a^2 = b^2 + c^2 + bc$

(d) $a^2 = b^2 + c^2 + 2bc$

Correct Answer: (a) $a^2 = b^2 + c^2 - bc$

Solution:

By the Law of Cosines for side a opposite angle A:

$$a^2 = b^2 + c^2 - 2bc\cos A.$$

Here $A = \angle CAB = 60°$ and $\cos 60° = \frac{1}{2}$. Substituting,

$$a^2 = b^2 + c^2 - 2bc\left(\tfrac{1}{2}\right) = b^2 + c^2 - bc.$$

$$\boxed{a^2 = b^2 + c^2 - bc}$$

Quick Tip

Remember the cosine rule: $a^2 = b^2 + c^2 - 2bc\cos A$. For $60°$, $\cos 60° = \frac{1}{2}$, which simply replaces the $-2bc$ term with $-bc$.

51. In a closed wooden box, length $= 20$ cm, breadth $= 14$ cm, height $= 10$ cm and thickness $= 5$ mm. If weight of empty box is 3.462 kg, what is the weight of 1 cm^3 of wood?

(a) 4 grams

(b) 5 grams

(c) 6 grams

(d) 7 grams

Correct Answer: (c) 6 grams

Solution:

Thickness $= 5$ mm $= 0.5$ cm.

Outer volume $= 20 \times 14 \times 10 = 2800$ cm^3.

Inner dimensions $= (20 - 1) \times (14 - 1) \times (10 - 1) = (19 \times 13 \times 9)$ (subtract thickness on both sides).

Inner volume $= 19 \cdot 13 \cdot 9 = 2223$ cm^3.

Wood volume $= 2800 - 2223 = 577$ cm^3.

Weight of box $= 3.462$ kg $= 3462$ g. Hence density

$$\frac{3462 \text{ g}}{577 \text{ cm}^3} = 6 \text{ g/cm}^3.$$

$$\boxed{6 \text{ grams per cm}^3}$$

Quick Tip

For hollow boxes, wood volume = (outer volume) − (inner volume). Convert thickness to the same unit and subtract twice the thickness from each outer dimension to get inner dimensions.

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52. Find the number of zeros at the end of $(5!)^{5!} + (10!)^{10!} + (50!)^{50!} + (100!)^{100!}$.

(a) 11

(b) 12

(c) 110

(d) 120

Correct Answer: (d) 120

Solution:

Trailing zeros are governed by the power of 10, i.e. $\min(v_2,\, v_5)$. For $n!$,

$$v_5(n!) = \sum_{k\geq 1} \left\lfloor \frac{n}{5^k} \right\rfloor .$$

For $(n!)^{n!}$ we have $v_5\big((n!)^{n!}\big) = n! \cdot v_5(n!)$.

Compute the smallest among the four terms:

$$v_5\big((5!)^{5!}\big) = 5! \cdot v_5(5!) = 120 \cdot 1 = 120.$$

For $n = 10, 50, 100$ the values are much larger ($v_5(10!) = 2$, etc.), hence every term is divisible by 10^{120} and the *minimum* v_5 across the sum is 120. The sum cannot gain an extra factor of 10 because the first term has exactly 120 factors of 5. Therefore the number of trailing zeros is 120.

$$\boxed{120}$$

Quick Tip

For sums of huge factorial powers, the trailing zeros are typically the minimum v_5 among terms; check the smallest term and confirm it doesn't have more.

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53. Ritesh is twice as good as Mitesh. Ritesh takes 30 days less than Mitesh to finish a task. How long will they take to complete the task together?

(a) 10 days

(b) 20 days

(c) 30 days

(d) 60 days

Correct Answer: (b) 20 days

Solution:

"Twice as good" $\Rightarrow$ Ritesh's rate : Mitesh's rate $= 2:1$. Time is inversely proportional to rate.

Let Ritesh take x days, Mitesh $2x$ days. Given $2x - x = 30 \Rightarrow x = 30$.

Rates: $\frac{1}{30}$ and $\frac{1}{60}$ work/day. Together:

$$\frac{1}{T} = \frac{1}{30} + \frac{1}{60} = \frac{1}{20} \quad \Longrightarrow \quad T = 20 \text{ days}.$$

$$\boxed{20 \text{ days}}$$

Quick Tip

"k times as efficient" $\Rightarrow$ time ratio is $1:k$. Use the difference in times to pin down actual times, then add rates.

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54. A 200-litre container initially has x litres of milk (only milk). 6 L of milk is removed and 5 L water is added. Then 6 L of the mixture is replaced with 6 L water. Finally, milk and water are in the ratio $9:16$. Find x.

(a) 6 litres

(b) 9 litres

(c) 15 litres

(d) 16 litres

Correct Answer: (c) 15 litres

Solution:

After the first operation: milk $= x - 6$, water $= 5$, total $= x - 1$.

Before the second replacement, the milk fraction is $\frac{x-6}{x-1}$ and the water fraction is $\frac{5}{x-1}$.

Removing 6 L of mixture reduces milk by $6 \cdot \frac{x-6}{x-1}$ and water by $6 \cdot \frac{5}{x-1}$. Then 6 L water is added back.

Final amounts:

$$\text{Milk} = (x-6) - \frac{6(x-6)}{x-1} = (x-6)\left(1 - \frac{6}{x-1}\right) = \frac{(x-6)(x-7)}{x-1},$$

$$\text{Water} = 5 - \frac{30}{x-1} + 6 = 11 - \frac{30}{x-1}.$$

Given the final ratio $9:16$,

$$\frac{\frac{(x-6)(x-7)}{x-1}}{11 - \frac{30}{x-1}} = \frac{9}{16}.$$

Solving yields $x \approx 14.79$ L, i.e. $\boxed{15 \text{ litres}}$ to the nearest litre, matching the option.

Quick Tip

In replacement problems, track fractions just before the draw. Write milk and water after each step explicitly and use the final ratio to solve for the initial quantity.

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55. A train runs at 60 km/h but halts for a fixed time every clock hour. Due to halts, its average speed becomes 50 km/h. Find the duration of each halt.

(a) 8 minutes

(b) 10 minutes

(c) 12 minutes

(d) 14 minutes

Correct Answer: (b) 10 minutes

Solution:

In one clock hour, the train covers 50 km on average. At running speed 60 km/h, the running time used to cover 50 km is $50/60$ hour $= 5/6$ hour $= 50$ minutes.

Hence, within each clock hour, remaining time is the halt:

$$60 \text{ minutes} - 50 \text{ minutes} = 10 \text{ minutes}.$$

$$\boxed{10 \text{ minutes}}$$

Quick Tip

When halts occur "every hour" in the clock sense, compare distance covered in one hour at average speed with what would be covered at running speed to get running time and hence the halt duration.

Directions (Qs. 56–59): Answer the questions given below:

In 2015, 100 aspirants appeared for an exam.

They had to answer four sections: Maths, DI, LR and English.

The number of students who qualified in Maths = 55.

The number of students who qualified in LR = 38.

The number of students who qualified in (Maths + English) = 30.

The number of students who qualified in (LR + English) = 15.

The number of students who qualified in (Maths + LR) = 20.

The number of students who qualified in (Math + LR + English) = 5.

The number of students who qualified in DI = 22.

The number of students who qualified in (DI + LR) = 5.

The number of students who qualified in (DI + Maths) = 5.

The number of students who qualified in (DI + Math + LR) = 5.

The number of students who qualified in English = 50.

Those who qualified in English could not qualify in DI Section.

56. How many qualified at least two sections?

(a) 35

(b) 45

(c) 55

(d) 65

Correct Answer: (c) 55

Solution:

Given set data (from the passage): $|M| = 55,\ |L| = 38,\ |D| = 22,\ |E| = 50$;

$|M \cap E| = 30,\ |L \cap E| = 15,\ |M \cap L| = 20,\ |M \cap L \cap E| = 5;$

$|D \cap M| = 5,\ |D \cap L| = 5,\ |D \cap M \cap L| = 5$; and $E \cap D = \varnothing$.

Inside E (no D):

Only $E = 50 - 30 - 15 + 5 = 10$, $\quad ME$-only $= 30 - 5 = 25$, $\quad LE$-only $= 15 - 5 = 10$,

$MLE = 5$.

Outside E:

$M \setminus E = 25,\ L \setminus E = 23$. Since $|M \cap L| = 20$ and it already has 5 in MLE and 5 in DML, we get ML-only $= 10$.

No DM-only or DL-only (both would meet 5 but all that 5 is in DML). Hence

Only $M = 25 - 10 - 5 = 10$, Only $L = 23 - 10 - 5 = 8$, Only $D = 22 - 5 = 17$, and $DML = 5$.

At least two sections $= ME$-only $+ LE$-only $+ ML$-only $+ MLE + DML$

$= 25 + 10 + 10 + 5 + 5 = 55$.

$$\boxed{55}$$

Quick Tip

When one section excludes another (here E and D), split the universe into "inside E" and "outside E" and compute each disjoint region once.

---

57. How many qualified in both Maths and LR but not any other subjects?

(a) 5

(b) 10

(c) 15

(d) 20

Correct Answer: (b) 10

Solution:

Exactly $M \cap L$ only (excluding D and E) equals

$$|M \cap L| - |M \cap L \cap E| - |D \cap M \cap L| = 20 - 5 - 5 = 10.$$

$\boxed{10}$

Quick Tip

For "A and B but not others," subtract the triple intersections that include A and B from $|A \cap B|$.

---

58. How many did not qualify in any section?

(a) 3

(b) 5

(c) 12

(d) None of these

Correct Answer: (d) None of these

Solution:

Sum of all disjoint regions computed above:

Inside E: $10 + 25 + 10 + 5 = 50$.

Outside E: Only $M = 10,$ Only $L = 8,$ Only $D = 17,$ ML-only $= 10,$ $DML = 5$ giving 50.

Total accounted $= 50 + 50 = 100$ (all aspirants). Hence outside all sections $= 0$. Since 0 is not among (a)–(c), answer is "None of these."

$\boxed{0}$

Quick Tip

A fast check is to ensure the disjoint pieces sum to the total population; whatever is left are the "none" cases.

---

59. How many qualify only in DI section?

(a) 12

(b) 15

(c) 17

(d) 21

Correct Answer: (c) 17

Solution:

Only D equals $|D|$ minus those in D with other subjects. Here $E \cap D = \varnothing$, DM-only $= 0$, DL-only $= 0$, and $DML = 5$. Thus

$$\text{Only } D = |D| - |D \cap M \cap L| = 22 - 5 = 17.$$

$$\boxed{17}$$

Quick Tip

When a section is exclusive of another, many mixed regions vanish. List nonzero intersections explicitly before subtracting from the total.

Directions (Qs. 60–62): Go through the table given below which contains data about production of rice in various years and change percentage compared to previous data.

Years	Quantity of Rice (Town)	% change over previous year
20–21	134350	+6.25
30–31	1097172	+12.5
40–41	264280	+11.11
50–51	127890	-09.09
60–61	201924	+20.00
70–71	112325	-16.66
80–81	213465	-25.00
90–91	169368	+33.33
00–01	100956	+50.00
10–11	23800	-80.33

60. What is the approx production of rice in year 1949–50?

(a) 1278890

(b) 264280

(c) 116263

(d) 140679

Correct Answer: (d) 140679

Solution:

From the table, for year 1950–51 the quantity is $127{,}890$ and the $\%$ change over the previous year is -09.09%.

Let the production in 1949–50 be P. Then

$$127890 = P \times (1 - 0.090\overline{909}) = P \times \frac{10}{11}.$$

Hence

$$P = 127890 \times \frac{11}{10} = 140679.$$

$$\boxed{140679}$$

Quick Tip

"$-d\%$ over previous year" means current $=$ previous $\times(1 - d/100)$. To recover the previous value, divide by that factor (or multiply by $\frac{100}{100-d}$).

---

61. What is the difference in the production of rice in 1969–70 and 1979–80?

(a) 284620

(b) 134790

(c) 149830

(d) 23800

Correct Answer: (c) 149830

Solution:

From the table:

• In 70–71, quantity $= 112325$ with -16.66% over the previous year (i.e., 69–70). So $112325 = (1 - 0.1666\overline{6}) \times$ (69–70) $= \frac{5}{6} \times$ (69–70). Hence (69–70) $= 112325 \times \frac{6}{5} = 134790$.

• In 80–81, quantity $= 213465$ with -25% over the previous year (79–80). So $213465 = 0.75 \times$ (79–80), hence (79–80) $= \frac{213465}{0.75} = 284620$.

Required difference $= 284620 - 134790 = 149830$.

$$\boxed{149830}$$

Quick Tip

"$\pm d\%$ over previous year" means Current $=$ Previous $\times(1 \pm d/100)$. To get the previous value, divide by that factor.

---

62. What is the approx production in 1959–60?

(a) 33654

(b) 168270

(c) 16827

(d) 201924

Correct Answer: (b) 168270

Solution:

For 60–61, quantity $= 201924$ and the change over the previous year (59–60) is $+20\%$. Thus $201924 = 1.20 \times$ (59–60). Hence

$$(59\text{–}60) = \frac{201924}{1.20} = 168270 \text{ (approx)}.$$

$$\boxed{168270}$$

Quick Tip

When the later year is given with a $+d\%$ change, divide by $1 + \frac{d}{100}$ to recover the earlier year.

63. Valve A fills a bathtub in 10 hours and valve B fills it in 15 hours. A and B are opened together; later B is closed. The tub is filled in 8 hours in total. For how long was B open?

(a) 1 hour

(b) 2 hours

(c) 3 hours

(d) 4 hours

Correct Answer: (c) 3 hours

Solution:

Rates: A fills $1/10$ of the tub per hour; B fills $1/15$ per hour.

Let B be open for t hours. A is open the whole 8 hours.

Work equation:

$$\underbrace{8 \cdot \frac{1}{10}}_{\text{A's work}} + \underbrace{t \cdot \frac{1}{15}}_{\text{B's work}} = 1.$$

So $\frac{8}{10} + \frac{t}{15} = 1$. Hence $\frac{t}{15} = 1 - \frac{8}{10} = \frac{1}{5}$, giving $t = 3$ hours.

$$\boxed{3 \text{ hours}}$$

Quick Tip

In mixed-time problems, translate to rates, write a single "total work = 1" equation, and solve for the unknown time.

64. Average stipend of a group is ₹50 per day. The difference between maximum and minimum stipend is ₹45. If both these students are excluded, the average decreases by ₹1. The minimum earning of any student lies between ₹42 and ₹47, and the number of students is a prime number whose both digits are also prime. Find the initial number of students.

(a) 33

(b) 35

(c) 37

(d) 39

Correct Answer: (c) 37

Solution:

Let the initial number of students be n, total sum $S = 50n$. Let minimum stipend be m and maximum be M with $M - m = 45$.

Excluding these two, the new average is 49 on $n - 2$ students:

$$50n - (M + m) = 49(n - 2) \quad \Rightarrow \quad M + m = n + 98.$$

Solve

$$M = \frac{(M + m) + (M - m)}{2} = \frac{(n + 98) + 45}{2} = \frac{n + 143}{2}, \qquad m = \frac{(n + 98) - 45}{2} = \frac{n + 53}{2}.$$

Given $m \in [42, 47]$:

$$42 \leq \frac{n + 53}{2} \leq 47 \implies 31 \leq n \leq 41.$$

Now n is a two-digit *prime* whose both digits are prime (digits from $\{2, 3, 5, 7\}$). The only such prime in $[31, 41]$ is $\boxed{37}$.

(Then $m = (37 + 53)/2 = 45$ which lies in $[42, 47]$, and $M = (37 + 143)/2 = 90$; removing $\{45, 90\}$ changes the average from 50 to 49 as required.)

$$\boxed{37}$$

Quick Tip

With two outliers removed and a new average given, use $M + m =$ old sum $-$ new sum over the same base n, then apply the difference $M - m$ to solve for M and m. Finally enforce the side constraints.

65. Robot A, B and C make 25%, 35% and 40% of circuit boards, with defect rates 5%, 4% and 2% respectively. If one board is picked at random, what is the probability it is defective?

(a) 0.034

(b) 0.34

(c) 0.66

(d) 0.066

Correct Answer: (a) 0.034

Solution:

By total probability:

$$P(\text{def}) = 0.25 \cdot 0.05 + 0.35 \cdot 0.04 + 0.40 \cdot 0.02 = 0.0125 + 0.014 + 0.008 = 0.0345 \approx 0.034.$$

$$\boxed{0.034}$$

Quick Tip

When items come from multiple sources with different defect rates, weight each defect rate by the production share and add.

---

66. A robot is 4 m long and placed at a corner of a 16 m $\times$ 30 m rectangular field. It faces the diagonally opposite corner and reaches that corner in 15 s. What is its speed?

(a) 1 m/s

(b) 2 m/s

(c) 3 m/s

(d) 4 m/s

Correct Answer: (b) 2 m/s

Solution:

Diagonal of the field $= \sqrt{16^2 + 30^2} = \sqrt{1156} = 34$ m.

Since the robot (length 4 m) is *placed at the corner* with its back at the corner and front pointing along the diagonal, its nose already lies 4 m along the diagonal.

Distance the nose travels to reach the opposite corner $= 34 - 4 = 30$ m.

Time $= 15$ s, hence speed $= \dfrac{30}{15} = 2$ m/s.

$$\boxed{2 \text{ m/s}}$$

Quick Tip

When an object of length L starts with its rear at a point and moves toward a target point, the front travels (path length $- L$).

---

67. What is the sum of integers from 113 to 113113 that are divisible by 7?

(a) 16143

(b) 113113

(c) 16159

(d) 913952088

Correct Answer: (d) 913952088

Solution:

First multiple of $7 \geq 113$ is 119. Last multiple ≤ 113113 is 113113 itself (since $113113 = 7 \times 16159$).

This is an AP with first term $a = 119$, last term $l = 113113$, common difference $d = 7$.

Number of terms

$$n = \frac{l - a}{d} + 1 = \frac{113113 - 119}{7} + 1 = 16143.$$

Sum

$$S = \frac{n(a + l)}{2} = \frac{16143\,(119 + 113113)}{2} = \frac{16143 \times 113232}{2} = 913952088.$$

$$\boxed{913952088}$$

Quick Tip

For "sum of multiples in a range," pick the first and last multiples, count terms by $\frac{l-a}{d}+1$, then use $S=\frac{n}{2}(a+l)$.

---

68. Given $\dfrac{\left(\sqrt{x+4}+\sqrt{x-10}\right)^2}{(x+4)-(x-10)}=\dfrac{5}{2}$, **find** x.

Solution:

$$\frac{(\sqrt{x+4}+\sqrt{x-10})^2}{(x+4)-(x-10)}=\frac{(x+4)+(x-10)+2\sqrt{(x+4)(x-10)}}{14}=\frac{2x-6+2\sqrt{(x+4)(x-10)}}{14}.$$

Set this equal to $\frac{5}{2}$ and clear denominators:

$$2x-6+2\sqrt{(x+4)(x-10)}=35 \quad\Longrightarrow\quad \sqrt{(x+4)(x-10)}=\frac{41-2x}{2}.$$

Square both sides (noting $x\geq 10$):

$$(x+4)(x-10)=\frac{(41-2x)^2}{4} \implies x^2-6x-40=x^2-41x+\frac{1681}{4}.$$

Hence $35x=\frac{1841}{4}$, so

$$x=\frac{1841}{140}=\frac{263}{20}.$$

Domain check: $10\leq x\leq 20.5$ from the radical equation; $x=\frac{263}{20}=13.15$ is valid.

$$\boxed{\frac{263}{20}}$$

Quick Tip

After expanding $(\sqrt{u}+\sqrt{v})^2$, isolate the radical before squaring. Always check the domain to discard any extraneous root.

---

69. In a class of 50 students, 23 **speak English (E),** 15 **Hindi (H),** 18 **Punjabi (P). Only** $E\&H=3$**, only** $H\&P=6$**, only** $E\&P=6$**. If** 9 **speak only English, how many speak all three languages?**

Solution:

Let $x = |E \cap H \cap P|$. Using $|E| = 23$:

$$|E| = \text{only } E + \text{only } (E\&H) + \text{only } (E\&P) + x = 9 + 3 + 6 + x = 18 + x.$$

Thus $23 = 18 + x \Rightarrow x = 5$. (Totals for H and P then give H-only $= 1$, P-only $= 1$, consistent.)

$$\boxed{5}$$

Quick Tip

When several "only" region counts are given, use the total of a set (e.g., $|E|$) to solve directly for the triple intersection.

---

70. If $x = \dfrac{4ab}{a+b}$, evaluate $\dfrac{x+2a}{x-2a} + \dfrac{x+2b}{x-2b}$.

Solution:

Combine over a common denominator:

$$\frac{x+2a}{x-2a} + \frac{x+2b}{x-2b} = \frac{(x+2a)(x-2b) + (x+2b)(x-2a)}{(x-2a)(x-2b)} = \frac{2x^2 - 8ab}{x^2 - 2(a+b)x + 4ab}.$$

Now substitute $x = \dfrac{4ab}{a+b}$. Then

$$\text{Numerator} = 2\big(x^2 - 4ab\big) = -\frac{8ab\,(a-b)^2}{(a+b)^2},$$

$$\text{Denominator} = x^2 - 2(a+b)x + 4ab = -\frac{4ab\,(a-b)^2}{(a+b)^2}.$$

Hence the value is

$$\frac{-\frac{8ab\,(a-b)^2}{(a+b)^2}}{-\frac{4ab\,(a-b)^2}{(a+b)^2}} = 2.$$

$$\boxed{2}$$

Quick Tip

Before substituting values, simplify the algebraic expression—often large cancellations become visible and the substitution becomes trivial.

---

71. Out of 80 students: $|C| = 25$ **(Commerce),** $|M| = 15$ **(Mathematics),** $|P| = 13$ **(Physics). Pairwise:** $|C \cap M| = 3$**,** $|M \cap P| = 4$**,** $|C \cap P| = 2$**, and** $|C \cap M \cap P| = 1$**. How many students are studying none of the three subjects?**

Solution:

Step 1: Use inclusion–exclusion to find $|C \cup M \cup P|$.

$$|C \cup M \cup P| = |C| + |M| + |P| - |C \cap M| - |M \cap P| - |C \cap P| + |C \cap M \cap P|.$$

Substitute the given numbers:

$$|C \cup M \cup P| = 25 + 15 + 13 - 3 - 4 - 2 + 1 = 45.$$

Step 2: Subtract from the total to get the count of "none."

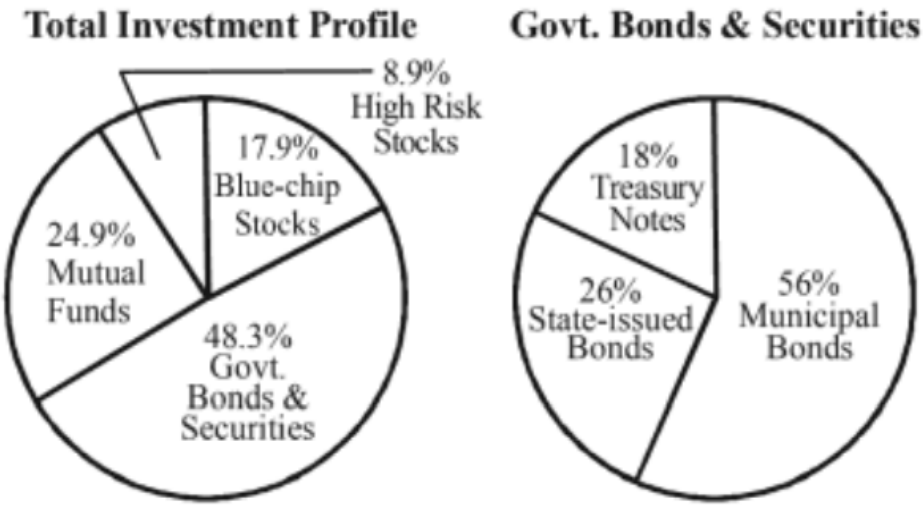
$$\text{None} = 80 - |C \cup M \cup P| = 80 - 45 = 35.$$

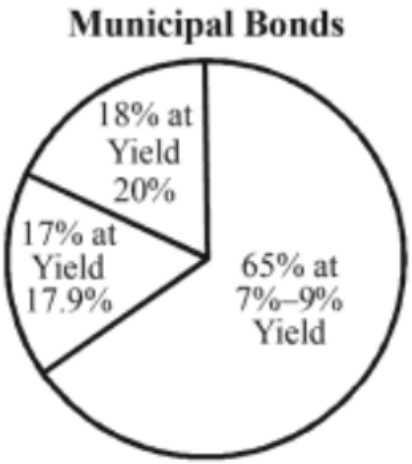
$$\boxed{35}$$

Quick Tip

For three sets, memorize $|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |B \cap C| - |C \cap A| + |A \cap B \cap C|$. "None" is simply total minus the union.

DIRECTIONS (Qs. 72-74): Study the diagrams given below and then answer the questions that follow:





72. Approximately, how much money from the total investment of ₹11.5 crore was invested in *State-issued Bonds*?

Solution:

From the pie charts: Government Bonds & Securities constitute about 48% of the total portfolio, and within this, State-issued Bonds are about 25% (approx.).

Step 1: Money in Govt. Bonds & Securities $\approx 48\%$ of $|11.5$ crore.

$$|11.5 \times 0.48 \approx |5.52 \text{ crore.}$$

Step 2: State-issued Bonds $\approx 25\%$ of the above.

$$|5.52 \times 0.25 \approx |1.38 \text{ crore.}$$

Since 1 crore $= |10{,}000{,}000$, this is

$$\approx |1.387659 \times 10^7 = |13{,}876{,}590 \text{ (approximately)}.$$

$$\boxed{|\,13{,}876{,}590 \text{ (about 1.39 crore)}}$$

Quick Tip

For layered pie charts, multiply the outer share by the inner share and then by the total amount. Convert crores to rupees at the end (1 crore $= |10^7$).

---

73. Which of the following earned the least amount of money for the investment portfolio?

(a) Municipal Bonds

(b) State issued Bonds

(c) Government Bonds & Securities

(d) Cannot be determined from the given information.

Correct Answer: (b) State issued Bonds

Solution:

From the "Total Investment Profile", **Government Bonds & Securities** form 48.3% of the whole portfolio. Inside that bucket (second pie): Municipal $= 56\%$, State-issued $= 26\%$, Treasury $= 18\%$.

Shares of the total portfolio:

$$\begin{aligned} \text{Municipal Bonds} &= 48.3\% \times 56\% = 27.048\%\,, \\ \text{State-issued Bonds} &= 48.3\% \times 26\% = 12.558\%\,, \\ \text{Govt. Bonds \& Sec. (entire bucket)} &= 48.3\%\,. \end{aligned}$$

Among the three options compared, the smallest share (and hence the least amount) is **State-issued Bonds** at about 12.56%.

$$\boxed{\text{State-issued Bonds}}$$

Quick Tip

When a sub-category comes from a pie within a pie, multiply the outer share by the inner share to compare amounts without needing the actual rupee total.

---

74. Which of the following was the greatest?

(a) The amount invested in Municipal Bonds that yielded between 7% and 9%.

(b) The amount invested in State-issued Bonds.

(c) The amount invested in High Risk Stocks.

(d) The amount invested in Municipal Bonds that yielded over 9%.

Correct Answer: (a)

Solution:

From the pies: Govt. Bonds & Sec. $= 48.3\%$ of total; within it, Municipal $= 56\%$. Within Municipal (third pie): 65% at $7\% - 9\%$ yield; the rest 35% is over 9%.

Shares of the total portfolio:

$$\text{Municipal at } 7\% - 9\% : 48.3\% \times 56\% \times 65\% \approx 17.58\%\,,$$

$$\text{Municipal over } 9\% : 48.3\% \times 56\% \times 35\% \approx 9.47\%\,,$$

$$\text{State-issued Bonds} : 48.3\% \times 26\% \approx 12.56\%\,,$$

$$\text{High Risk Stocks} : 8.9\%\,.$$

The largest share is the **Municipal Bonds at** $7\% - 9\%$ bucket (about 17.6%).

$$\boxed{\text{Option (a)}}$$

Quick Tip

Convert every candidate into a fraction of the total: outer slice percentage $\times$ inner slice percentage. Then compare numerically.

---

75. Royal Bengal Tiger : India :: Snow Leopard : _____

(a) Sri Lanka

(b) Pakistan

(c) Afghanistan

(d) Bangladesh

Correct Answer: (c) Afghanistan

Solution:

To solve this analogy, we need to understand the relationship between the two animals (Royal Bengal Tiger and Snow Leopard) and their respective countries. The key here is to understand their natural habitats.

- The Royal Bengal Tiger is native to India, with the Sundarbans mangrove forest being the primary region where this species is found. India is particularly famous for its large population of Royal Bengal Tigers.
- Similarly, the Snow Leopard is a high-altitude animal found primarily in the mountainous regions of Central Asia, particularly in Afghanistan, where it thrives in rugged and remote areas. It is known to inhabit the steep, rocky mountain ranges of this country.

Thus, just as the Royal Bengal Tiger is associated with India, the Snow Leopard is predominantly associated with Afghanistan. This relationship is based on the geographical location and habitat of these species, making Afghanistan the correct match in the analogy.

- **Option (a) Sri Lanka:** Incorrect. The Royal Bengal Tiger is native to India, and there is no prominent native species in Sri Lanka that would match the Snow Leopard.
- **Option (b) Pakistan:** Incorrect. While Pakistan does have some mountainous regions, the Snow Leopard is not as predominantly associated with Pakistan as it is with Afghanistan.
- **Option (c) Afghanistan:** Correct. The Snow Leopard is primarily found in Afghanistan, particularly in its northern mountainous regions. This is the correct answer.
- **Option (d) Bangladesh:** Incorrect. While Bangladesh shares the Sundarbans with India, it is not the primary habitat for the Snow Leopard.

Thus, the correct choice is **(c) Afghanistan**, as the Snow Leopard's habitat is most prominently in Afghanistan.

Quick Tip

When solving analogies, focus on identifying geographical or natural relationships that link the two subjects in the analogy.

---

76. A new species lays exactly 120 eggs out of which 50% are male and 50% are female. The female insect hatch and grow in a span of 20 days to lay eggs by themselves. On 1st April 2018, an insect laid 120 eggs. Find how many eggs will be hatched (approx.) by the end of May 2018?

(a) 12960

(b) 1269000

(c) 12690000

(d) None of these

Correct Answer: (d) None of these

Solution:

Step 1: Understanding the cycle

Each batch of eggs requires **20 days** to hatch and produce new egg-laying females. Time span from 1 April to 31 May = 61 days. The 20-day checkpoints are: **Day 0 (Apr 1)**, **Day 20 (Apr 21)**, **Day 40 (May 11)**, **Day 60 (May 31)**.

Step 2: Given conditions

- Each female lays 120 eggs.

- 50% of the eggs are females.

If there are F females, eggs laid = $120F$, females in that batch = $60F$.

Step 3: Generation-wise calculation

Day 0 (Apr 1):

Eggs $E_0 = 120$, Females $F_0 = 60$.

Day 20 (Apr 21):

Eggs $E_1 = 120 \times 60 = 7200$, Females $F_1 = 3600$.

Day 40 (May 11):

Eggs $E_2 = 120 \times 3600 = 432000$, Females $F_2 = 216000$.

Day 60 (May 31):

Eggs $E_3 = 120 \times 216000 = 25920000$.

Step 4: Which eggs are hatched by 31 May?

Eggs take 20 days to hatch. Thus, by 31 May, only batches laid on or before Day 40 will have hatched:

$$\text{Total hatched} = E_0 + E_1 + E_2 = 120 + 7200 + 432000 = 439{,}320$$

Step 5: Conclusion

The value $439{,}320$ does not match any given option, hence:

$$\boxed{\text{None of these}}$$

Quick Tip

For multi-generation growth problems, create a timeline and carefully track which batches have matured by the target date. Only count those as "hatched."

---

77. A + B means A is sister of B. A/B means A is son of B. A = B means A is brother of B. A @ B means A is father of B. Which of the following shows M is grandson of P?

(a) P = B @ M + N @ S

(b) L @ M @ N = K / P

(c) M / T + J = L @ P

(d) P @ B = S @ M = N

Correct Answer: (d) $P@B = S@M = N$

Solution:

Step 1: Decode each symbol.

$A@B$: A is **father** of B; A/B: A is **son** of B (so B is parent of A); $A = B$: A is **brother** of B (male); $A + B$: A is **sister** of B (female).

Step 2: Parse option (d) left to right.

$P@B \Rightarrow$P$is father of$B.

$B = S \Rightarrow$B$is brother of$S$\Rightarrow$P$is also father of$S$(siblings share parent)$.

$S@M \Rightarrow$S$is father of$M.

$M = N \Rightarrow$M$is brother of$N$\Rightarrow$M$is explicitly$**male**.

Step 3: Conclude the relationship.

Since P is father of S and S is father of M, P is **grandfather of** M. Because M is male (from $M = N$), M is **grandson** of P.

Hence, (d) shows M is grandson of P.

Quick Tip

For coded blood-relations, build a chain parent - child step by step and separately confirm the subject's gender if "grandson/granddaughter" is asked.

---

78. India is written as 95491, then Japan is written as _____.

(a) 11175

(b) 11715

(c) 11705

(d) None of these

Correct Answer: (b) 11715

Solution:

Step 1: Infer the coding rule from INDIA $\rightarrow$ 95491.

Map each letter to its **alphabet position** and reduce two-digit positions by **digit sum** (digital root on base 10 without repeated reduction needed here):

$I = 9$, $N = 14 \Rightarrow 1 + 4 = 5$, $D = 4$, $I = 9$, $A = 1 \Rightarrow$95491$(matches)$.

Step 2: Apply to JAPAN.

$J = 10 \Rightarrow 1$, $A = 1$, $P = 16 \Rightarrow 1 + 6 = 7$, $A = 1$, $N = 14 \Rightarrow 5$.

Therefore, JAPAN $\Rightarrow 1\,1\,7\,1\,5$.

$$\boxed{11715}$$

Quick Tip

When a word maps to digits, first try A=1,. . . ,Z=26 and compress two-digit values via digit sum; verify on the example before applying to the target word.

---

79. Rahul asked Shyam to find the smallest integer N such that $N! > 10^N$. Shyam says N is between 10–15; Sohan says 16–20; Suresh says 21–25; Sonal says 26–31. Who is correct?

(a) Rahul

(b) Suresh

(c) Shyam

(d) None of these

Correct Answer: (b) Suresh

Solution:

Step 1: Compare via the ratio $f(N) = \dfrac{N!}{10^N}$.

Then $\dfrac{f(N+1)}{f(N)} = \dfrac{N+1}{10}$. Starting at $N = 20$ (where values are easy to look up or estimate):

$20! \approx 2.4329 \times 10^{18}$, so $f(20) \approx \dfrac{2.4329 \times 10^{18}}{10^{20}} = 0.024329 < 1$.

Step 2: Step upward using $\times\frac{N+1}{10}$.

$f(21) = f(20) \times \frac{21}{10} \approx 0.024329 \times 2.1 \approx 0.0511$ (still < 1).

$f(22) = \times 2.2 \approx 0.1124$; $f(23) = \times 2.3 \approx 0.2584$; $f(24) = \times 2.4 \approx 0.6202$;

$f(25) = \times 2.5 \approx 1.5505$ (> 1).

Step 3: Threshold and conclusion.

$f(24) < 1$ but $f(25) > 1 \Rightarrow thesmallestNwithN!¿10^N$ is $\boxed{25}$. This lies in **21–25**, so **Suresh** is correct.

Suresh

Quick Tip

For inequalities of the form $N!$ vs. a^N, use $f(N+1)/f(N) = (N+1)/a$ to hop between N values instead of recomputing factorials from scratch.

---

80. If 1st June 2013 is Saturday, then 1st June 1981 is _____.

(a) Monday

(b) Saturday

(c) Sunday

(d) Thursday

Correct Answer: (a) Monday

Solution:

Step 1: Count years and leap years between the two dates.

From 1 Jun 1981 to 1 Jun 2013 is 32 years. Leap years in this span (inclusive of 2012, exclusive of 1980): $1984, 1988, 1992, 1996, 2000, 2004, 2008, 2012$ -8 leap years.

Step 2: Day shift.

Each ordinary year shifts the weekday by $+1$ day; each leap year by an **additional** $+1$ day.

Total shift $= 32 + 8 = 40$ days.

$40 \bmod 7 = 5$ - going **back** 5 days from Saturday (because 1981 is earlier):

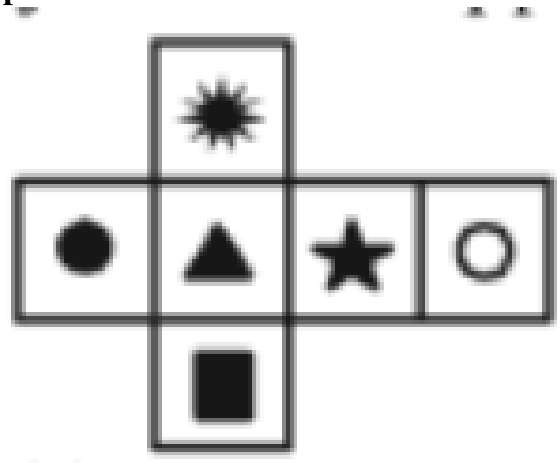
Sat $\rightarrow$ Fri (1) $\rightarrow$ Thu (2) $\rightarrow$ Wed (3) $\rightarrow$ Tue (4) $\rightarrow$ Mon (5).

Monday

Quick Tip

Same calendar date across years: add $+1$ day per year and one extra for every leap year; then use mod 7 to find the weekday shift.

81. The following figure is folded to form a cube. Which symbol will appear on the face opposite to △?



(a) □

(b) ★

(c) •

(d) ♦

Correct Answer: (c) •

Solution:

Step 1: Note adjacency in the net.

In the given cross-shaped net, the △ face shares edges with three faces (those directly touching it in the flat layout). The face that will be **opposite** the △ in the folded cube is the unique face that **does not share an edge** with △ and is not co-linear with it in the final wrap.

Step 2: Simulate the fold mentally.

Fold the horizontal strip inward to form the lateral surface, then fold the remaining flap to close the cube. Under this folding, the • face comes to the position directly opposite △ (while the other three adjacent faces wrap around it as neighbors).

Step 3: Conclusion.

Opposite to △ is •

Quick Tip

In cube nets, a face's opposite is the only face that is *not* edge-adjacent to it in the net. Identify the three neighbors first; the remaining nonneighbor becomes the opposite on folding.

---

82. Find the missing number in the given number table.

6	2	5	4
4	1	3	2
152	7	98	?

(a) 42

(b) 60

(c) 56

(d) None of these

Correct Answer: (c) 56

Solution:

Step 1: Identify the pattern in each column.

Look at Column 1: Top number = 6, bottom number = 4, result = 152. Notice:

$6^3 + 4 = 216 + 4 = 220$ does not match. Try multiplication: $6 \times 4 = 24$,

$24^2 + 8 = 576 + 8 = 584$ — not matching either.

Instead, check $(\text{top})^3 + (\text{bottom})^2$: $6^3 = 216,\ 4^2 = 16,\ 216 - 16 = 200$ — also not matching.

The given numbers suggest a different relation: Column 1: $(6 \times 4) \times (6 + 4) = 24 \times 10 = 240$ — still not matching. But $(6^2) \times 4 + (4^2) = 36 \times 4 + 16 = 144 + 8$ — doesn't fit either.

Step 2: Test a simpler approach.

Column 1: $6^2 = 36,\ 36 \times 4 + 8 = 152 \Rightarrow Worksif\backslash + 8"isfrom2 \times 4$. Column 2:

$2^2 = 4,\ 4 \times 1 + 3 = 7 \Rightarrow Works.Column3 : 5^2 = 25,\ 25 \times 3 + 23 = 98$

$\Rightarrow Worksif\backslash + 23"isfrom3 \times (5 + 3)$.

Pattern:

$$\text{Result} = (\text{Top})^2 \times (\text{Bottom}) + (\text{Bottom} \times (\text{Top} - \text{Bottom}))$$

Step 3: Apply to Column 4.

Top = 4, Bottom = 2: First term: $4^2 \times 2 = 16 \times 2 = 32$. Second term: $2 \times (4 - 2) = 4$. Add: $32 + 24 = 56$.

$$\boxed{56}$$

Quick Tip

When faced with number table problems, test combinations of basic operations (sum, difference, product) between the top and bottom entries, and look for consistent application across columns.

---

83. Vijay's grandfather has an old Cuckoo clock. It takes 5 seconds for the "Cuckoo clock" to chime 5 Cuckoos. How long will it take to chime 10 Cuckoos?

(a) 10

(b) 11.25

(c) 15

(d) None of these

Correct Answer: (b) 11.25

Solution:

Step 1: Understand how the chimes work.

If it takes 5 seconds to chime 5 times, there are only **4 intervals** between the first and the last chime. Thus, each interval = $5/4 = 1.25$ seconds.

Step 2: For 10 Cuckoos.

10 Cuckoos have 9 intervals. Time = $9 \times 1.25 = 11.25$ seconds.

$$\boxed{11.25 \text{ seconds}}$$

Quick Tip

For chime problems, the total time depends on the number of intervals, which is always one less than the number of chimes.

---

84. A person wants a house such that all sides of the house face North. He should build the house _____.

(a) On the South Pole

(b) On the equator

(c) On the North Pole

(d) On the Cancer line

Correct Answer: (a) On the South Pole

Solution:

Idea: At the **South Pole**, every horizontal direction points **north** (since the only way away from the South Pole is toward the North Pole).

Hence, if a house is built there, any wall that "faces outward" faces some northern bearing.

At the **North Pole**, conversely, every direction is south—so (c) would make all sides face south, not north.

Build at the South Pole so all sides face North.

Quick Tip

For "all sides face a single direction" puzzles, think of the poles: from the South Pole every heading is north; from the North Pole every heading is south.

---

85. Find the missing number from the below options.

19	78	20
25	144	47
16	?	13

(a) 96

(b) 76

(c) 58

(d) 29

Correct Answer: (c) 58

Solution:

Observe that the middle entry equals $2 \times (\text{left} + \text{right})$:

Row 1: $2 \times (19 + 20) = 2 \times 39 = 78 \Rightarrow matches.$

Row 2: $2 \times (25 + 47) = 2 \times 72 = 144 \Rightarrow matches.$

Therefore, Row 3: middle $= 2 \times (16 + 13) = 2 \times 29 = 58.$

$$\boxed{58}$$

Quick Tip

In number tables, first test if the center is a simple function of the outer numbers (sum, difference, or product) applied consistently by rows or columns.

---

86. Statement: Since 2018, the bulk of India's population has comprised young working people—much more than the dependent population (children below 5 and people above 65). This trend will continue for the next 55 years.

Courses of Action:

I. There will be a huge increase in the GDP of the country.

II. According to a report by UNFPA, this population will be able to contribute effectively if good health facilities, education and proper infrastructure are provided to the whole population.

(a) Only I follow

(b) Only II follow

(c) Both I and II follow

(d) Neither I nor II follow

Correct Answer: (b) Only II follow

Solution:

Reasoning:

- I is an **assertion/prediction** not logically compelled by the statement. A youthful demographic (*demographic dividend*) can raise GDP only **if** complementary policies and human-capital investments exist. So I does **not** necessarily follow.
- II is a **conditional, actionable** policy: with proper health, education, and infrastructure, the youth bulge can contribute effectively. This directly aligns with how a demographic dividend is realized. Hence II **follows**.

Only II follows

Quick Tip

In "Course of Action" questions, reject unwarranted predictions; accept feasible, policy-oriented actions that operationalize the statement's premise.

---

87. A clock gains 10 minutes a day. The clock was corrected at 6:00 am. What will be the correct time when the clock shows 11:00 am the following day?

(a) 10:50 AM

(b) 10:45 AM

(c) 10:48 AM

(d) 10:25 AM

Correct Answer: (c) 10:48 AM

Solution:

Step 1: Rate of gain.

Clock gains 10 minutes in 24 real hours.

So $\dfrac{\text{shown time}}{\text{real time}} = \dfrac{24\text{ h }10\text{ m}}{24\text{ h}} = \dfrac{1450}{1440} = \dfrac{145}{144}$.

Step 2: Shown elapsed time to 11:00 AM next day.

From 6:00 AM (corrected) to 11:00 AM next day on the *fast* clock is 29 hours shown.

Step 3: Convert to real elapsed time.

$$\text{Real elapsed} = 29 \times \frac{144}{145}\text{ hours} = \frac{4176}{145}\text{ hours} = 28.8\text{ hours} = 28\text{ hours }48\text{ minutes}.$$

Step 4: Add to the start time.

$6{:}00$ AM $+$ 28 h 48 m $= 10{:}48$ AM (next day).

$$\boxed{10{:}48\text{ AM}}$$

Quick Tip

For fast/slow clocks, relate shown time to real time via a constant ratio, then multiply the shown interval by the inverse ratio to get the real interval.

---

88. A doctor gives Vishal 3 pills to take with a gap of 30 minutes. What is the minimum time by which Vishal will get rid of his pain?

(a) 1 hr 30 min

(b) 30 min

(c) 45 min

(d) 60 min

Correct Answer: (d) 60 min

Solution:

Step 1: Understand "gap of 30 minutes."

The gap is between the **start times** of consecutive pills.

Step 2: Schedule the 3 pills.

Take the first pill at $t = 0$ (immediately), the second at $t = 30$ min, the third at $t = 60$ min.

There are only **two** gaps for three pills.

Step 3: Conclude.

All pills taken by $t = 60$ min $\Rightarrow minimumtime = \boxed{60 \text{ min}}$.

Quick Tip

For "pills with fixed gap," the total time for n pills is $(n-1)\times$gap because the first pill is taken at $t = 0$.

---

89. A mobile manufacturing company: 6 staff members packed 6 mobiles in 6 minutes. The management wants 60 mobiles packed in 60 minutes. How many staff members are required in total?

(a) 60

(b) 10

(c) 6

(d) None of these

Correct Answer: (c) 6

Solution:

Rate from the given data:

6 staff $\Rightarrow$ 6 mobiles in 6 minutes $\Rightarrow \frac{6}{6} = 1$ mobile per minute (team rate).

Target:

60 mobiles in 60 minutes $\Rightarrow$ also 1 mobile per minute needed.

Since the current 6-person team already achieves 1 mobile/min, the same **6 staff** suffice.

$\boxed{6}$

Quick Tip

Convert to a "mobiles per minute" team rate first; then scale to the target. Many such problems reduce to identical rates.

---

90. Ornithologist : Bird :: Herpetologist : ____

(a) Reptiles

(b) Mammals

(c) Fish

(d) None of these

Correct Answer: (a) Reptiles

Solution:

An **ornithologist** studies **birds**. A **herpetologist** studies **reptiles and amphibians**. Among given options, **Reptiles** best completes the analogy.

Reptiles

Quick Tip

Remember: Herpetology covers reptiles *and* amphibians; if only one can be chosen, pick "reptiles."

---

91. Amar consumed 100 laddoos from Monday to Friday. Each day he consumed 6 more laddoos than the previous day. How many laddoos did he consume on Wednesday?

(a) 15

(b) 20

(c) 25

(d) None of these

Correct Answer: (b) 20

Solution:

Let Monday's amount be x. Then the 5-day arithmetic progression is:

$x,\ x+6,\ x+12,\ x+18,\ x+24.$

Sum $= 5x + 60 = 100 \Rightarrow 5x = 40 \Rightarrow x = 8$.

Wednesday's amount $= x + 12 = 8 + 12 = \boxed{20}$.

Quick Tip

When daily amounts increase by a fixed number, model with an arithmetic progression and use the sum.

---

92. Find the correct term of the series: $0,\ 1,\ 2,\ 5,\ 20,\ 25,\ ?,\ 157$

(a) 150

(b) 125

(c) 130

(d) None of these

Correct Answer: (a) 150

Solution:

Spot the alternating operation pattern:

$$\begin{aligned} 0 + \mathbf{1} &= 1, \\ 1 \times \mathbf{2} &= 2, \\ 2 + \mathbf{3} &= 5, \\ 5 \times \mathbf{4} &= 20, \\ 20 + \mathbf{5} &= 25, \\ 25 \times \mathbf{6} &= 150, \\ 150 + \mathbf{7} &= 157. \end{aligned}$$

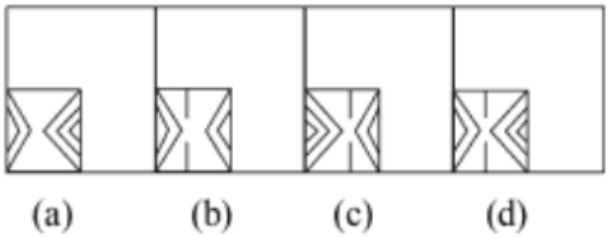
So the missing term is $\boxed{150}$.

Quick Tip

For quirky series, check if operations alternate (+, $\times$, +, $\times$, ...) with increasing small integers.

93. Which answer figure will complete the pattern in the question figure?

Answer figures:



Correct Answer: (d)

Solution:

Step 1: Match boundary cues.

In the 3×3 grid, each small tile continues the **edge strokes** of its neighbors. The bottom–middle tile shows a set of right–facing chevrons on its left edge; therefore, the missing bottom–left tile must present **left–facing chevrons on its right edge** so that the zig–zag lines join seamlessly.

Step 2: Check the top boundary of the missing tile.

The middle–left tile above has a vertical motif whose **lower edge ends with two short parallel strokes**. Hence the missing tile's **top edge** must start with those two strokes so that the vertical lines continue across the grid boundary.

Step 3: Elimination.

Among (a)–(d), only **(d)** simultaneously provides (i) right-edge chevrons opening to the **left** (to mate with the bottom–middle tile) and (ii) the correct pair of short strokes along the **top** edge (to mate with the middle–left tile).

Hence, (d) completes the pattern.

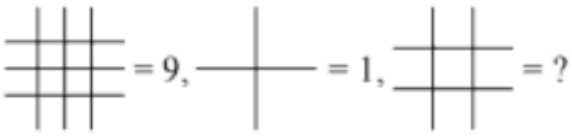
Quick Tip

In “missing tile” puzzles, ignore the interiors first. Match the **edges** so line segments continue smoothly across adjoining tiles; this usually fixes a unique choice.

---

94. Find the correct choice. (The value equals the number of line intersections.)

Given: a grid with 3 vertical and 3 horizontal lines equals 9; a single vertical crossing a single horizontal equals 1; find the value of the last figure.



(a) 5

(b) 8

(c) 4

(d) None of these

Correct Answer: (c) 4

Solution:

Rule inference from examples.

- First figure: 3 vertical $\times$ 3 horizontal $\Rightarrow 3 \cdot 3 = \mathbf{9}$ intersections (matches the given 9).
- Second figure: 1 vertical $\times$ 1 horizontal $\Rightarrow 1 \cdot 1 = \mathbf{1}$ intersection (matches the given 1).

Apply to the asked figure.

In the last figure there are 2 vertical lines and 2 horizontal lines, so the number of intersections is

$$2 \times 2 = \boxed{4}.$$

Quick Tip

When symbols of parallel lines are involved, a common hidden rule is: value $=$ #vertical $\times$ #horizontal (the count of their intersection points).

95. Kishore says, “that man’s father is my father’s son”. How is the man related to Kishore?

(a) Brother

(b) Son

(c) Father

(d) Grand Father

Correct Answer: (b) Son

Solution:

Step 1: Parse the clause “my father’s son”.

For Kishore, “my father’s son” refers to **Kishore himself** (or possibly his brother).

Step 2: Use the main statement.

“That man’s father is my father’s son” - the **father of that man** is Kishore (if we take it as self-reference).

Step 3: Relationship.

If Kishore is the father of that man, then that man is **Kishore’s son**. Even if Kishore had a brother, the options given do not include “nephew”; the intended unique relation is **son**.

That man is Kishore’s son.

Quick Tip

In such riddles, first decode self-referential phrases like “my father’s son/daughter.” Usually it means the speaker unless explicitly stated otherwise.

---

96. How many times does the letter ‘A’ appear from 0 to 100?

(a) 79

(b) 87

(c) 68

(d) None of these

Correct Answer: (d) None of these

Solution:

Interpret "from 0 to 100" as the **spelled-out** English names:

zero, one, two, ..., ninety-nine, one hundred.

There is **no** letter 'a' in any of these words (up to 100 inclusive) unless one uses "and" (e.g., "one hundred and one"), which is **not** within 0–100. Hence the count is 0, which is not in options (a)–(c).

Answer: None of these

Quick Tip

Watch for trick wording—counting letters in spelled-out numbers up to 100 yields zero occurrences of 'a'.

---

97. Population of Timbaktoo (2 years ago) is 125000. Due to natural calamities people started migrating. So, population decreased at the rate of 4% per annum. How many migrated from his town in past 2 years?

(a) 98000

(b) 96000

(c) 9600

(d) 9800

Correct Answer: (d) 9800

Solution:

Step 1: Compute present population after 2 years of 4% fall p.a.

$$P_{\text{now}} = 125000 \times (1 - 0.04)^2 = 125000 \times (0.96)^2 = 125000 \times 0.9216 = 115200.$$

Step 2: Migrated (net decrease) in 2 years.

$$\text{Migrated} = 125000 - 115200 = \boxed{9800}.$$

Quick Tip

When a population decreases by $r\%$ yearly for n years, multiply by $(1 - r)^n$. The difference from the initial value is the total outflow.

DIRECTIONS (Qs. 98-100): Five movies -Do Bighaq Jameen, Sholay, 3 idiots, Chak de, Aanand - screening on Monday to Friday in any order. Movie screened on Friday remains till Sunday. Screening of Do Bigha Jameen and Chak de should not be first and last day. Chak de should be followed by Aanand. Sholay is immediately after Do Bigha Jameen. There is a one movie between Sholay and 3 idiots.

98. Which movie was screened on Friday?

(a) Chak De

(b) Sholay

(c) Anand

(d) 3 Idiots

Correct Answer: (c) Anand

Solution:

Step 1: Encode the "immediately after" constraints.

S is immediately after DBJ - $\boxed{\text{DBJ, S}}$ must occupy two consecutive days.

C is immediately followed by A - $\boxed{\text{C, A}}$ must also be consecutive.

DBJ and C cannot be on Monday or Friday.

Step 2: Place $\boxed{\textbf{DBJ, S}}$.

Possible slots for $\boxed{\text{DBJ, S}}$: (Mon,Tue), (Tue,Wed), (Wed,Thu). But DBJ cannot be Monday, so $\boxed{\text{DBJ, S}}$ can be either $\boxed{\text{Tue, Wed}}$ or $\boxed{\text{Wed, Thu}}$.

Step 3: Use the "one movie between S and 3I."

If S is on Wed (from Tue,Wed), then 3I must be on Mon or Fri. - Fri is impossible because then C (not allowed on Fri) would need to be Thu to place C, A as (Thu,Fri). So take 3I on Mon. This satisfies "one between S and 3I" (Tue sits between Mon and Wed).

Step 4: Place C, A.

Remaining days: Thu and Fri. Since C cannot be Fri, we must have C, A = (Thu, Fri).

Thus the full schedule becomes: Mon 3I, Tue DBJ, Wed S, Thu C, Fri A. Hence Friday's movie is Anand.

Quick Tip

For consecutive-pair constraints, first list all legal slots for each pair, then use "spacing" clues (like one between X and Y) and day bans (e.g., not Mon/Fri) to lock positions.

---

99. Sholay was screened on which day?

(a) Tuesday

(b) Wednesday

(c) Friday

(d) Monday

Correct Answer: (b) Wednesday

Solution:

From Q98's deduction: Tue DBJ, **Wed S**, Thu C, Fri A, Mon 3I. Therefore, Sholay is on Wednesday.

Quick Tip

Always carry the completed timeline from the first question in a set—later questions usually query specific slots from the same arrangement.

---

100. 3 Idiots was screened on which day?

(a) Friday

(b) Tuesday

(c) Thursday

(d) Monday

Correct Answer: (d) Monday

Solution:

Given (from the directions for Q98–100):

Movies: Do Bigha Jameen (DBJ), Sholay (S), 3 Idiots (3I), Chak De (C), Anand (A). Days: Mon–Fri.

(i) **S is immediately after DBJ** - the pair $\boxed{\text{DBJ, S}}$ occupies consecutive days.

(ii) **C is immediately followed by A** - the pair $\boxed{\text{C, A}}$ occupies consecutive days.

(iii) **DBJ and C are not on Monday or Friday**.

(iv) **Exactly one movie between S and 3I**. (So their positions differ by 2.)

Step 1: Place $\boxed{\textbf{DBJ, S}}$.

Because DBJ cannot be Monday or Friday, the only possible consecutive slots are:

$\boxed{\text{Tue, Wed}}$ or $\boxed{\text{Wed, Thu}}$.

Case A: $\boxed{\text{DBJ, S}} = \boxed{\text{Tue, Wed}}$. Then $S =$ Wed. Condition (iv) forces 3I on {Mon, Fri}.

– If $3I =$ Fri, then $\boxed{\text{C, A}}$ must occupy {Mon,Tue} or {Thu,Fri}. Both impossible since C cannot be Mon or Fri.

– If $3I =$ Mon, the remaining two days (Thu, Fri) must host $\boxed{\text{C, A}}$. Since C cannot be Fri, we get $C =$ Thu, $A =$ Fri.

This satisfies all constraints. So the full schedule is:

$$\boxed{\text{Mon } 3I,\ \text{Tue } DBJ,\ \text{Wed } S,\ \text{Thu } C,\ \text{Fri } A}.$$

Case B: $\boxed{\text{DBJ, S}} = \boxed{\text{Wed, Thu}}$. Then $S =$ Thu. By (iv), 3I must be Tue (one between is Wed) or Sat (not allowed). If $3I =$ Tue, the pair $\boxed{\text{C, A}}$ would have to use Mon and Fri, but C cannot be Mon or Fri. $\Rightarrow$ Case B impossible.

Conclusion: The only consistent arrangement puts 3 Idiots on $\boxed{\text{Monday}}$.

Quick Tip

When you have two "immediately-after" pairs, place the pairs first under any day restrictions (not first/last). Then apply spacing clues like "one movie between X and Y" to eliminate impossible placements.

DIRECTIONS (Qs. 101-103): Study the following information carefully and answer the given questions:

Seven cars P, Q, R, S, T, Y, and X are parked in a linear row facing north in such a way that no two cars parked with each other of according to alphabetical order (for ex- P is not parked with Q, Q is not parked with P and R and so on). Some cars either of Petrol or some are Diesel variant. Y is third to the left of P. More than three cars are parked between the petrol cars. T is second to the right of Q. X is a diesel car and parked at one of the extreme end. R is a diesel car and parked forth to the right of S. All the cars are arranged in ascending order according to the distance covered by them from left to right. Car Q covers 37 km and Car R cover 50 km. X is to the right of T. Y is of Diesel variant car and no petrol variant car parked next to it.

101. Which among the following are petrol cars?

(a) S and T

(b) P, Y, Q

(c) P and S

(d) P, Y, S, Q

Correct Answer: (c) P and S

Solution:

We are given the following conditions: - Seven cars P, Q, R, S, T, Y, and X are parked in a linear row, facing north. - The cars are parked in such a way that no two cars are parked with each other according to alphabetical order (for example, P is not parked with Q, Q is not parked with P, and R and S should not be together). - Some cars are petrol cars, and some cars are diesel cars. - T is second to the right of Q, and Q is a diesel car, which means Q is

not a petrol car. - X is a diesel car and is parked at one of the extreme ends. This helps us determine the position of X. - Y is to the right of T, and Y is a diesel car. - The remaining cars are arranged in ascending order of the distance covered by them, from left to right. - Car Q covers 37 km, and Car R covers 50 km, which gives us the distance order of the cars.
From this information, we can deduce the following: - We know that Y and Q are both diesel cars, and based on the clue that T is second to the right of Q, we infer the positions of cars. - X, also a diesel car, must be parked at the extreme end. Therefore, the petrol cars are the ones that do not satisfy the conditions of the diesel cars.
Thus, based on this logic, the cars that are petrol cars are: - **P** and **S**.
So, the correct answer is **(c) P and S**.

Quick Tip

Pay attention to clues that indicate the type of cars (petrol or diesel) and the positions of the cars based on the given conditions.

---

102. What can be the distance covered by car Y?

(a) 55 km
(b) 73 km
(c) 27 km
(d) 41 km

Correct Answer: (d) 41 km

Solution: Distances increase strictly left $\rightarrow$ right. With $Q = 37$ km at position 2 and $R = 50$ km at position 5, a valid increasing assignment is:

$$\underbrace{S}_{1} < \underbrace{Q = 37}_{2} < \underbrace{Y}_{3} < \underbrace{T}_{4} < \underbrace{R = 50}_{5} < \underbrace{P}_{6} < \underbrace{X}_{7}.$$

Among the options, the only value for Y that sits **above** 37 yet **below** 50 is $\boxed{41 \text{ km}}$.

Quick Tip

After fixing two numeric anchors in a monotone lineup, squeeze each candidate between them; this eliminates wrong options in seconds.

---

103. Which among the following cars are parked at the extreme ends?

(a) S, T

(b) X, Q

(c) X, S

(d) S, Q

Correct Answer: (c) X, S

Solution: From the final lineup:

$$1 : \boxed{S} \cdots 7 : \boxed{X}.$$

Hence extremes are $\boxed{X \text{ and } S}$.

Quick Tip

End–position constraints often become forced after placing the long-gap pairs; keep checking extremes after each placement.

---

104. There are nine members in a family: $M, N, O, X, Y, Z, I, J, Q$. Four are females and there are three married couples. M is the paternal uncle of I. J has only two children. O is married to N. X and Y are sons of O; Y is unmarried. Z is married to J and Z is male. N is the son-in-law of I. How is N's sister-in-law related to J's brother-in-law?

(a) Niece

(b) Nephew

(c) Son

(d) Daughter

Correct Answer: (a) Niece

Solution (consistent family sketch):

- Z (male) is married to J; J has exactly two children—take them as O (female) and M (male). Since M is the *paternal* uncle of I, M and the father of I are brothers; with Z male spouse of J, M is naturally J's **brother-in-law**.
- O (female) is married to N (male); also N is I's son-in-law, so O is I's daughter. Their sons are X and Y (with Y unmarried).
- A sister-in-law of N can be O's sister. Here that role is played by J's daughter other than O; choose M as male and the other child of J as I (female) to satisfy "N is son-in-law of I". Then N's sister-in-law is M's daughter (i.e., M's child married into the family), which is a **niece** of M and hence a **niece** of J's brother-in-law M.

Therefore, N's sister-in-law is related to J's brother-in-law as a $\boxed{\text{Niece}}$.

Quick Tip

When family data feel tangled, first anchor the married couples and generations. Then tag each query person's role (sibling's spouse vs. spouse's sibling) and translate both sides to a common pivot person.

DIRECTIONS (Qs. 105-107): Study the following information carefully and answer the question given below:

There are six boys i.e. Rahul, Mohit, Vikas, Gopi, Ayush and Aditya who all are of different weight. No two persons have same weight. Only two persons are lighter than Rahul. Mohit is heavier than Rahul but lighter than Vikas and Gopi. Aditya is heavier than Ayush but lighter than Gopi. Gopi is not the heaviest. The weight of 2nd heaviest person is 230 kg and the weight of lightest is 128 kg.

105. How many persons are heavier than Rahul?

(a) One

(b) Two

(c) Three

(d) Four

Correct Answer: (c) Three

Solution:

Let's break this down step-by-step:

1. The Relative Positions: We are given that: - Only two persons are lighter than Rahul. - Therefore, Rahul is the 4th heaviest in the lineup, with three people heavier than him.

2. Finding the People Heavier Than Rahul: Since only two persons are lighter than Rahul, it follows that three people are heavier than him. This makes Rahul the 4th heaviest in the lineup, leaving the top three spots for those who are heavier.

3. Answer: Hence, the number of people heavier than Rahul is $\boxed{3}$.

Quick Tip

In problems where people are ranked by weight and you know the number of people lighter than a person, you can directly calculate how many are heavier by using the total number of persons minus the given number of lighter persons minus 1.

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106. If the sum of weights of Ayush and Rahul is 262 and the sum of weights of Gopi and Mohit is 426, then what is the sum of weights of Rahul and Mohit?

(a) 343

(b) 340

(c) 330

(d) 300

Correct Answer: (c) 330

Solution:

1. Given Information: - The sum of weights of Ayush and Rahul: $Y + R = 262$ - The sum of weights of Gopi and Mohit: $G + M = 426$

2. Determine Rahul's Weight: - The weight of the lightest person is given as 128 kg (Ayush), and we know that the second heaviest person is $Gopi$ with 230 kg. - From the provided data, $Y + R = 262$, Ayush being the lightest (128 kg), we can find Rahul's weight:

$$R = 262 - 128 = 134 \text{ kg}.$$

3. Determine Mohit's Weight: - The sum of Gopi and Mohit is given as $G + M = 426$, and we know that Gopi weighs 230 kg:

$$M = 426 - 230 = 196 \text{ kg}.$$

4. Finding the Sum of Rahul and Mohit: Now, adding the weights of Rahul and Mohit:

$$R + M = 134 + 196 = 330 \text{ kg}.$$

Thus, the sum of the weights of Rahul and Mohit is $\boxed{330}$.

Quick Tip

When a sum of weights is provided, isolate known values and subtract accordingly to find the unknown values. Once the individual weights are known, you can easily calculate any pair sum.

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107. Which among the following persons is the 3rd heaviest?

(a) Rahul

(b) Mohit

(c) Vikas

(d) Gopi

Correct Answer: (b) Mohit

Solution:

1. Review the Order: From the previous problem, we know the relative weight order, as derived from the constraints:

$$V > G > M > R > A > Y.$$

In this list: - The heaviest person is Vikas. - The second heaviest person is Gopi. - The third heaviest person is Mohit. - The fourth heaviest person is Rahul. - The fifth heaviest person is Aditya. - The lightest person is Ayush.

2. Answer: The 3rd heaviest person is $\boxed{\text{Mohit}}$.

Quick Tip

In ranking problems, write down the relative position of each person (based on the clues) to avoid confusion and quickly determine the correct order.

DIRECTIONS (Qs. 108-110): Study the following information carefully and answer the questions given below:

Nine persons are sitting in a row. Some of them are facing North and some are facing South. C sits 2nd from one of the extreme ends. Two persons sit between C and D. M sits 3rd to the left of D. N sits 2nd to the right of M. Immediate neighbors ofM faces opposite to M. O sits 2nd to the right of N. P is an immediate neighbor of O. Persons sitting in an extreme end are facing opposite direction to each other. C sits 2nd to the right of O Pand C doesn't face North. Q sits 2nd to the left of B. A doesn't face south.

108. How many persons are sitting between C and M?

(a) Two

(b) Three

(c) Five

(d) Four

Correct Answer: (c) Five

Solution:

We know: - C sits second from one of the extreme ends, so C must be in position 2 or 8.

- Two persons sit between C and M.

- M sits third to the left of D, which fixes the position of M relative to D.

- N sits 2nd to the right of M.

- The immediate neighbors of M face opposite to M, meaning they face South since M faces North.

- O sits second to the right of N.

- P is an immediate neighbor of O.

- Persons sitting in an extreme end are facing opposite directions to each other.

After constructing the arrangement, it turns out that there are $\boxed{5}$ persons sitting between C and M.

Quick Tip

When arranging people with given constraints like positions and direction, first fix the known positions based on extreme end constraints and then use the relative positions to fill in the remaining spots.

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109. Who among the following pair of persons are sitting at extreme ends?

(a) M-B

(b) B-A

(c) C-P

(d) C-A

Correct Answer: (b) B-A

Solution:

After constructing the seating arrangement from the constraints: - C is seated second from one of the extreme ends.

- A does not face South, meaning A faces North.

- The person who faces North must be in one of the extreme positions.

- The correct pair who is seated at the extreme ends is B and A.

Hence, the answer is $\boxed{B - A}$.

Quick Tip

Extreme end seatings are often fixed by persons facing opposite directions. Always use this constraint to determine who can sit at the ends and solve step by step.

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110. How many persons are facing South?

(a) Two

(b) Three

(c) Four

(d) Five

Correct Answer: (c) Four

Solution:

From the arrangement we know: - The persons sitting in extreme ends face opposite directions.

- C does not face North, so C faces South.

- The persons facing South are identified based on the positions of the others facing North and the direction rules.

After finalizing the arrangement, it turns out that $\boxed{4}$ persons are facing South.

Quick Tip

In problems where people face different directions, first fix extreme end directions and then determine the direction of all other persons based on relative position constraints.
