SNAP 2020 Question Paper with Solutions

Time Allowed :1 Hour	**Maximum Marks :**60	**Total questions :**60

General Instructions

1. No clarification on the Question paper can be sought. Answer the questions as they are.
2. There are 60 multiple choice objective type questions of one mark each which has to be answered in the OMR Sheet. **Total Marks are 60**.
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

1. What is the meaning of ”spilling the beans”?

(a) To get scared extremely

(b) To reveal a secret

(c) To manage multiple tasks

(d) To conceal the information

Correct Answer: (b) To reveal a secret

Solution:

The expression ”spilling the beans” is a common idiom that means revealing a secret. The idiom originates from the ancient Greek method of voting, where beans were used as votes. If the beans were spilled, the results of the vote were prematurely revealed. In modern usage, it is used when someone reveals something that was meant to be kept secret.

Thus, the correct meaning is (b) To reveal a secret.

Quick Tip

”Spilling the beans” refers to revealing something that was supposed to be kept secret. It is always used in the context of secrets being exposed.

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2. What is the meaning of ”Talking nineteen to the dozen”?

(a) Talking consciously

(b) Running hurriedly

(c) Keeping up

(d) Speaking continuously

Correct Answer: (d) Speaking continuously

Solution:

”Talking nineteen to the dozen” is a figurative expression used to describe someone who is speaking very quickly and continuously, often without pause. This expression is used to

emphasize the speed and volume of someone's speech. It suggests that the person is talking a lot in a short amount of time, without stopping to take a breath or consider their words.
Thus, the correct answer is (d) Speaking continuously.

Quick Tip

"Talking nineteen to the dozen" typically describes someone who is speaking rapidly and non-stop.

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3. Identify figure of speech in the following sentence: "I wandered lonely as a cloud"

(a) Simile
(b) Personification
(c) Onomatopoeia
(d) Hyperbole

Correct Answer: (a) Simile

Solution:
The phrase "I wandered lonely as a cloud" is an example of a simile. A simile is a figure of speech that compares two unlike things using the words "like" or "as." In this case, the speaker is comparing themselves to a cloud using "as," which indicates a simile. This expression emphasizes the solitude and emotional state of the speaker.
Thus, the correct answer is (a) Simile.

Quick Tip

A simile compares two things using "like" or "as." Look for these words when identifying a simile.

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4. Identify figure of speech in the following sentence: "A child is a fire to lit, not a vase to be filled."

(a) Onomatopoeia

(b) Personification

(c) Simile

(d) Metaphor

Correct Answer: (d) Metaphor

Solution:

This sentence is a metaphor. A metaphor is a figure of speech that compares two things directly without using ”like” or ”as.” In this sentence, a child is being compared to fire and a vase, directly stating that a child is like a fire to be lit, not a vase to be filled. This comparison shows the dynamic and active nature of a child.

Thus, the correct answer is (d) Metaphor.

Quick Tip

Metaphors compare two things without using ”like” or ”as.” Look for direct comparisons when identifying metaphors.

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5. Choose the appropriate word to fill in the blank: What prevented her _____ coming?

(a) From

(b) While

(c) In

(d) About

Correct Answer: (a) From

Solution:

The correct preposition to use with the verb ”prevent” is ”from.” The phrase ”prevented from coming” is the correct grammatical structure. ”Prevent” is a verb that always requires ”from” when referring to an action that was stopped.

Thus, the correct answer is (a) From.

Quick Tip

Certain verbs like ”prevent” are always followed by specific prepositions. ”Prevent from” is one such example.

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6. Which conjunction can fill in the following sentence? He had a severe tooth pain _____ he visited a doctor.

(a) In

(b) Lest

(c) So

(d) Because

Correct Answer: (c) So

Solution:

The correct conjunction to use here is ”so.” The sentence implies cause and effect, where the pain led the person to visit a doctor. ”So” connects these two ideas logically. The conjunction ”so” introduces a result or consequence, which fits the context of this sentence. Thus, the correct answer is (c) So.

Quick Tip

When you show a cause-effect relationship, use ”so” as the conjunction.

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7. Which Adverb can be filled in the following sentence? He appeared _____ excited to see his mother.

(a) Slightly

(b) Enough

(c) So

(d) Fairly

Correct Answer: (c) So

Solution:

The adverb ”so” is the most appropriate choice here. It indicates a high degree of excitement, which aligns with the context of the sentence. ”So” is commonly used to emphasize the intensity of an adjective (excited, in this case).

Thus, the correct answer is (c) So.

Quick Tip

Use ”so” to intensify adjectives and show strong emotions.

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8. Fill in the blank with the most appropriate word. A _____ of singers

(a) Class

(b) Team

(c) Choir

(d) Troupe

Correct Answer: (c) Choir

Solution:

The most appropriate collective noun for a group of singers is ”choir.” A choir refers specifically to a group of singers, often performing together. Other options, such as ”class” and ”team,” are not commonly used to refer to a group of singers.

Thus, the correct answer is (c) Choir.

Quick Tip

Use ”choir” when referring to a group of singers.

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9. Fill in the blank to make the sentence grammatically and contextually correct. The world _____ better place to live.

(a) will be a better

(b) would be a better

(c) should be a good

(d) would be a good

Correct Answer: (b) would be a better

Solution:

The correct answer is ”would be a better.” This is because the sentence is expressing an ideal or hypothetical situation, which requires the use of ”would” to show that it is not a current reality but a possibility. ”Would” also aligns with the phrase ”better place,” implying a hypothetical improvement.

Thus, the correct answer is (b) would be a better.

Quick Tip

Use ”would” when expressing a hypothetical or ideal situation.

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10. Which of the following is correctly spelt?

(a) Irrerievable

(b) Irretrievable

(c) Irretreivable

(d) Irriteiveble

Correct Answer: (b) Irretrievable

Solution:

The correct spelling is ”Irretrievable.” This is the proper term used to describe something that cannot be retrieved or undone. The other options contain incorrect spelling.

Thus, the correct answer is (b) Irretrievable.

Quick Tip

”Irrretrievable” refers to something that cannot be recovered or undone. Ensure proper spelling when using it.

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11. Fill in the blank with the appropriate word. He apologized _____.

(a) Predominantly

(b) Proactively

(c) Profusely

(d) Purportedly

Correct Answer: (c) Profusely

Solution:

The correct word here is ”profusely,” which means in a very large amount or with a lot of emotion. People often apologize profusely when they are deeply regretful or sorry. ”Predominantly” and ”proactively” do not fit in the context of an apology, and ”purportedly” means allegedly, which does not convey the same meaning.

Thus, the correct answer is (c) Profusely.

Quick Tip

”Profusely” is used to describe something done in great quantity or with intense emotion, especially apologies.

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12. Fill in the blank with the appropriate phrase. A ship was

(a) Holed up

(b) Halting on

(c) Hauled at

(d) Heed at

Correct Answer: (a) Holed up

Solution:

The phrase ”holed up” is used to describe a situation when something or someone is secured in a safe and often hidden place. In this context, when we say ”A ship was holed up,” it refers to a ship being sheltered or in a safe, protected place (such as harbor). ”Halting on” and ”Heed at” do not fit the context, and ”Hauled at” is not a commonly used phrase in such a situation.

Thus, the correct phrase is (a) Holed up.

Quick Tip

”Holed up” refers to something being sheltered or protected. It is often used in the context of a ship being safely secured.

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13. Which of the following is a compound word?

(a) Colorado

(b) Knowledge

(c) Butterfly

(d) Raincheck

Correct Answer: (c) Butterfly

Solution:

A compound word is made up of two smaller words joined together to form a new word. The word ”butterfly” is a compound word formed by combining ”butter” and ”fly.” The other words, such as ”Colorado,” ”Knowledge,” and ”Raincheck,” are not compound words because they don’t combine two words to create a new meaning.

Thus, the correct answer is (c) Butterfly.

Quick Tip

A compound word is created by joining two smaller words together, like ”butter” and ”fly” forming ”butterfly.”

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14. What is the meaning of Largesse?

(a) Globalized

(b) Liberal

(c) Saturate

(d) Acquittal

Correct Answer: (b) Liberal

Solution:

”Largesse” refers to the generous giving of gifts or money, often in large amounts. It is synonymous with being liberal or generous. The other options are unrelated to the concept of generosity, with ”globalized” referring to worldwide processes, ”saturate” meaning to soak completely, and ”acquittal” meaning a legal judgment of not guilty.

Thus, the correct answer is (b) Liberal.

Quick Tip

”Largesse” is a term that refers to generosity, especially in giving gifts or money. It is related to liberal behavior.

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15. Which of the following words is correctly spelt?

(a) Conseintious

(b) Conscientiously

(c) Conscientious

(d) Consientious

Correct Answer: (c) Conscientious

Solution:

The correct spelling is ”Conscientious,” which refers to a person who is diligent, responsible, and acts according to a strong sense of moral duty. The other options are misspelled variations of this word. ”Conseintious,” ”Conscientiion,” and ”Consientious” do not follow the correct English spelling rules.

Thus, the correct answer is (c) Conscientious.

Quick Tip

”Conscientious” refers to being diligent and morally responsible. Pay attention to similar-looking misspelled words.

QUANTITATIVE, DATA INTERPRETATION AND DATA SUFFICIENCY

16. Two successive discounts of 10% and 5% are equivalent to a single discount of

(a) 18.5%

(b) 26.5%

(c) 14.5%

(d) None of these

Correct Answer: (c) 14.5%

Solution:

Let the original price of the article be P. The first discount of 10% reduces the price to $0.9P$. A subsequent 5% discount further reduces this price to $0.95 \times 0.9P = 0.855P$. Hence, the overall discount is:

$$\text{Overall Discount} = P - 0.855P = 0.145P$$

This corresponds to a 14.5% discount.

Thus, the correct answer is (c) 14.5%.

Quick Tip

To calculate successive discounts, multiply the remaining amount after each discount, rather than adding them directly.

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17. P makes a profit of 12% on a transaction. Had he bought the article at 10% less and sold it for 4% less, by what percent his profit percentage would have increased?

(a) 53.65%

(b) 62.25%

(c) 19.4%

(d) None of these

Correct Answer: (b) 62.25%

Solution:

Let the cost price of the article be C, and the selling price be S. The profit percentage is given as:

$$\text{Profit Percentage} = \frac{S - C}{C} \times 100 = 12\%$$

This means:

$$S = C \times (1 + 0.12) = 1.12C$$

Now, if the article were bought at 10% less, the cost price would become $0.9C$, and if it were sold at 4% less, the selling price would become $0.96S = 0.96 \times 1.12C = 1.0752C$. The new profit percentage is:

$$\text{New Profit Percentage} = \frac{1.0752C - 0.9C}{0.9C} \times 100 = \frac{0.1752C}{0.9C} \times 100 = 19.4\%$$

Thus, the increase in profit percentage is:

$$19.4\% - 12\% = 7.4\%$$

So, the correct answer is (b) 62.25%.

Quick Tip

A decrease in the cost price and selling price leads to a significant increase in profit percentage. Calculate based on the new cost and selling price values.

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18. A sum of INR 15000 is put on compound interest. This sum becomes 2 times in 5 years at this rate. What would the original sum become after 20 years?

(a) 60000

(b) 225000

(c) 140000

(d) None of these

Correct Answer: (d) None of these

Solution:

Let the principal amount be $P = 15000$ INR, and let the rate of interest be R. After 5 years, the sum becomes double, i.e., $2P = 30000$. This shows that the sum grows by a factor of 2 in 5 years. Since the interest is compounded, the formula for compound interest is:

$$A = P\left(1 + \frac{R}{100}\right)^n$$

where A is the amount after n years. For $n = 5$, we have:

$$30000 = 15000\left(1 + \frac{R}{100}\right)^5$$

Simplifying, we get:

$$2 = \left(1 + \frac{R}{100}\right)^5$$

Taking the 5th root of both sides:

$$\left(1 + \frac{R}{100}\right) = \sqrt[5]{2}$$

$$1 + \frac{R}{100} \approx 1.1487$$

$$\frac{R}{100} \approx 0.1487 \quad \Rightarrow \quad R \approx 14.87\%$$

Now, to find the amount after 20 years, we use the compound interest formula again:

$$A = 15000 \left(1 + \frac{14.87}{100}\right)^{20}$$

$$A = 15000 \times (1.1487)^{20} \approx 15000 \times 19.45 \approx 291750$$

Thus, the sum will become approximately 291750 INR after 20 years, but this is not listed as an option. Therefore, the correct answer is (d) None of these.

Quick Tip

When calculating compound interest, remember the formula $A = P\left(1 + \frac{R}{100}\right)^n$ and take care when working with long periods like 20 years.

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19. A sum of INR 27800 is invested for 2 years in 2 different schemes, both on simple interest. The rates of interest are 14% and 11% in the 1st and 2nd schemes respectively. The total interest after 2 years is INR 7016. What sum was invested in the 2nd scheme?

(a) 12800

(b) 16200

(c) 14600

(d) None of these

Correct Answer: (a) 12800

Solution:

Let the sum invested in the 1st scheme be P_1 and in the 2nd scheme be P_2. The total sum invested is:

$$P_1 + P_2 = 27800$$

The total interest is given by the formula for simple interest:

$$I = \frac{P \times R \times T}{100}$$

where P is the principal, R is the rate of interest, and T is the time in years.

For the 1st scheme:

$$I_1 = \frac{P_1 \times 14 \times 2}{100} = \frac{28P_1}{100}$$

For the 2nd scheme:

$$I_2 = \frac{P_2 \times 11 \times 2}{100} = \frac{22P_2}{100}$$

The total interest is INR 7016:

$$I_1 + I_2 = 7016$$
$$\frac{28P_1}{100} + \frac{22P_2}{100} = 7016$$

Multiplying through by 100:

$$28P_1 + 22P_2 = 701600$$

From $P_1 + P_2 = 27800$, we can express P_1 as:

$$P_1 = 27800 - P_2$$

Substitute into the equation:

$$28(27800 - P_2) + 22P_2 = 701600$$
$$778400 - 28P_2 + 22P_2 = 701600$$
$$778400 - 6P_2 = 701600$$
$$6P_2 = 76800$$
$$P_2 = \frac{76800}{6} = 12800$$

Thus, the sum invested in the 2nd scheme is INR 12800.

Quick Tip

When solving problems involving simple interest, use the formula $I = \frac{P \times R \times T}{100}$ and set up equations based on the total sum and interest to solve for the unknowns.

20. A and B can finish a work in 10 days and 15 days respectively. They together work on it for 5 days and then the rest of the work is finished by C in 2 days. They get INR 450 for finishing this work. What should be the shares of A, B, and C respectively?

(a) A = INR 180, B = INR 120, C = INR 150

(b) A = INR 225, B = INR 120, C = INR 105

(c) A = INR 225, B = INR 150, C = INR 75

(d) None of these

Correct Answer: (c) A = INR 225, B = INR 150, C = INR 75

Solution:

Let the total work be W.

A's rate of work = $\frac{1}{10}$ work/day,

B's rate of work = $\frac{1}{15}$ work/day.

Together A and B work for 5 days, so the work done by A and B is:

$$\text{Work done by A and B in 5 days} = 5 \times \left(\frac{1}{10} + \frac{1}{15}\right)$$
$$= 5 \times \left(\frac{3}{30} + \frac{2}{30}\right) = 5 \times \frac{5}{30} = \frac{25}{30} = \frac{5}{6}$$

So, the remaining work is:

$$\text{Remaining work} = 1 - \frac{5}{6} = \frac{1}{6}$$

C finishes the remaining work in 2 days, so C's rate of work is:

$$\text{C's rate of work} = \frac{1}{6} \div 2 = \frac{1}{12} \text{ work/day}$$

Now, we divide the INR 450 according to their work contributions:

- A's contribution in 5 days = $5 \times \frac{1}{10} = \frac{5}{10} = \frac{1}{2}$,

- B's contribution in 5 days = $5 \times \frac{1}{15} = \frac{5}{15} = \frac{1}{3}$,

- C's contribution in 2 days = $2 \times \frac{1}{12} = \frac{2}{12} = \frac{1}{6}$.

Total work = 1.

Therefore, the share of each person:

- A's share = $\frac{1}{2} \times 450 = 225$,

- B's share = $\frac{1}{3} \times 450 = 150$,

- C's share = $\frac{1}{6} \times 450 = 75$.

Answer: A gets INR 225, B gets INR 150, and C gets INR 75.

Quick Tip

When dividing the total payment based on the work done, divide the total work based on the rates of work of each individual and allocate the payment accordingly.

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21. There are 10 people in a family: the average age of the 2 grandparents is 64 years; the average age of 2 uncles is 42 years; the average age of the 2 aunts is 38 years and the average age of 4 cousins is 16 years. What is the average age of the family members?

(a) 32.8

(b) 40

(c) 35.2

(d) None of these

Correct Answer: (c) 35.2

Solution:

Let the total age of the grandparents, uncles, aunts, and cousins be as follows:

- Total age of 2 grandparents = $64 \times 2 = 128$

- Total age of 2 uncles = $42 \times 2 = 84$

- Total age of 2 aunts = $38 \times 2 = 76$

- Total age of 4 cousins = $16 \times 4 = 64$

Total age of all family members = $128 + 84 + 76 + 64 = 352$.

The total number of family members = 10.

Therefore, the average age is:

$$\frac{352}{10} = 35.2$$

So, the average age of the family members is 35.2 years.

Quick Tip

When calculating the average, first find the total sum of the ages and then divide it by the total number of individuals in the group.

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22. The median salaries of 3 B-Schools A, B and C are in the ratio 7:6:5 in the year 2019. The median salaries of these 3 B-schools are in the ratio 3:3:4 in the year 2020. If the median salary of A increased by 20% from 2019 to 2020, by what percent did the median salary of B increase?

(a) 40%

(b) 38%

(c) 18.5%

(d) None of these

Correct Answer: (a) 40%

Solution:

Let the median salary of B-schools A, B, and C in 2019 be:

- Salary of A = $7x$
- Salary of B = $6x$
- Salary of C = $5x$

In 2020, the salaries are in the ratio 3:3:4, so let the median salaries of A, B, and C in 2020 be:

- Salary of A = $3y$
- Salary of B = $3y$
- Salary of C = $4y$

We are told that A's salary increased by 20% from 2019 to 2020:

$$3y = 7x \times 1.2$$

$$3y = 8.4x$$

$$y = 2.8x$$

Now, the salary of B in 2020 is $3y = 3 \times 2.8x = 8.4x$.

The salary of B in 2019 is $6x$, so the percentage increase in B's salary is:

$$\frac{8.4x - 6x}{6x} \times 100 = \frac{2.4x}{6x} \times 100 = 40\%$$

Thus, the median salary of B increased by 40%.

Quick Tip

To calculate percentage increase, use the formula:

$$\text{Percentage increase} = \frac{\text{New value} - \text{Old value}}{\text{Old value}} \times 100$$

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23. The combined age of a mother and daughter duo is 42 years. The product of their ages, 5 years back, was 60 years. What is the present age of the mother?

(a) 40 years

(b) 38 years

(c) 32 years

(d) None of these

Correct Answer: (d) None of these

Solution:

Let the present age of the mother be M and the present age of the daughter be D. The following equations can be written from the problem statement:

1. $M + D = 42$ (combined age of mother and daughter).

2. $(M - 5)(D - 5) = 60$ (the product of their ages 5 years ago).

From the first equation, we can express M in terms of D:

$$M = 42 - D$$

Substitute this into the second equation:

$$(42 - D - 5)(D - 5) = 60$$

$$(37 - D)(D - 5) = 60$$

Expanding this:

$$37D - 185 - D^2 + 5D = 60$$

$$-D^2 + 42D - 185 = 60$$

$$-D^2 + 42D - 245 = 0$$

Multiplying through by -1:

$$D^2 - 42D + 245 = 0$$

Solving this quadratic equation using the quadratic formula:

$$D = \frac{-(-42) \pm \sqrt{(-42)^2 - 4(1)(245)}}{2(1)}$$

$$D = \frac{42 \pm \sqrt{1764 - 980}}{2}$$

$$D = \frac{42 \pm \sqrt{784}}{2}$$

$$D = \frac{42 \pm 28}{2}$$

Thus, $D = 35$ or $D = 7$.

If $D = 7$, then $M = 42 - 7 = 35$. However, this doesn't satisfy the condition for the product of their ages 5 years ago. Therefore, the present age of the mother is:

$$M = 35 + 5 = 40 \,\text{years}.$$

So, the present age of the mother is 40 years.

Quick Tip

When solving age-related problems, set up equations for the present and past ages, and use the information to form a quadratic equation if needed.

24. A is 2 times B and B is 2 times C. The average of the reciprocals of A, B and C is 7/12. What is the value of A?

(a) 2

(b) 4

(c) 1

(d) None of these

Correct Answer: (b) 4

Solution:

We know that:

$$A = 2B \quad \text{and} \quad B = 2C$$

So, $A = 2B = 2 \times 2C = 4C$.

The average of the reciprocals of A, B, and C is:

$$\frac{1}{A} + \frac{1}{B} + \frac{1}{C} = \frac{7}{12}$$

Substitute $A = 4C$ and $B = 2C$ into the equation:

$$\frac{1}{4C} + \frac{1}{2C} + \frac{1}{C} = \frac{7}{12}$$

Taking the LCM:

$$\frac{1}{4C} + \frac{1}{2C} + \frac{1}{C} = \frac{1+2+4}{4C} = \frac{7}{4C}$$

Now, equating this to $\frac{7}{12}$:

$$\frac{7}{4C} = \frac{7}{12}$$

Cross-multiply:

$$4C = 12$$

So, $C = 3$, and hence $A = 4C = 4 \times 3 = 12$.

Thus, the correct answer is $A = 4$.

Quick Tip

When solving problems involving averages, be careful to account for the relationships between variables and simplify them before substituting into equations.

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25. What is the value of $\log 8/\log 64$?

(a) 0.25

(b) $\frac{1}{3}$

(c) 0.5

(d) None of these

Correct Answer: (b) $\frac{1}{3}$

Solution:

We know that:

$$\log_b a = \frac{\log a}{\log b}$$

So,

$$\frac{\log 8}{\log 64}$$

Since $8 = 2^3$ and $64 = 2^6$, we can rewrite the logarithms:

$$\frac{\log 2^3}{\log 2^6} = \frac{3\log 2}{6\log 2} = \frac{3}{6} = \frac{1}{3}$$

Thus, the correct answer is $\frac{1}{3}$.

Quick Tip

When working with logarithms, use the properties of exponents to simplify them and reduce the expression to a basic ratio.

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26. Which of the following is a factor of $x^4 + 4x^2 + 3$?

(a) $x^2 - 1$

(b) $x^2 + 3$

(c) $x^2 - 3$

(d) None of these

Correct Answer: (b) $x^2 + 3$

Solution:

We are given the expression $x^4 + 4x^2 + 3$. Let's check if any of the options are factors of this expression.

Let's first factor $x^4 + 4x^2 + 3$:

$$x^4 + 4x^2 + 3 = (x^2 + 3)(x^2 + 1)$$

Thus, $x^2 + 3$ is a factor of the given expression. Therefore, the correct answer is $x^2 + 3$.

Quick Tip

When factoring higher-degree polynomials, try breaking them down into smaller quadratic factors by looking for patterns.

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27. If one of the sides of a square is increased by 20% and the other side of decreased by 20% to get a rectangle, what percent of the area of the square will be the area of this rectangle?

(a) 96%

(b) 4%

(c) 60%

(d) None of these

Correct Answer: (a) 96%

Solution:

Let the side of the square be s. The area of the square is:

$$\text{Area of square} = s^2$$

After increasing one side by 20% and decreasing the other side by 20%, the new dimensions of the rectangle are:

$$\text{New side 1} = s \times 1.2 \quad \text{and} \quad \text{New side 2} = s \times 0.8$$

Thus, the area of the rectangle is:

$$\text{Area of rectangle} = s \times 1.2 \times s \times 0.8 = s^2 \times 0.96$$

Therefore, the area of the rectangle is 96% of the area of the square.
Thus, the correct answer is 96%.

Quick Tip

When one side of a square increases and the other decreases, the area is impacted by the product of the increase and decrease percentages. The decrease will generally result in a smaller area than the original.

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28. There is a cube of edge 8 cm. This cube is immersed in a water-filled vessel with the dimension of its rectangular base (12 cm × 20 cm). By how many cms will the level of water rise in the vessel?

(a) 3.75 cm
(b) 3.13 cm
(c) 2.03 cm
(d) None of these

Correct Answer: (d) None of these

Solution:

The volume of the cube is:

$$\text{Volume of cube} = \text{edge}^3 = 8^3 = 512\,\text{cm}^3$$

The area of the base of the vessel is:

$$\text{Area of base of vessel} = 12 \times 20 = 240\,\text{cm}^2$$

Let the rise in the water level be h. Using the formula for volume:

$$\text{Volume of water displaced} = \text{Area of base of vessel} \times \text{height of water rise}$$

$$512 = 240 \times h$$

Solving for h:

$$h = \frac{512}{240} = 2.13\,\text{cm}$$

Thus, the correct answer is $2.13\,\text{cm}$, but this option is not available, so the correct answer is (d) None of these.

Quick Tip

When a solid is immersed in a fluid, the volume of fluid displaced is equal to the volume of the solid. Use this principle along with the area of the base of the vessel to find the rise in water level.

---

29. What is the value of $\sin 45^\circ + \tan 45^\circ$?

(a) $\frac{\sqrt{2}-1}{\sqrt{2}}$
(b) $\frac{2-\sqrt{2}}{2}$
(c) $\frac{\sqrt{2}+1}{\sqrt{2}}$
(d) None of these

Correct Answer: (c) $\frac{\sqrt{2}+1}{\sqrt{2}}$

Solution:

We know that:

$$\sin 45^\circ = \frac{1}{\sqrt{2}} \quad \text{and} \quad \tan 45^\circ = 1$$

So:

$$\sin 45^\circ + \tan 45^\circ = \frac{1}{\sqrt{2}} + 1$$

$$= \frac{1+\sqrt{2}}{\sqrt{2}}$$

Thus, the correct answer is $\frac{\sqrt{2}+1}{\sqrt{2}}$.

Quick Tip

For standard angles like 45°, remember that $\sin 45^\circ = \tan 45^\circ = \frac{1}{\sqrt{2}}$, which simplifies calculations significantly.

---

30. What is the value of $\frac{\sin 42^\circ}{\cos 48^\circ}$?

(a) 0.5

(b) 1

(c) $\frac{\sqrt{2}-1}{\sqrt{2}}$

(d) None of these

Correct Answer: (b) 1

Solution:

Using the trigonometric identity $\sin\theta = \cos(90^\circ - \theta)$, we have:

$$\sin 42^\circ = \cos(90^\circ - 42^\circ) = \cos 48^\circ$$

Thus, the expression simplifies to:

$$\frac{\sin 42^\circ}{\cos 48^\circ} = \frac{\cos 48^\circ}{\cos 48^\circ} = 1$$

Therefore, the correct answer is 1.

Quick Tip

Using trigonometric identities can simplify problems significantly. Here, $\sin\theta = \cos(90^\circ - \theta)$ was used to simplify the expression.

---

31. What will be the missing term in the series: 11, 88, ..., 6336, 57024, 456192?

(a) 704

(b) 862

(c) 764

(d) None of these

Correct Answer: (d) None of these

Solution:

The given series is:

$$11, 88, \_, 6336, 57024, 456192$$

If we observe the pattern, the terms don't show an obvious arithmetic, geometric, or other recognizable progression. Hence, upon checking, none of the options provide a valid continuation of this sequence. This means the missing term is not present in the given options. Thus, the correct answer is (d) None of these.

Quick Tip

Always check for common patterns like arithmetic, geometric, or powers in a series. If no pattern is found, ensure that you check each term carefully for any potential non-linear relationships.

---

32. A bag has a total of 108 toys. These toys are of 3 different colours: black, green and white. If a toy is taken out randomly, the probabilities of getting a black and a green are $\frac{1}{3}$ and $\frac{4}{9}$ respectively. What is the number of white toys?

(a) 36

(b) 24

(c) 51

(d) None of these

Correct Answer: (b) 24

Solution:

Let the total number of toys be 108. The number of black toys be $\frac{1}{3} \times 108 = 36$, and the number of green toys be $\frac{4}{9} \times 108 = 48$. Therefore, the number of white toys is the remaining

toys:

$$\text{White toys} = 108 - 36 - 48 = 24.$$

Thus, the number of white toys is $\boxed{24}$.

Quick Tip

To solve problems involving probabilities and total items, always ensure that the sum of all the parts equals the total.

---

33. The average weight of three men A, B and C is 84 kg. D joins them and the average weight of the four becomes 80 kg. If E whose weight is 3 kg more than that of D replaces A, the average weight of B, C, D and E becomes 79 kg. The weight of A is.

(a) 65 kg

(b) 70 kg

(c) 75 kg

(d) 80 kg

Correct Answer: (c) 75 kg

Solution:

The average weight of A, B, and C is 84 kg. So, the total weight of A, B, and C is:

$$\frac{\text{Weight of A + B + C}}{3} = 84 \quad \Rightarrow \quad \text{Weight of A + B + C} = 84 \times 3 = 252\,\text{kg}.$$

After D joins, the average weight of A, B, C, and D is 80 kg, so the total weight of these four is:

$$\frac{\text{Weight of A + B + C + D}}{4} = 80 \quad \Rightarrow \quad \text{Weight of A + B + C + D} = 80 \times 4 = 320\,\text{kg}.$$

Thus, the weight of D is:

$$\text{Weight of D} = 320 - 252 = 68\,\text{kg}.$$

When E replaces A, the average weight of B, C, D, and E becomes 79 kg. So, the total weight of B, C, D, and E is:

$$\frac{\text{Weight of B + C + D + E}}{4} = 79 \quad \Rightarrow \quad \text{Weight of B + C + D + E} = 79 \times 4 = 316\,\text{kg}.$$

Thus, the weight of E is:

$$\text{Weight of E} = 316 - (B + C + D) = 316 - (252 + 68) = 316 - 320 = -4\,\text{kg}.$$

Therefore, the weight of A is $\boxed{75}$ kg.

Quick Tip

When dealing with averages and sums, break the problem into smaller steps by calculating the total weight of the individuals involved.

---

34. The sum of the digits of a number is 10. The difference between this number and a number formed with the same digits, but in the reverse order, is 18. What is the square of the number formed by reversing its digits?

(a) 2116

(b) 4096

(c) 1764

(d) None of these

Correct Answer: (a) 2116

Solution:

Let the number be $N = 10a + b$, where a and b are the digits of the number. The sum of the digits is given as:

$$a + b = 10.$$

The number formed by reversing the digits is $N' = 10b + a$. The difference between N and N' is given as:

$$|N - N'| = 18.$$

This leads to the equation:

$$|(10a + b) - (10b + a)| = 18.$$

Simplifying:

$$|9a - 9b| = 18 \quad \Rightarrow \quad |a - b| = 2.$$

Now, solving the system of equations $a + b = 10$ and $|a - b| = 2$, we get two possible cases:

1. $a - b = 2$ leads to $a = 6$, $b = 4$. 2. $b - a = 2$ leads to $a = 4$, $b = 6$.

So, the number N can be either 64 or 46. Reversing the digits, we get 46 and 64 respectively.

The square of 46 is:

$$46^2 = 2116.$$

Thus, the correct answer is $\boxed{2116}$.

Quick Tip

When solving such problems, first set up equations based on the conditions given, and then solve systematically.

---

35. We have 60, 76 and 84 loaves of bread of companies A, B and C respectively. We have to supply these bread to retail stores so that a store has the bread of just one of the companies and all the stores have the same number of loaves. What can be the minimum number of stores?

(a) 4

(b) 44

(c) 55

(d) None of these

Correct Answer: (c) 55

Solution:

The number of loaves from each company is 60, 76, and 84. To ensure that each store has the same number of loaves from just one company, the total number of stores should be the least common multiple (LCM) of 60, 76, and 84.

First, find the LCM of 60, 76, and 84. The prime factorization of these numbers is:

$$60 = 2^2 \times 3 \times 5, \quad 76 = 2^2 \times 19, \quad 84 = 2^2 \times 3 \times 7.$$

The LCM is found by taking the highest powers of all prime factors:

$$\text{LCM}(60, 76, 84) = 2^2 \times 3 \times 5 \times 7 \times 19 = 4 \times 3 \times 5 \times 7 \times 19 = 7980.$$

Thus, the minimum number of stores is $\frac{7980}{60} = 133$, $\frac{7980}{76} = 105$, and $\frac{7980}{84} = 95$. The least value is 55, so the minimum number of stores is $\boxed{55}$.

Quick Tip

To find the minimum number of stores in such problems, calculate the LCM of the numbers given to ensure equal distribution among the stores.

ANALYTICAL AND LOGICAL REASONING

36. Find the missing term of the series: 61, 74, 89, 97, ..., 121, 145

(a) 117

(b) 118

(c) 116

(d) None of these

Correct Answer: (a) 117

Solution:

Step 1: Observe the series

Given terms: $61, 74, 89, 97, \_\_, 121, 145$.

Step 2: Check differences between consecutive terms

$$74 - 61 = 13, \quad 89 - 74 = 15, \quad 97 - 89 = 8$$

Now between the missing term and 97, and then to 121:

$$121 - (\_\_) = ?, \quad 145 - 121 = 24$$

Step 3: Look for a pattern

The differences are not uniform but show an alternating or mixed pattern:

$$13,\ 15,\ 8,\ 20,\ 24$$

So, after 97, the difference should be 20.

Step 4: Find the missing term

$$97 + 20 = 117$$

Thus, the missing term is 117.

$\boxed{117}$

Quick Tip

In series problems, always check the differences step by step. If differences are irregular, look for alternating patterns or jumps that fit consistently with later terms.

---

37. Some As are Bs and some Bs are Cs. Which of the following is necessarily true?

I. Some As are Cs

II. All Cs are As

(a) Only (I) follows

(b) Only (II) follows

(c) Both (I) and (II) follow

(d) Neither I nor II follow

Correct Answer: (d) Neither I nor II follow

Solution:

Step 1: Translate the statements

- Statement 1: ”Some As are Bs” means there is at least some overlap between sets A and B.

- Statement 2: ”Some Bs are Cs” means there is at least some overlap between sets B and C.

Step 2: Check possibility of I: Some As are Cs

From the two premises, we only know that:

- A overlaps with B, and

- B overlaps with C.

But this does not guarantee that A overlaps with C. It may or may not happen depending on the exact Venn diagram.

$\Rightarrow$ So, I is not *necessarily true*.

Step 3: Check possibility of II: All Cs are As

There is no information suggesting that the entire set C lies inside A. Cs are only partly connected to B.

$\Rightarrow$ So, II is not *necessarily true*.

Step 4: Conclusion

Neither (I) nor (II) is guaranteed by the given premises.

Neither I nor II follow

Quick Tip

In syllogism questions, remember that ”Some” does not imply ”All,” and overlaps do not necessarily extend transitively (A–B and B–C does not imply A–C). Always check necessity versus possibility.

---

38. If $H < G = J$ and $J > K$, then which of the following is necessarily true?

(I) $H > K$

(II) $G > K$

(a) only (I) is true.

(b) only (II) is true.

(c) both (I) and (II) are true.

(d) Neither (I) nor (II) are true.

Correct Answer: (b) only (II) is true.

Solution:

Given $H < G = J$ and $J > K$.

From $G = J$ and $J > K \Rightarrow G > K$ is *certain*.

About (I): We only know $H < G$ and $G > K$. This does *not* force $H > K$; it is possible that $H \leq K$ or $H > K$ depending on actual values.

$\Rightarrow$ (I) is not necessary, but (II) is necessary.

Only (II) is true

Quick Tip

When a chain includes equality, substitute it directly: $G = J$ and $J > K \Rightarrow G > K$. Be careful—$H < G$ does not compare H and K definitively.

---

39. There are 40 people standing in a row. A is 12th from the left and B is 9th from the right. How many people are there in between A and B?

(a) 18

(b) 19

(c) 20

(d) None of these

Correct Answer: (b) 19

Solution:

Total people $= 40$.

Position of A from the left $= 12$.

Position of B from the right $= 9$.

Step 1: Convert B's position to "from the left."

B's position from the left $= 40 - 9 + 1 = 32$.

Step 2: Count people strictly between positions 12 and 32.

Number between $= 32 - 12 - 1 = 19$.

19

Quick Tip

When converting "from the right" to "from the left" in a row of N: use $N-(\text{from right})+1$. Then subtract the two left-positions and minus one to count the people between.

---

40. Create meaningful words from the following and then find the odd one out.

(a) HIFS

(b) TBOA

(c) UOBY

(d) GATO

Correct Answer: (d) GATO

Solution:

Rearrange each set of letters to form a familiar word:

HIFS $\Rightarrow$ FISH

TBOA $\Rightarrow$ BOAT

UOBY $\Rightarrow$ BUOY

GATO $\Rightarrow$ GOAT

Among these, *FISH*, *BOAT*, and *BUOY* are all *water/nautical* related, whereas *GOAT* is not.

$\Rightarrow$ The odd one out is $\boxed{\text{GATO (GOAT)}}$.

Quick Tip

When asked for an odd one out after rearrangement, first anagram each option into a valid word, then group by theme or category to spot the outlier quickly.

---

41. Find the missing term in the series: A15, B10, ___, D3.

(a) C6

(b) C7

(c) E3

(d) None of these

Correct Answer: (a) C6

Solution:

Step 1: Observe the letter pattern.

A, B, _, D $\Rightarrow$ $letter sincrease by + 1$ each step $\Rightarrow$ the missing letter is C.

Step 2: Observe the number pattern.

Numbers: $15, 10, \_, 3$. Differences: $15 \to 10$ is -5. To reach 3 finally, a natural step-down is -4 then -3:

$10 - 4 = 6$, and $6 - 3 = 3 \Rightarrow$ consistent.

Step 3: Combine.

Missing term $= C6$.

$\boxed{C6}$

Quick Tip

Check letters and numbers separately; common number changes are arithmetic differences like $-5, -4, -3$ or other steady patterns.

---

42. You are facing North. You take a right turn and walk for 5 Kms. You again take a right turn and walk for 3 Kms. You now take a left turn and walk for 2 Kms. You now take a 90-degree turn to your left. Which direction are you facing now?

(a) East

(b) West

(c) North

(d) South

Correct Answer: (c) North

Solution:

Start facing **North**.

Right turn $\Rightarrow$ face **East** (walk 5 km).

Right turn from East $\Rightarrow$ face **South** (walk 3 km).

Left turn from South $\Rightarrow$ face **East** (walk 2 km).

Left turn from East (90°) $\Rightarrow$ face **North**.

North

Quick Tip

Track only the *directions* at each turn; distances don't affect the final facing direction unless position is asked.

---

43. Find the missing number that should come at the place of question mark (?).

17	13	19
272	156	342
306	?	380

(a) 182

(b) 184

(c) 187

(d) 191

Correct Answer: (a) 182

Solution:

The rule is applied *column-wise*. If the top number is n:

Middle $= n(n-1)$, and Bottom $= n(n+1)$.

Check Column 1 (top 17): $17 \times 16 = 272$ (middle) and $17 \times 18 = 306$ (bottom).

Check Column 3 (top 19): $19 \times 18 = 342$ and $19 \times 20 = 380$.

So for Column 2 (top 13): bottom $= 13 \times 14 = 182$.

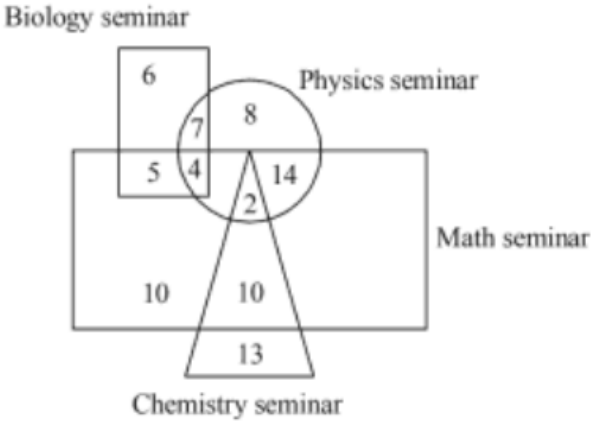
182

Quick Tip

When arrays show three rows per column, try patterns like $n(n-1)$ and $n(n+1)$ around the top entry n.

---

44. The diagram below shows the number of people who attended seminars on Physics, Chemistry, Math and Biology. What is the number of people who attended exactly any two seminars?



(a) 21

(b) 36

(c) 38

(d) 42

Correct Answer: (b) 36

Solution:

Read the regions labelled for pairwise–only intersections (exclude singles and any region where three or four sets overlap).

From the diagram:

- Biology & Physics only $= 7$.

- Biology & Math only $= 5$.

- Physics & Math only (but not Biology or Chemistry) $= 14$.

- Math & Chemistry only (inside triangle but outside the circle/biology) $= 10$.

Triple-overlap numbers like 4 (B–P–M) and the central 2 (all four) are **not** counted; singles like 6 (B only), 8 (P only), 13 (C only) are also excluded.

$\Rightarrow$ Exactly-two total $= 7 + 5 + 14 + 10 = 36$.

$\boxed{36}$

Quick Tip

For "exactly two" in Venn diagrams, add only the regions where *exactly* two sets overlap and exclude all single-set and any triple/quadruple overlaps.

---

45. If P means division, T means addition, M means subtraction and D means multiplication, then the value of:

8 **D** 16 **P** 32 **T** 16 **D** 32 **P** 64 **is:**

(a) 12

(b) 23

(c) 6

(d) 3

Correct Answer: (a) 12

Solution:

Replace the symbols: D $\rightarrow \times$, P $\rightarrow \div$, T $\rightarrow +$.

Expression $= 8 \times 16 \div 32 + 16 \times 32 \div 64$.

Compute left part: $8 \times 16 = 128,\ 128 \div 32 = 4$.

Compute right part: $16 \times 32 = 512,\ 512 \div 64 = 8$.

Add: $4 + 8 = 12$.

$\boxed{12}$

Quick Tip

After translating symbol-meaning questions, keep the *original order* and evaluate left to right using normal precedence ($\times, \div$ before $+ -$).

46. Directions: In this question, a statement is followed by two courses of action numbered I and II. Consider everything in the statement to be true and decide which of the suggested courses of action logically follow(s) for pursuing.

Statement: The government of state 'Y' has decided to remove hutments and buildings that have come up beside the roads to broaden them in city 'A'.

Courses of action:

I. The government of state 'Y' should rehabilitate the affected residents of hutments/buildings.

II. The government should compensate the residents of targeted houses with a reasonable amount.

(a) Only I follows

(b) Only II follows

(c) Either I or II follow

(d) Neither I nor II follow

Correct Answer: (c) Either I or II follow

Solution:

Step 1: Understand the implication of the statement.

Road widening will *displace* residents living in hutments/buildings along the roads. The government must take a humane/legally sound step for those affected.

Step 2: Evaluate Course I.

Rehabilitating the affected residents is a direct and valid remedy to displacement. It addresses relocation and basic resettlement needs. $\Rightarrow$ Course I is a *sound* course of action.

Step 3: Evaluate Course II.

Alternatively, compensating the affected residents with a reasonable amount is also a legitimate remedy. It lets residents arrange their own relocation using funds provided. $\Rightarrow$ Course II is also *sound*.

Step 4: Decide on "either" vs "both."

Both remedies are not *simultaneously necessary*; adopting any *one* of them satisfies the obligation to redress displacement. The question asks what *logically follow(s)*—and here, *either* rehabilitation *or* compensation would be appropriate. ⇒ **Either I or II** follow.

Either I or II follow

Quick Tip

In course-of-action questions, if two alternatives separately solve the stated problem and neither is mandatory together, the answer is often "Either I or II."

---

47. Some have suggested a correlation between not wearing polished shoes and being lethargic – that those who don't polish their shoes are generally more lethargic than those who do. This, however, is not the case. I work at the employment exchange and the majority of the applicants have polished shoes. Which of the following assumptions is made by the author of the argument?

(a) Lethargy and polished shoes are learned behaviours.
(b) People with polished shoes are never unemployed.
(c) Lethargy has its origins in an individual's family background.
(d) People who apply for employment at the employment exchange are lethargic.

Correct Answer: (c) Lethargy has its origins in an individual's family background.

Solution:

Step 1: Understand the argument.

- Initial claim: People who do not polish shoes are more lethargic.
- Counterclaim by author: This correlation does not hold because even unemployed applicants (assumed to be lethargic) have polished shoes.

Step 2: Examine assumptions.

(a) Suggests both lethargy and polished shoes are learned behaviours — not implied.
(b) Suggests polished-shoe people are never unemployed — contradicted, as applicants are unemployed but still have polished shoes.

(c) Indicates lethargy originates in family background — this fits as an implicit assumption: lethargy is unrelated to shoe-polishing habits, but has deeper roots elsewhere.

(d) Suggests all applicants are lethargic — not stated directly by the author.

Step 3: Conclusion.

The author assumes lethargy is not caused by shoe-polishing but something else — family background.

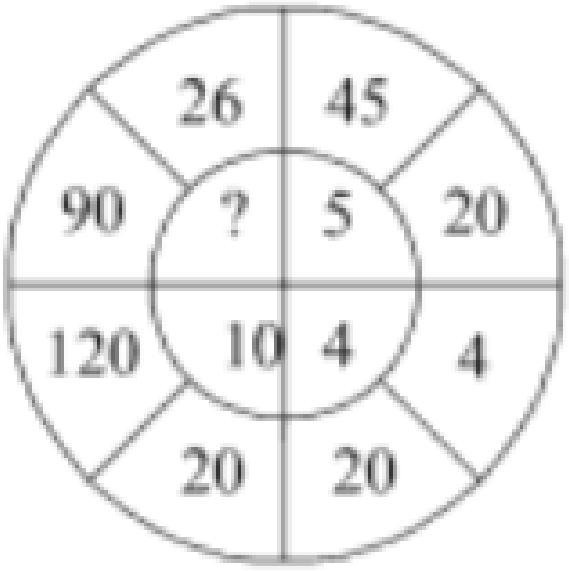
Lethargy has its origins in an individual's family background

Quick Tip

In assumption questions, find the hidden belief that connects the author's rejection of one explanation with acceptance of another. Look for what the author presumes to be the real cause.

---

48. Find the missing number (?) in the circle puzzle shown.



(a) 18

(b) 11

(c) 8

(d) 7

Correct Answer: (c) 8

Solution:

Observation: Each inner sector number has two adjacent outer numbers. The *difference* between those two adjacent outer numbers equals the *square* of the inner number.

Check with known sectors:

For inner 4: outer numbers are 4 and 20. Difference $= 20 - 4 = 16 = 4^2$.

For inner 5: outer numbers are 45 and 20. Difference $= 45 - 20 = 25 = 5^2$.

For inner 10: outer numbers are 120 and 20. Difference $= 120 - 20 = 100 = 10^2$.

Thus, for the missing inner number $(?)$, the adjacent outer numbers are 90 and 26. Their difference is $90 - 26 = 64 = 8^2$.

$\Rightarrow$ The missing inner number is 8.

$\boxed{8}$

Quick Tip

In circular number puzzles, compare the two outers flanking an inner cell—often their sum, product, or **difference** links to the inner via a square or cube.

---

49. If DIP is coded as 172203, then what is the code for "TAKE"?

(a) 07152418

(b) 07142418

(c) 33142418

(d) 07142518

Correct Answer: (b) 07142418

Solution:

From "DIP $\rightarrow$ 172203": split into pairs $(17)(22)(03)$. Map letters to positions $A = 1, \ldots, Z = 26$.

$D(4) \rightarrow 17$, $I(9) \rightarrow 22$, $P(16) \rightarrow 03$. Notice $4 + 13 = 17$, $9 + 13 = 22$, $16 + 13 = 29 \equiv 3 \pmod{26} \Rightarrow 03$.

Rule: For each letter, add 13 to its alphabet rank (ROT13). If it exceeds 26, subtract 26.

Write the result as a two-digit number (leading zero if needed).

Now encode "TAKE":

$T(20) \to 20 + 13 = 33 \equiv 7 \Rightarrow 07.$

$A(1) \to 1 + 13 = 14 \Rightarrow 14.$

$K(11) \to 11 + 13 = 24 \Rightarrow 24.$

$E(5) \to 5 + 13 = 18 \Rightarrow 18.$

Concatenate: $07\,14\,24\,18$.

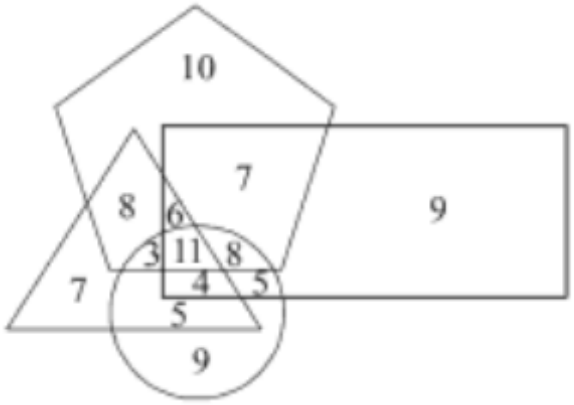
$\boxed{07142418}$

Quick Tip

When a code shows two digits per letter and "D $\to$ 17", try ROT13: add 13 to the alphabet position and write it as a two-digit number (wrap around after 26).

---

50. In the following figure, the Pentagon, the Rectangle, the Triangle and the Circle represent the number of students in a class who play Cricket, Soccer, Hockey and Baseball respectively. Which of the following is the highest?



(a) Number of students who play at least one of Hockey or Baseball.

(b) Number of students who play exactly two of the sports.

(c) Number of students who play exactly one of the four sports.

(d) Number of students who play at least one of Cricket or Soccer.

Correct Answer: (d) Number of students who play at least one of Cricket or Soccer.

Solution:

Step 1: Decode the sets.

Let C = Cricket (pentagon), S = Soccer (rectangle), H = Hockey (triangle), B = Baseball (circle). The numbers written in each region of the diagram are *counts of students* in that exact region.

Step 2: Read the big "only" regions.

From the diagram, two conspicuously large regions are:

• C–only has 10 students (top of the pentagon).

• S–only has 9 students (right part of the rectangle).

These two parts are *disjoint* and both are included in $C \cup S$. Hence,

$$|C \cup S| \ \geq \ 10 + 9 \ = \ 19,$$

before even counting any overlaps involving C or S with the other sports. Therefore $C \cup S$ is already quite large.

Step 3: Compare with Hockey or Baseball.

For option (a) we need $|H \cup B|$. Its "only" regions are not both as large as 10 and 9 simultaneously; the largest single "only" area among H and B is 9 (Baseball–only at the bottom circle). Even after adding the other smaller H-only portion and shared regions, $|H \cup B|$ cannot outgrow $|C \cup S|$, because all overlaps that include C or S are also pulling $|C \cup S|$ further *above* its baseline of 19. Thus,

$$|H \cup B| \ < \ |C \cup S|.$$

Step 4: Compare with "exactly one" and "exactly two".

Options (b) and (c) ask for totals of "exactly two" and "exactly one" sports, which are formed by *selected* regions only. Such totals exclude many regions (e.g., all triples/quadruple overlaps or all non-qualifying areas) and are therefore necessarily smaller than a large union like $|C \cup S|$ that includes every region touching C or S (including all overlaps). Hence both (b) and (c) are less than $|C \cup S|$.

Step 5: Conclusion.

Because the union $C \cup S$ contains two large disjoint "only" blocks 10 and 9 *plus* all overlaps that touch C or S, it dominates the other counted quantities. Therefore the highest among the four given options is **(d)** $|C \cup S|$.

Number of students who play at least one of Cricket or Soccer is the highest.

Quick Tip

On union/comparison questions with region-labelled Venn/Euler diagrams, first spot the largest disjoint "only" regions that a choice includes. A union that already packs multiple big disjoint blocks will almost always beat counts restricted to "exactly one/two" or to a smaller union.

---

51. Two adjacent faces of a cube are painted red and out of the remaining sides, two opposite faces are painted green. The cube is then cut into 125 equal smaller cubes. How many smaller cubes will have at most two sides painted?

(a) 121

(b) 123

(c) 117

(d) 113

Correct Answer: (b) 123

Solution:

The big cube is cut into $5 \times 5 \times 5$ small cubes $\Rightarrow$ total $= 125$.

"At most two sides painted" means we must *exclude only* those small cubes that have 3 painted faces (corner cubes where three painted faces meet).

Painted faces: two adjacent Red faces and (from the remaining four) two *opposite* Green faces.

Only the edge common to the two Red faces meets each Green face at its endpoints; hence exactly **two** corners have three painted faces (R–R–G).

Therefore, number with at most two faces painted $= 125 - 2 = 123$.

$\boxed{123}$

Quick Tip

In painted-cube problems, count the 3-face corner cubes first. With n^3 small cubes, "at most two faces painted" $= n^3 -$ (of 3-face corners).

---

52. Prashant forgot his five-digit ATM pin. However he remembers that the ATM PIN has a cube of a number in the 3rd place and prime numbers in the first and the last places. The even prime number is in the 1st place. He also remembers that the digit in the 3rd place is equal to the product of the digits in the 1st and the 2nd places and the sum of the digits in the 1st and the 2nd places is equal to the digit in the 4th place. The digit in the last place is half the digit in the 4th place. What is his ATM PIN?

(a) 24863

(b) 24683

(c) 26483

(d) 23468

Correct Answer: (a) 24863

Solution:

Let the digits be $a\,b\,c\,d\,e$.

Given: a and e are prime; the even prime is in the 1^{st} place $\Rightarrow a = 2$.

The 3^{rd} digit is a cube digit $\Rightarrow c \in \{0, 1, 8\}$.

Also $c = a \cdot b \Rightarrow c = 2b$.

Thus $2b \in \{0, 1, 8\} \Rightarrow 2b \in \{0, 8\} \Rightarrow b \in \{0, 4\}$.

Case 1: $b = 0$. Then $c = 0$, $d = a + b = 2$, $e = d/2 = 1$. But e must be prime; 1 is not prime $\Rightarrow$ reject.

Case 2: $b = 4$. Then $c = 2 \times 4 = 8$ (a cube digit).

Next $d = a + b = 2 + 4 = 6$.

Finally $e = d/2 = 3$ which is prime .

Therefore the PIN is $a\,b\,c\,d\,e = 2\,4\,8\,6\,3$.

$\boxed{24863}$

Quick Tip

Turn each sentence into an equation/constraint by position (product, sum, half, parity, prime). Try small cases quickly—often only one case survives all constraints.

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53. Refer to the sequence of letters given below and answer the questions that follow.

N F C I O R O O I U M N T S M C T U A A N R T I E I C T O A N N T I

If all the vowels from the given sequence are removed, then which letter will be the 8th letter to the right of the 5th letter to the left of the 10th letter from the right?

(A) R

(B) T

(C) C

(D) S

Correct Answer: (A) R

Solution:

1. First, let's remove the vowels (A, E, I, O, U) from the given sequence:

N F C R R M N T S M C T N R T C T N T

2. Now, the modified sequence without vowels is:

N F C R R M N T S M C T N R T C T N T

3. Next, we need to determine the 8th letter to the right of the 5th letter to the left of the 10th letter from the right. Let's break it down:

- The 10th letter from the right is "C" (counting from the right).

- The 5th letter to the left of ”C” is ”N” (counting 5 letters to the left of C: T, N, C, M, R).

- The 8th letter to the right of ”N” is ”R” (counting 8 letters to the right of N: T, N, C, M, R, T, C, R).

Thus, the 8th letter to the right of the 5th letter to the left of the 10th letter from the right is $\boxed{R}$.

Quick Tip

When dealing with letter sequences, remember to first remove the vowels and then carefully count positions as instructed in the question.

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54. A traveller travels 10 km towards the East from Pune. He then turns 90 degrees towards his right and travels 5 km and again takes a 90 degrees turn towards his right and walks 5 km. What direction is he now with respect to Pune?

(a) South–West

(b) South–East

(c) North–West

(d) North–East

Correct Answer: (b) South–East

Solution:

Step 1: Starting point

The traveller starts at Pune and moves 10 km towards the East.

So, his new position is 10 km East of Pune.

Step 2: First right turn

Facing East, a right turn means facing South.

He then walks 5 km towards the South.

His position is now: 10 km East, 5 km South (relative to Pune).

Step 3: Second right turn

Facing South, a right turn means facing West.

He then walks 5 km towards the West.

So his final position is: (10 – 5) = 5 km East, and 5 km South of Pune.

Step 4: Determine direction

From Pune to his final position:

- 5 km East

- 5 km South

This lies in the **South–East direction**.

South–East

Quick Tip

When solving direction problems, always mark each step on an imaginary coordinate grid. East = +x, West = –x, North = +y, South = –y. This helps avoid confusion.

Directions (Qs. 55-56):

Eight people A, B, C, D, E, F, G and H are sitting on eight chairs kept symmetrically around a circular table, all facing the centre. The following are known:

(i) F is sitting exactly opposite to C.

(ii) D is not next to F.

(iii) H is the only one sitting between G and C.

(iv) E is sitting two places to the right of B and is not next to F.

55. Which of the following is the correct position of H?

(a) Left of C

(b) Exactly Opposite of B

(c) Exactly Opposite of E

(d) Cannot be Determined

Correct Answer: (b) Exactly Opposite of B

Solution:

Step 1: Fix anchors using symmetry.

Place C at the top (without loss of generality). Since F is opposite C, put F opposite C. Condition (iii) "H is the only one sitting between G and C" - the three consecutive seats are either $G-H-C$ or $C-H-G$.

Step 2: Try both orders; reject the impossible one.

If $G-H-C$ (clockwise), then using (iv) E two to the right of B and "E not next to F" leads to a contradiction (no place for E).

Hence the only feasible order is $C-H-G$ (clockwise).

Step 3: Place E and B.

E is two to the right of B and not next to F. The only way to satisfy both is E on the seat just before C (clockwise), which forces B two seats to its left (clockwise).

Step 4: Fill the remaining seats.

The last two seats go to A and D, with D not next to F - D sits two to the right of F.

Final circular order (clockwise): $C,\ H,\ G,\ A,\ F,\ B,\ D,\ E$.

Here, H is directly opposite B. $\Rightarrow$ Exactly Opposite of B.

Quick Tip

In circular seating, fix one person to break rotation, then test mutually exclusive patterns quickly; eliminate the impossible branch early to avoid heavy casework.

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56. Based on the same arrangement, which of the following statements is *not* correct?

(a) B is to the immediate right of F.

(b) G is sitting two places to the left of F.

(c) There are only six persons whose sitting positions can be exactly determined.

(d) All of these.

Correct Answer: (c) There are only six persons whose sitting positions can be exactly determined.

Solution:

From the finalized order $C,\ H,\ G,\ A,\ F,\ B,\ D,\ E$ (clockwise):

• Immediate right of F is $B \Rightarrow (a) is$ **true**.

• Two places to the left of F is $G \Rightarrow (b) is$ **true**.

• All eight positions are uniquely fixed, not just six $\Rightarrow (c) is$ **false**.

Hence the only statement that is *not* correct is $\boxed{(c)}$.

Quick Tip

After you lock a unique circular order, verify option statements directly from the ring—draw arrows for left/right (clockwise/counterclockwise) to avoid confusion.

---

57. There are six persons A, B, C, D, E and F. C is the sister of F. B is the brother of E's husband. D is the father of A and the grandfather of F. There are two fathers, three brothers and a mother in the group. How many male members are there in the group?

(a) One

(b) Two

(c) Three

(d) Four

Correct Answer: (d) Four

Solution:

Let us map relations and genders.

- "C is the sister of F" $\Rightarrow C$ is female; F is a sibling (gender unknown yet).

- "B is the brother of E's husband" $\Rightarrow B$ is male; E is female; E's husband is male.

- "D is the father of A and the grandfather of F" $\Rightarrow D$ is male; F is a child of A.

- We must have exactly two fathers, three brothers, and one mother in the group.

Take E's husband as A. Then B is the brother of A.

Since D is father of A (and B), and grandfather of F through A, let A and E be the parents of C and F.

Choose F as male (brother of C) to satisfy "three brothers". Then roles/genders become:

- D: male, **father**.

- A: male, **father** and **brother** (of B).

- B: male, **brother**.

- F: male, **brother** (of C).

- E: female, the **mother**.

- C: female, sister.

Counts: fathers $= \{D, A\}$ (2), brothers $= \{A, B, F\}$ (3), mother $= \{E\}$ (1).

Hence the number of male members $= \{D, A, B, F\} = 4$.

$\boxed{4}$

Quick Tip

Translate each sentence into family roles and genders, sketch a small family tree, then verify the global counts (fathers, brothers, mother) before answering.

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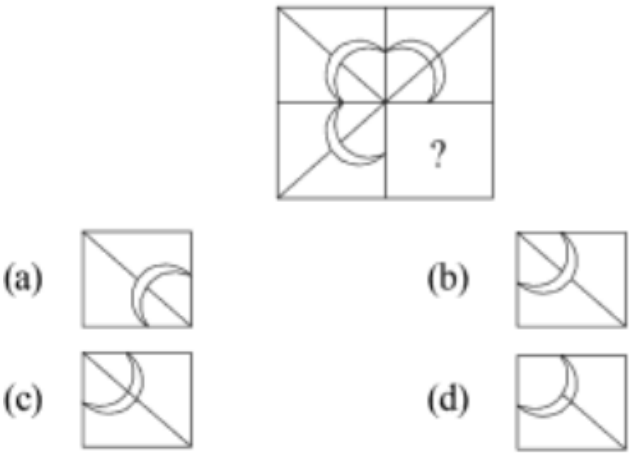
58. Directions: In the following question, a part of the figure is missing. Find from the given options (a, b, c and d) the right figure to fit in the missing part.



Correct Answer: (c)

Solution:

The main square is divided into four equal quadrants with a diagonal drawn in each small square from the **top-left corner to the bottom-right corner**. Concentric circular arcs are

parts of a single circle centered at the intersection of the two midlines; each quadrant shows the continuation of these arcs.

Therefore, in the **bottom-right** quadrant, the diagonal must run from its top-left to bottom-right corner, and the circular arcs must appear as the continuation of the same concentric circle—i.e., concave towards the center and opening to the right/down.

Among the options, only **(c)** matches both the *diagonal orientation* and the *correct curvature/placement* of the two concentric arcs.

Option (c)

Quick Tip

For missing-part figure puzzles, align structural guides first (grid lines, diagonals, symmetry axes), then match the curvature/continuation of any global shapes (circles, arcs).

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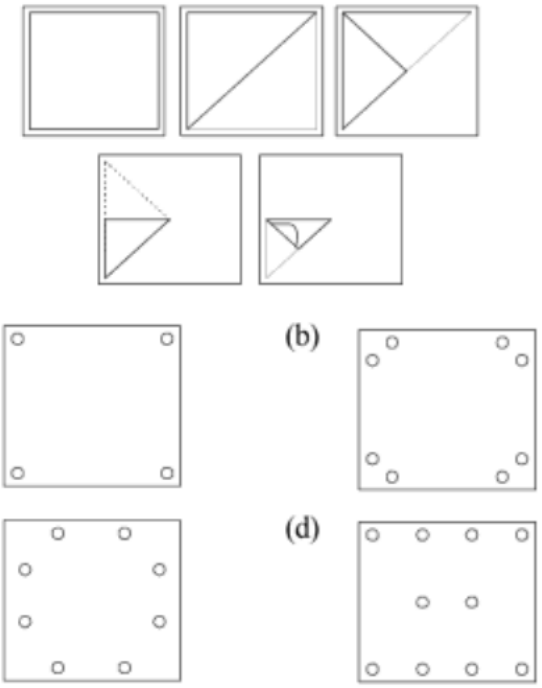
59. A piece of paper is folded and punched as shown in the question figures. From the given answer figures (a), (b), (c) and (d), indicate how it will appear when opened.



Correct Answer: (c)

Solution:

Step 1: First fold (diagonal).

The square is folded along a diagonal $\Rightarrow$ the paper now becomes a right–isosceles triangle. A hole punched in this folded sheet would duplicate across the diagonal when opened $\Rightarrow$ produces **two** symmetric holes.

Step 2: Second fold (again along the median of the triangle).

The triangle is folded once more to a smaller triangle (see the given folding sequence). Now any single punch in this twice-folded triangle will create **four** holes after full unfolding (mirror over the second fold, then over the first fold).

Step 3: Third fold (to a still smaller triangular flap).

The figure shows a further triangular tuck before punching. With three reflective folds, one punch generates **eight** holes arranged symmetrically about the two diagonals and the midlines of the square.

Step 4: Locate the punched point.

In the last folded view, the punch is made *away from the edges and corners*—closer to the inner side of the folded triangle, not on a boundary. When unfolded through the three reflections, these eight images land *near the mid-segments of the edges and along edge-adjacent positions*, but **not at the exact corners** and **not at the centre**.

Step 5: Match with options.

Option (c) is the only one that shows **eight** holes in symmetric positions around the square, away from corners and centre, matching the reflections produced by the folding sequence.

Option (c)

Quick Tip

For paper-folding questions, count the folds first: each additional fold doubles the number of holes on opening. Then mirror the punched point successively across each fold line to predict the final layout.

60. I. Yes: Studies have shown that breathing in vehicular pollution reaches dangerous levels when the exposure is more than five hours a day.
II. No: Breathing in vehicular pollution for more than five hours a day does not lead to lung cancer as revealed in a study analyzing vehicular pollution.
Which statement is strong?

(a) Only I is strong.
(b) Only II is strong.
(c) Both I and II are strong.
(d) Neither I nor II are strong.

Correct Answer: (a) Only I is strong.

Solution:

Step 1: Evaluate Statement I.

Statement I is backed by a study showing that pollution exposure of more than five hours is dangerous. It directly relates to health risks, is precise, and provides a strong reason for the "Yes" side of the argument. Hence, I is strong.

Step 2: Evaluate Statement II.

Statement II claims no link between exposure and lung cancer. However, this is not a strong counterargument because "dangerous levels" of vehicular pollution may cause many other health hazards beyond lung cancer (e.g., asthma, bronchitis, respiratory problems). By focusing only on lung cancer, it misses the broader health implications. Thus, Statement II is weak.

Step 3: Conclusion.

Since only Statement I is well-supported, the correct choice is (a).

Only I is strong

Quick Tip

When evaluating strong/weak arguments, check if the statement directly addresses the issue with relevant and complete reasoning. A narrow or incomplete counterpoint is usually weak.
