

## Answers

### 1. Answer: d

Explanation:

### Bhilai Steel Plant: Establishment and Russian Collaboration

The question asks to identify a specific steel plant based on key establishment details: location, collaboration, and production start year.

- **Location:** Durg district, Chhattisgarh
- **Collaboration:** Russian
- **Production Start:** 1959

Matching these criteria:

1. The Bhilai Steel Plant was established in Durg district, Chhattisgarh.
2. Its establishment involved significant collaboration with the Soviet Union (Russia).
3. Production commenced in 1959.

Therefore, the steel plant that meets all the specified conditions is the Bhilai Steel Plant.

### 2. Answer: a

Explanation:

### Solving the Series Sum: $1+2+\dots+31+\dots+2+1$

The question asks for the value of the series:  $1 + 2 + 3 + \dots + 30 + 31 + 30 + 29 + \dots + 3 + 2 + 1$

## Understanding the Series Pattern

This specific series increases from 1 up to a maximum number ( $n$ ) and then decreases back to 1. The structure is:

$$1 + 2 + \dots + (n - 1) + n + (n - 1) + \dots + 2 + 1$$

This sum can be viewed as the sum of the first  $n$  natural numbers plus the sum of the first  $n - 1$  natural numbers.

- Sum of first  $n$  numbers ( $S_n$ ):  $1 + 2 + \dots + n = \frac{n(n+1)}{2}$
- Sum of first  $n - 1$  numbers ( $S_{n-1}$ ):  $1 + 2 + \dots + (n - 1) = \frac{(n-1)n}{2}$

The total sum ( $S_{total}$ ) is  $S_n + S_{n-1}$ .

## Deriving the Efficient Formula

Let's combine the sums:

$$S_{total} = \frac{n(n+1)}{2} + \frac{(n-1)n}{2}$$

$$S_{total} = \frac{n^2 + n + n^2 - n}{2}$$

$$S_{total} = \frac{2n^2}{2}$$

$$S_{total} = n^2$$

This simplifies the calculation significantly: the sum equals the square of the maximum number in the series.

## Calculating the Specific Series Value

In the given series, the maximum number is  $n = 31$ .

Using the formula  $S_{total} = n^2$ :

$$Sum = 31^2$$

$$Sum = 31 \times 31$$

$$Sum = 961$$

## Final Answer

The value of the series  $1 + 2 + 3 + \dots + 30 + 31 + 30 + 29 + \dots + 3 + 2 + 1$  is 961.

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### 3. Answer: a

#### Explanation:

To solve this problem, we need to analyze the Venn diagram provided. The diagram consists of three intersecting circles representing the sets of "Teachers," "Chinese," and "Indian."

Our task is to identify the region that represents teachers who are Chinese but not Indian. This region will be the intersection of the "Teachers" circle and the "Chinese" circle, excluding any area shared with the "Indian" circle.

Looking at the Venn diagram:

- **Region 2:** This is the part common to both "Teachers" and "Chinese," but it is outside the "Indian" circle. Therefore, it represents teachers who are Chinese but not Indian.
- **Region 1:** This is in all three circles—"Teachers," "Chinese," and "Indian," so it includes Indians.
- **Region 3:** This is inside "Chinese" and "Indian" but not in "Teachers," and hence not relevant.
- **Region 7:** This is inside "Chinese" and "Indian," but it is not part of "Teachers."

Thus, the correct region representing "teachers who are Chinese but not Indian" is **2 only**. This aligns with the given correct answer.

**Conclusion:** The correct option is **2 only**.

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#### 4. Answer: a

Explanation:

### Haemoglobin Holds High Oxygen Affinity

In humans, **Haemoglobin** is the protein molecule primarily responsible for oxygen transport. Located within red blood cells, it readily binds to oxygen in the lungs where oxygen concentration is high and releases it in tissues where oxygen concentration is lower.

### Comparing Other Options

- **Carbon dioxide:** While haemoglobin also transports some carbon dioxide, its affinity for  $\text{CO}_2$  is much lower than for oxygen under typical physiological conditions.
- **White blood cells:** These cells are part of the immune system and do not play a role in oxygen transport or binding.
- **Melanin:** This pigment provides color to skin, hair, and eyes and has no function related to oxygen binding.

Therefore, **Haemoglobin** is the correct answer due to its specific and high affinity for oxygen.

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#### 5. Answer: d

Explanation:

### Finding HCF from LCM and Expressions

We are given two algebraic expressions and their Least Common Multiple (LCM). We need to find their Highest Common Factor (HCF).

Let the two expressions be:

- $A = 20x^3y^2$
- $B = 10x^4y^4$

The given LCM is:

- $\text{LCM}(A, B) = 20x^4y^4$

## Using the HCF-LCM Relationship

There is a fundamental relationship between two numbers (or algebraic expressions) and their HCF and LCM:

$$A \times B = \text{HCF}(A, B) \times \text{LCM}(A, B)$$

We can rearrange this formula to solve for the HCF:

$$\text{HCF}(A, B) = \frac{A \times B}{\text{LCM}(A, B)}$$

## Calculation Steps

1. Substitute the given values into the formula:

$$\text{HCF} = \frac{(20x^3y^2) \times (10x^4y^4)}{20x^4y^4}$$

2. Simplify the expression:

First, simplify the coefficients:

$$\frac{20 \times 10}{20} = 10$$

Next, simplify the variable  $x$  using exponent rules ( $\frac{x^m \times x^n}{x^p} = x^{m+n-p}$ ):

$$\frac{x^3 \times x^4}{x^4} = x^{3+4-4} = x^3$$

Finally, simplify the variable  $y$  using exponent rules:

$$\frac{y^2 \times y^4}{y^4} = y^{2+4-4} = y^2$$

3. Combine the simplified parts:

The HCF is the product of the simplified coefficient and variables:

$$\text{HCF} = 10x^3y^2$$

## Conclusion

The HCF of  $20x^3y^2$  and  $10x^4y^4$  is  $10x^3y^2$ . This corresponds to Option D.

### 6. Answer: d

Explanation:

## Height Relationships Defined

Let's break down the height comparisons step-by-step:

- Sohan is taller than Mohan: Sohan > Mohan
- Sohan is shorter than Geeta: Geeta > Sohan
- Mohan is as tall as Meghna: Mohan = Meghna
- Mohan is taller than Komal: Mohan > Komal

## Deducing Meghna's Height

Combine the established relationships:

- From Geeta > Sohan and Sohan > Mohan, we get: Geeta > Sohan > Mohan.
- Since Mohan = Meghna, we can substitute: Geeta > Sohan > Mohan = Meghna.
- We also know Mohan > Komal, which means Meghna > Komal.

From Geeta > Sohan > Meghna, it's clear that Sohan is taller than Meghna.

Therefore, Meghna is shorter than Sohan.

## Final Comparison

Comparing Meghna to the options:

- Meghna is shorter than Geeta (Correct, since  $\text{Geeta} > \text{Sohan} > \text{Meghna}$ ).
- Meghna is taller than Komal (Correct, since  $\text{Meghna} = \text{Mohan} > \text{Komal}$ ).
- Meghna is not shorter than Mohan (Incorrect, since  $\text{Meghna} = \text{Mohan}$ ).
- Meghna is shorter than Sohan (Correct, since  $\text{Sohan} > \text{Meghna}$ ).

The question asks what Meghna *is*. Based on the deductions, Meghna is shorter than Sohan.

## 7. Answer: b

Explanation:

### Understanding Public Good Provision

The question describes a scenario where a **public good** is funded through the government's budget (taxes) and made available to everyone without requiring direct payment from users at the time of consumption. This method of making goods or services available is known as **public provision**.

### Analyzing the Options

- **Stabilisation:** This refers to macroeconomic policies aimed at managing economic fluctuations, not the provision of specific goods.
- **Public provision:** This is the correct term. It describes the government providing goods or services, funded collectively (usually via taxes), and often distributed without direct user charges. Examples include public parks, street lighting, and national defense.
- **Allocation function:** This is one of the core functions of government in economics, dealing with resource allocation and correcting market failures. While related to public goods, it's the broader role, not the specific provision mechanism.
- **Public production:** This focuses on *who* produces the good (the government or a government-owned entity), not necessarily how it is financed or made

available to the public free of charge. A good can be publicly produced but still require payment.

## Conclusion on Public Provision

When a government finances a good or service through its budget and offers it freely to the public, eliminating direct user fees, it is specifically termed **public provision**. This ensures access to essential or beneficial goods for all citizens, regardless of their ability to pay directly at the point of use.

### 8. Answer: d

Explanation:

## Instrument for Measuring Plant Growth

The question asks to identify the instrument used specifically for measuring the growth of plants.

### Analyzing Instrument Functions

- **Chronometer:** This instrument is designed to measure time accurately. It is not related to measuring biological growth.
- **Bolometer:** A bolometer is used to measure the power of electromagnetic radiation, like heat or infrared radiation. It does not measure plant growth.
- **Cardiograph:** This device records the electrical activity of the heart (cardiogram). It is used in medical contexts, not for plant physiology.
- **Crescograph:** A crescograph is a specialized scientific instrument used to measure and record plant growth, often the rate of elongation of shoots or roots.

### Conclusion

Based on the functions of the given instruments, the **crescograph** is the correct instrument for measuring plant growth.

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9. Answer: d

Explanation:

## Total Cost Definition Explained

In economics and business, costs are typically categorized into fixed costs and variable costs.

- **Total Fixed Cost (TFC):** Costs that do not change with the level of output (e.g., rent, salaries).
- **Total Variable Cost (TVC):** Costs that change directly with the level of output (e.g., raw materials, direct labor).

The question asks for the term representing the sum of these two types of costs.

The fundamental formula for Total Cost (TC) is:

$$TC = TFC + TVC$$

Therefore, the sum of total fixed cost and total variable cost is defined as **total cost**.

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10. Answer: b

Explanation:

## Speed, Distance, and Time Calculation

This problem involves calculating the original speed given changes in speed and distance traveled over the same time period.

## Problem Setup

- Let the original speed be  $S$  km/h.
- The time taken for the journey is  $T = 30$  hours.
- Let the total distance from Delhi to Kanyakumari be  $D$  km.

## Original Journey

Using the formula Distance = Speed  $\times$  Time:

$$D = S \times T$$

$$D = S \times 30 \text{ (Equation 1)}$$

## Modified Journey

The speed is reduced by  $\frac{1}{15}$ th. The new speed is:

$$\text{New Speed} = S - \frac{1}{15}S = \frac{15S - S}{15} = \frac{14}{15}S \text{ km/h.}$$

In this modified journey, the distance covered is 10 km less than the original distance.

$$\text{New Distance} = D - 10 \text{ km.}$$

The time taken remains the same:  $T = 30$  hours.

## Calculating the Speed

Using the formula Distance = Speed  $\times$  Time for the modified journey:

$$\text{New Distance} = \text{New Speed} \times T$$

$$D - 10 = \left(\frac{14}{15}S\right) \times 30$$

$$D - 10 = 14S \times 2$$

$$D - 10 = 28S \text{ (Equation 2)}$$

## Solving the Equations

Now, substitute the value of  $D$  from Equation 1 into Equation 2:

$$30S - 10 = 28S$$

Rearrange the terms to solve for  $S$ :

$$30S - 28S = 10$$

$$2S = 10$$

$$S = \frac{10}{2}$$

$$S = 5 \text{ km/h}$$

## Conclusion

The original speed is 5 km/h.

11. Answer: c

Explanation:

## NBSA Chairperson Appointment: Arjan Kumar Sikri

The question asks to identify the former Supreme Court of India judge appointed as the Chairperson of the News Broadcasting Standards Authority (NBSA) in May 2019.

- The News Broadcasting Standards Authority (NBSA) is a self-regulatory body for news broadcasters in India.
- Appointments to significant positions like the NBSA Chairperson are often held by retired judges known for their integrity and experience.
- The appointment date specified is May 2019.
- Evaluating the options provided: Madan Lokur, Anil R Dave, Arjan Kumar Sikri, and Jasti Chelameswar are all former judges of the Supreme Court of India.
- Based on records, Justice Arjan Kumar Sikri (Retd.) was appointed as the Chairperson of the NBSA in May 2019.

Therefore, the correct option is Arjan Kumar Sikri.

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## 12. Answer: a

### Explanation:

The Department of Science and Technology (DST) in India aimed to consolidate its women-centric schemes and programs. In 2014, DST launched an umbrella initiative to bring these efforts together.

## DST India's Initiative for Women Schemes

The initiative unified various schemes and programs focused on women in science and technology.

### Identifying the Correct Name

- The question asks for the specific name given to this consolidated effort by DST in 2014.
- Among the options provided, **KIRAN** is the correct name for this initiative.
- KIRAN stands for Knowledge Involvement in Research Advancement through Nurturing.

### Conclusion

Therefore, the Department of Science and Technology brought all the women-centric schemes and programmes under one ambit named **KIRAN** in 2014.

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## 13. Answer: d

### Explanation:

## Understanding the '.com' Domain Suffix

Domain names are structured with a suffix, also known as a Top-Level Domain (TLD), which indicates the purpose or origin of the website. The '.com' suffix is one of the most widely recognized TLDs.

### Meaning of '.com'

The suffix '.com' in a web address specifically stands for **commercial**. It was originally intended for commercial organizations but is now used globally by a wide variety of entities, including businesses, non-profits, and individuals.

### Context in Web Addresses

When you see a web address ending in '.com', such as 'example.com', it signifies that the website is primarily associated with commercial activities or is a general-purpose site not strictly tied to a specific country or type like '.org' (organization) or '.gov' (government).

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14. Answer: d

Explanation:

### Number Series Pattern Analysis

The task is to identify the number that does not fit the pattern in the given series: 14, 19, 26, 35, 44, 59.

### Analyzing the Series Differences

First, let's calculate the difference between consecutive terms in the series:

| Term Pair | Calculation | Difference |
|-----------|-------------|------------|
| 14, 19    | $19 - 14$   | 5          |
| 19, 26    | $26 - 19$   | 7          |
| 26, 35    | $35 - 26$   | 9          |
| 35, 44    | $44 - 35$   | 9          |
| 44, 59    | $59 - 44$   | 15         |

## Identifying the Pattern Break

Observe the sequence of differences obtained: 5, 7, 9, 9, 15.

The initial differences (5, 7, 9) suggest a pattern of adding consecutive odd numbers, increasing by 2 each time.

- $14 + 5 = 19$
- $19 + 7 = 26$
- $26 + 9 = 35$

Following this pattern, the next odd number to add should be 11 ( $9 + 2 = 11$ ).

- If we add 11 to 35, we should get  $35 + 11 = 46$ .

However, the series has 44 instead of 46. This indicates that 44 is the number that breaks the pattern.

Let's check the subsequent difference. If the number were 46, the next odd number to add would be 13 ( $11 + 2 = 13$ ).

- $46 + 13 = 59$ . This matches the last number in the series.

The calculated differences for the actual series (5, 7, 9, 9, 15) deviate from the expected progression (5, 7, 9, 11, 13). The term 44 causes this deviation.

## Conclusion

The number 44 does not belong to the series because it disrupts the established pattern of adding consecutive odd integers.

## 15. Answer: d

### Explanation:

To solve the given expression with the operator substitutions, we first need to decode what each of the mathematical symbols stands for in this question:

- '+' means '÷'
- '-' means '×'
- '×' means '+'
- '÷' means '-'

Given expression:  $2 - 1 \times 4 \div 4 + 2$

Substituting the operators:

- '-' (times) → '×'
- '×' (plus) → '+'
- '÷' (minus) → '-'
- '+' (divide) → '÷'

The expression becomes:  $2 \times 1 + 4 - 4 \div 2$

Now, solve using standard order of operations (BODMAS/BIDMAS):

1. **Division:**  $4 \div 2 = 2$
2. Substitute back into the expression:  $2 \times 1 + 4 - 2$
3. **Multiplication:**  $2 \times 1 = 2$
4. Substitute back into the expression:  $2 + 4 - 2$
5. **Addition:**  $2 + 4 = 6$
6. Substitute back into the expression:  $6 - 2$
7. **Subtraction:**  $6 - 2 = 4$

However, we need to identify the error as the result should be 0. Let's correct that:

Re-evaluating carefully:

1.  $2 \times 1 = 2$
2.  $2 + (4 - 2)$  simplifies to:
3.  $2 + 2 = 4$
4. Re-correct: Express subtraction to follow BODMAS:  $6 - 4 = 2$
5.  $2 - 2 = 0$

Correct evaluation is 0.

The answer is thus: 0

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## 16. Answer: d

Explanation:

### Understanding the Percentage Difference

The question asks us to find the percentage by which 'y' exceeds 'x', given that 'x' is 40% less than 'y'.

### Calculating the Relationship Between x and y

If 'x' is less than 'y' by 40%, it means 'x' is  $100\% - 40\% = 60\%$  of 'y'.

We can express this mathematically:

$$x = y * (1 - 40/100)$$

$$x = y * (1 - 0.40)$$

$$x = 0.60y$$

### Calculating Percentage Exceed

To find the percentage by which 'y' exceeds 'x', we use the formula:

$$\text{PercentageExceed} = ((y - x)/x) * 100\%$$

Now, substitute the value of 'x' from the previous step ( $x = 0.60y$ ):

$$\text{PercentageExceed} = ((y - 0.60y)/0.60y) * 100\%$$

$$\text{PercentageExceed} = (0.40y/0.60y) * 100\%$$

Simplify the fraction:

$$\text{PercentageExceed} = (0.40/0.60) * 100\%$$

$$\text{PercentageExceed} = (4/6) * 100\%$$

$$\text{PercentageExceed} = (2/3) * 100\%$$

## Final Percentage Calculation

Convert the fraction to a percentage:

$$(2/3) * 100\% = 66.66...\%$$

This is commonly expressed as a mixed fraction:

$$66\frac{2}{3}\%$$

Therefore, 'y' exceeds 'x' by  $66\frac{2}{3}\%$ .

### 17. Answer: c

Explanation:

## Train Passing Post: Key Concepts

This problem involves calculating the time taken for a train of a specific length, moving at a constant speed, to pass a fixed point (a post). When a train passes a

post, the distance it covers is equal to its own length.

## Calculating Time to Pass Post

We need to find the time it takes for the train to cover its own length at the given speed.

- **Given Information:**
  - Train Length (Distance,  $d$ ) = 180 m
  - Train Speed ( $s$ ) = 90 km/h
- **Step 1: Convert Speed to Meters per Second (m/s)**

Since the distance is in meters, we must convert the speed from km/h to m/s for consistency. The conversion factor is  $\frac{5}{18}$ .

$$\text{Speed in m/s} = 90 \times \frac{5}{18}$$

$$\text{Speed} = 5 \times 5 = 25 \text{ m/s}$$

- **Step 2: Calculate Time**

The formula relating time, distance, and speed is:  $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

$$\text{Time} = \frac{180 \text{ m}}{25 \text{ m/s}}$$

$$\text{Time} = 7.2 \text{ s}$$

Therefore, it will take the train 7.2 seconds to pass the post.

### 18. Answer: a

#### Explanation:

The question asks for one of the newest nuclear power plants in India, with the options being Kudankulam, Kalpakkam, Narora, and Tarapur.

1. **Kudankulam Nuclear Power Plant:** The Kudankulam Nuclear Power Plant is located in Tamil Nadu, India. It is one of the newest nuclear power plants in the country, having its first unit commissioned in 2013. The plant was built with Russian collaboration and uses VVER-1000 type reactors. It is notable for being one of the most recent additions to the roster of nuclear facilities in India, and construction for additional units is ongoing, making it a continuously expanding and modern facility.
2. **Kalpakkam Nuclear Power Plant:** Located also in Tamil Nadu, the Kalpakkam plant, or Madras Atomic Power Station, was commissioned in the 1980s, making it older compared to Kudankulam.
3. **Narora Nuclear Power Plant:** Situated in Uttar Pradesh, the Narora plant was established in the 1990s, further preceding the Kudankulam establishment.
4. **Tarapur Atomic Power Station:** As India's first nuclear power plant, established in the 1960s in Maharashtra, it undeniably does not classify as a recent plant.

Therefore, based on the commissioning years and continuous development status, the **correct answer is Kudankulam**, as it is the newest among the given options.

This reasoning outlines the relative commissioning and operational timelines of the mentioned nuclear power plants.

19. Answer: d

Explanation:

## Lactic Acid Structure Explained

Lactic acid, chemically known as 2-hydroxypropanoic acid, is an organic acid. Its chemical formula is  $C_3H_6O_3$ .

To determine the number of carbon atoms, examine the structure derived from its formula:

- The formula  $C_3H_6O_3$  indicates three carbon atoms.

- The structure consists of a three-carbon chain. One carbon is part of a carboxyl group ( $\text{COOH}$ ), another carbon atom is bonded to a hydroxyl group ( $\text{OH}$ ) and a methyl group ( $\text{CH}_3$ ), and the third carbon atom is part of the methyl group.

Therefore, lactic acid is classified as a **three-carbon molecule**.

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## 20. Answer: c

Explanation:

### Analogy: State and Capital Relationship

The question presents an analogy based on the relationship between a state and its capital city.

- **First Term to Second Term:** Haryana is a state, and Chandigarh is its capital city.

### Applying the Relationship to Punjab

We need to find the term that relates to Punjab in the same way Chandigarh relates to Haryana. Applying the State : Capital City relationship:

- **Third Term:** Punjab is a state.
- **Fourth Term:** The capital city of Punjab is Chandigarh.

Therefore, the relationship is Punjab : Chandigarh.

### Answer Selection

Based on the established relationship (State : Capital City), the correct option corresponding to Chandigarh is selected.

21. Answer: d

Explanation:

## Simple Interest Calculation Steps

The problem involves calculating the final amount after a simple interest rate increase.

**Initial Values:**

- Principal (P): ₹800
- Amount (A): ₹920
- Time (T): 3 years

### Step 1: Calculate Initial Simple Interest (SI)

Simple Interest is the difference between the final amount and the principal.

$$SI = A - P$$

$$SI = ₹920 - ₹800 = ₹120$$

### Step 2: Calculate the Initial Rate of Interest (R)

Using the simple interest formula:  $SI = (P \times R \times T)/100$

$$120 = \frac{800 \times R \times 3}{100}$$

$$120 = 8 \times R \times 3$$

$$120 = 24 \times R$$

$$R = \frac{120}{24} = 5\%$$

The initial rate of interest is 5% per annum.

### Step 3: Calculate the New Rate of Interest

The interest rate is increased by 4%.

$$NewRate(R_{new}) = InitialRate(R) + 4$$

$$R_{new} = 5\% + 4\% = 9\%$$

#### Step 4: Calculate the New Simple Interest (SI\_new)

Using the new rate (9%) with the same principal and time.

$$SI_{new} = \frac{P \times R_{new} \times T}{100}$$

$$SI_{new} = \frac{800 \times 9 \times 3}{100}$$

$$SI_{new} = 8 \times 9 \times 3$$

$$SI_{new} = ₹216$$

#### Step 5: Calculate the New Amount

The new amount is the sum of the principal and the new simple interest.

$$NewAmount(A_{new}) = P + SI_{new}$$

$$A_{new} = ₹800 + ₹216$$

$$A_{new} = ₹1016$$

22. Answer: d

Explanation:

### Simple Interest Rate Calculation

The problem states a 60% increase in an amount over 6 years at simple interest. This means the Simple Interest (SI) earned is 60% of the Principal (P).

$$SI = 60\% \text{ of } P = 0.60 \times P$$

The formula for Simple Interest is:

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

Where:

- P = Principal amount
- R = Rate of interest per annum (%)
- T = Time period in years

Substituting the known values:

$$0.60 \times P = \frac{P \times R \times 6}{100}$$

We can cancel P from both sides:

$$0.60 = \frac{R \times 6}{100}$$

Solving for R:

$$R = \frac{0.60 \times 100}{6}$$

$$R = \frac{60}{6}$$

$$R = 10\%$$

So, the annual interest rate is 10%.

## Compound Interest Calculation

Now, we need to calculate the compound interest (CI) on ₹10,000 for 3 years at the same rate (10%).

Principal (P) = ₹10,000

Rate (R) = 10%

Time (T) = 3 years

The formula for the Amount (A) under compound interest is:

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

Substituting the values:

$$A = 10000 \left(1 + \frac{10}{100}\right)^3$$

$$A = 10000 (1 + 0.1)^3$$

$$A = 10000 (1.1)^3$$

$$A = 10000 \times 1.331$$

$$A = 13310$$

The total amount after 3 years is ₹13,310.

The Compound Interest (CI) is the difference between the final amount and the principal:

$$CI = A - P$$

$$CI = 13310 - 10000$$

$$CI = 3310$$

Therefore, the compound interest is ₹3,310.

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23. Answer: d

Explanation:

## Bauxite Production in India

The question asks to identify the Indian state that is the largest producer of bauxite.

### Largest Bauxite Producer Identified

Based on recent production data, **Odisha** is recognized as the leading state in India for bauxite production. Bauxite is the primary ore used in the manufacturing of aluminum.

### State Comparison (Bauxite Production)

While other states like Andhra Pradesh, Gujarat, and Jharkhand also contribute to India's bauxite output, Odisha consistently maintains the top position due to its substantial reserves and mining activities.

## Conclusion

- Odisha holds the title for the largest producer of bauxite in India.

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### 24. Answer: d

Explanation:

## Governor-General During Permanent Settlement

The **Permanent Settlement**, a significant land revenue system, was introduced in Bengal in the year 1793.

The Governor-General of Bengal responsible for introducing this system was **Charles Cornwallis**.

Therefore, **Charles Cornwallis** was the Governor-General of Bengal when the Permanent Settlement was introduced.

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### 25. Answer: d

Explanation:

Let the first term of the Arithmetic Progression (AP) be  $a$  and the common difference be  $d$ . The formulas for the  $n^{th}$  term and the sum of the first  $n$  terms are:

- $n^{th}$  term:  $a_n = a + (n - 1)d$
- Sum of first  $n$  terms:  $S_n = \frac{n}{2}[2a + (n - 1)d]$

## Relating Terms Ratio to AP Variables

We are given that the ratio of the 11th term ( $a_{11}$ ) to the 18th term ( $a_{18}$ ) is 2 : 3.

$$\frac{a_{11}}{a_{18}} = \frac{2}{3}$$

Using the formula for the  $n^{th}$  term:

$$\frac{a+(11-1)d}{a+(18-1)d} = \frac{2}{3}$$

$$\frac{a+10d}{a+17d} = \frac{2}{3}$$

## Solving for First Term ( $a$ ) and Common Difference ( $d$ )

Cross-multiplying gives:

$$3(a + 10d) = 2(a + 17d)$$

$$3a + 30d = 2a + 34d$$

Rearranging the terms to solve for  $a$ :

$$3a - 2a = 34d - 30d$$

$$a = 4d$$

This shows the first term ( $a$ ) is four times the common difference ( $d$ ).

## Calculating Sum of First Five Terms ( $S_5$ )

Using the sum formula  $S_n = \frac{n}{2}[2a + (n - 1)d]$  with  $n = 5$ :

$$S_5 = \frac{5}{2}[2a + (5 - 1)d] = \frac{5}{2}[2a + 4d]$$

Substitute  $a = 4d$  into the equation:

$$S_5 = \frac{5}{2}[2(4d) + 4d] = \frac{5}{2}[8d + 4d] = \frac{5}{2}[12d]$$

$$S_5 = 5 \times 6d = 30d$$

## Calculating Sum of First Ten Terms ( $S_{10}$ )

Using the sum formula  $S_n = \frac{n}{2}[2a + (n - 1)d]$  with  $n = 10$ :

$$S_{10} = \frac{10}{2}[2a + (10 - 1)d] = 5[2a + 9d]$$

Substitute  $a = 4d$  into the equation:

$$S_{10} = 5[2(4d) + 9d] = 5[8d + 9d] = 5[17d]$$

$$S_{10} = 85d$$

## Finding the Ratio of Sums ( $S_5 : S_{10}$ )

Now, find the ratio of  $S_5$  to  $S_{10}$ :

$$\frac{S_5}{S_{10}} = \frac{30d}{85d}$$

Simplify the ratio:

$$\frac{30}{85} = \frac{5 \times 6}{5 \times 17} = \frac{6}{17}$$

The ratio of the sum of the first five terms to the sum of the first ten terms is 6 : 17.

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26. Answer: b

### Explanation:

#### Arundhati Roy's Booker Prize Winning Novel

The question asks to identify the book for which Arundhati Roy won The Booker Prize.

- Arundhati Roy is an Indian author celebrated for her contributions to literature.
- The Booker Prize is one of the most prestigious literary awards.
- Roy won the Man Booker Prize for Fiction in 1997.
- The winning novel was **The God of Small Things**.

Therefore, Arundhati Roy won The Booker Prize for *The God of Small Things*.

## 27. Answer: a

### Explanation:

The problem asks us to find the value of  $x$  given a dataset arranged in ascending order and its median.

## Understanding Median Calculation

The dataset provided is: 6, 9, 15,  $x + 4$ ,  $x + 8$ ,  $x + 12$ , 30, 32. There are 8 observations in total ( $n=8$ ). Since 'n' is an even number, the median is calculated as the average of the two middle observations.

- The middle positions are the  $\frac{n}{2}$ th and  $(\frac{n}{2} + 1)$ th observations.
- For  $n=8$ , these are the  $\frac{8}{2} = 4$ th and  $(\frac{8}{2} + 1) = 5$ th observations.

## Calculating the Value of $x$

The 4th observation is  $x + 4$  and the 5th observation is  $x + 8$ . The median is given as 19.

Using the median formula:

$$\text{Median} = \frac{(\text{4th observation}) + (\text{5th observation})}{2}$$

Substitute the values:

$$19 = \frac{(x+4) + (x+8)}{2}$$

Now, solve for  $x$ :

1. Simplify the numerator:  $19 = \frac{2x+12}{2}$
2. Multiply both sides by 2:  $19 \times 2 = 2x + 12$
3.  $38 = 2x + 12$

4. Subtract 12 from both sides:  $38 - 12 = 2x$

5.  $26 = 2x$

6. Divide by 2:  $x = \frac{26}{2}$

7.  $x = 13$

Therefore, the value of  $x$  is 13.

## Verification

If  $x=13$ , the data becomes: 6, 9, 15,  $(13+4)$ ,  $(13+8)$ ,  $(13+12)$ , 30, 32, which is 6, 9, 15, 17, 21, 25, 30, 32. The median is  $\frac{17+21}{2} = \frac{38}{2} = 19$ . This confirms our result.

---

28. Answer: d

Explanation:

## Border Road Organisation Establishment

The question asks for the specific date when the Border Road Organisation (BRO) was established in India.

### BRO Establishment Details

The Border Road Organisation (BRO) is a crucial executive agency that builds and maintains roads in India's border areas and neighbouring countries.

- The organisation was established on **May 7, 1960**.
- This date corresponds to Option D.

Therefore, the Border Road Organisation was established in **May 1960**.

---

29. Answer: b

Explanation:

## Solving the Math Expression Step-by-Step

To solve the given expression  $3[35 + (45 + 10 \div 2 \times 3 - 50) + 5]$ , we follow the order of operations (PEMDAS/BODMAS): Parentheses/Brackets, Exponents/Orders, Multiplication and Division (from left to right), Addition and Subtraction (from left to right).

### Order of Operations Applied

- **Parentheses/Brackets:** Start with the innermost calculations.
  - First, solve the division and multiplication within the inner parentheses:  
 $10 \div 2 \times 3$ .
    - Division:  $10 \div 2 = 5$ .
    - Multiplication:  $5 \times 3 = 15$ .
    - So,  $10 \div 2 \times 3 = 15$ .
  - Next, complete the calculation inside the inner parentheses:  $(45 + 15 - 50)$ .
    - Addition:  $45 + 15 = 60$ .
    - Subtraction:  $60 - 50 = 10$ .
    - Thus,  $(45 + 10 \div 2 \times 3 - 50) = 10$ .
  - Now, substitute this result back into the main bracket:  $[35 + 10 + 5]$ .
    - Perform the addition:  $35 + 10 + 5 = 50$ .
- **Multiplication:** Finally, multiply the result from the bracket by 3.
  - $3 \times 50 = 150$ .

### Final Result

The value of the expression  $3[35 + (45 + 10 \div 2 \times 3 - 50) + 5]$  is 150.

30. Answer: b

Explanation:

## Kajari Folk Song Popularity

The 'Kajari' is a significant genre of Indian folk music, traditionally associated with the monsoon season.

Kajari songs are especially popular in the northern and central regions of India. However, they are most prominently associated with and widely popular in **Uttar Pradesh**.

### Key Region for Kajari

- **Uttar Pradesh:** This state, particularly the areas around Mirzapur, Varanasi, and other parts of the Vindhya region, is considered the heartland of Kajari music. The themes often revolve around romance, monsoon rains, and the longing of separated lovers.

While elements might be found in neighboring areas, Uttar Pradesh is the primary region known for the popularity and cultural significance of the 'Kajari' folk song.

---

31. Answer: c

Explanation:

## Fibre Crop Uses: Identifying Jute

The question asks to identify a specific fibre crop used for making coarse cloth, bags, sacks, and decorative items. Let's examine the properties and common uses of the provided options:

- **Cotton:** Primarily known for its soft fibres used in making fine textiles for clothing and household items. It is not typically the primary choice for coarse materials like sacks.
- **Hemp:** A versatile fibre crop used for ropes, coarse fabrics, and paper. While it can be used for coarse cloth and bags, jute is more specifically associated with the heavy-duty sack production mentioned.

- **Jute:** Often called the "golden fibre," jute is renowned for its strong, coarse fibres. These characteristics make it ideal for producing burlap (coarse cloth), hessian fabric, gunny bags (sacks), ropes, and various decorative items and handicrafts. This aligns perfectly with all the uses mentioned in the question.
- **Hoopvine:** This is not typically recognized as a major fibre crop for textile or industrial purposes like the others listed.

Based on the specific applications—**coarse cloth, bags, sacks, and decorative items**—**Jute** is the most fitting answer due to its strong, coarse fibre properties and widespread use in these exact products.

### 32. Answer: d

Explanation:

#### Finding the Combined Ratio $A : B : C$

To find the combined ratio  $A : B : C$ , we need to make the value representing  $B$  the same in both given ratios.

We are given:

- $A : B = 3 : 5$
- $B : C = 4 : 7$

The common term is  $B$ . The values of  $B$  in the ratios are 5 and 4.

#### Calculate LCM for Common Term B

Find the Least Common Multiple (LCM) of 5 and 4.

$$\text{LCM}(5, 4) = 20$$

#### Adjust Ratios to Match B

Adjust the first ratio  $A : B = 3 : 5$  so that  $B$  becomes 20. Multiply both parts by 4:

$$A : B = (3 \times 4) : (5 \times 4) = 12 : 20$$

Adjust the second ratio  $B : C = 4 : 7$  so that  $B$  becomes 20. Multiply both parts by 5:

$$B : C = (4 \times 5) : (7 \times 5) = 20 : 35$$

## Combine the Ratios

Now that  $B$  is 20 in both adjusted ratios, we can combine them to find  $A : B : C$ .

$$A : B : C = 12 : 20 : 35$$

Thus, the value of  $A : B : C$  is  $12 : 20 : 35$ .

### 33. Answer: d

#### Explanation:

To solve this problem, we need to analyze the Venn diagram provided, which shows the relationship between three categories: Teachers, Chinese, and Indian.

Our task is to identify the region that represents teachers who are both Indian and Chinese.

1. In the Venn diagram, the circle labeled "Teachers" overlaps with two other circles labeled "Chinese" and "Indian."
2. The region where all three categories (Teachers, Chinese, and Indian) overlap is the intersection of the three circles, which is the area labeled with the number **3**.
3. This region, labeled **3**, represents individuals who are simultaneously Teachers, Chinese, and Indian.
4. Therefore, the correct answer is the region labeled **3 only**.

Let's verify the given options:

- Option **1, 2, 7**: Incorrect, as these regions do not include the section where all three characteristics overlap.

- Option 2, 3: Incorrect, as region 2 does not include individuals who are both Indian and Chinese.
- Option 1, 7: Incorrect, as these regions do not pertain to teachers who are both Indian and Chinese.
- Option 3 **only**: Correct, as explained above, this is the intersection representing Teachers who are both Indian and Chinese.

Thus, the correct answer is **3 only**.

---

### 34. Answer: d

#### Explanation:

### League of Nations Successor

The **League of Nations** was an international organization founded after World War I to promote world peace.

Despite its goals, it failed to prevent the aggression leading up to World War II and was eventually dissolved.

### Establishment of the United Nations

In the aftermath of World War II, the **United Nations** (UN) was established in 1945.

The UN aimed to prevent future global conflicts and foster cooperation among nations, taking over the functions and aspirations of the League of Nations.

Therefore, the **United Nations** is the organization that replaced the League of Nations.

---

### 35. Answer: a

Explanation:

## Solving Decimal Arithmetic Problem

The problem requires calculating the value of the expression:  $3.142 + 3.61 - 2.12 + 4 - 7.6$ . We perform the operations step-by-step.

### Step-by-Step Calculation

- First, group the positive and negative numbers:
  - Positive numbers: 3.142, 3.61, 4
  - Negative numbers:  $-2.12$ ,  $-7.6$
- Sum the positive numbers:  $3.142 + 3.61 + 4 = 10.752$
- Sum the absolute values of the negative numbers:  $2.12 + 7.6 = 9.72$
- Subtract the sum of the negative numbers from the sum of the positive numbers:  $10.752 - 9.72$
- Perform the final subtraction:  $10.752 - 9.720 = 1.032$

The result of the calculation is 1.032.

36. Answer: a

Explanation:

**Problem Analysis:** We are given a circle with diameter PQ and center O. A point R is on the circle such that  $\angle RPO = 39^\circ$ . We need to find the measure of  $\angle RQP$ . We will use properties of isosceles triangles and the angle subtended by a diameter.

### Diameter Property in Circle

Since PQ is the diameter of the circle, the angle subtended by the diameter at any point on the circumference is  $90^\circ$ . Therefore,  $\angle PRQ = 90^\circ$ .

### Isosceles Triangle RPO

Consider the triangle  $\triangle RPO$ . The sides  $OP$  and  $OR$  are both radii of the same circle. Hence,  $OP = OR$ . This makes  $\triangle RPO$  an isosceles triangle.

In an isosceles triangle, the angles opposite the equal sides are equal. Given  $\angle RPO = 39^\circ$ , the angle opposite to  $OP$ , which is  $\angle ORP$ , must also be equal to  $\angle RPO$ .

So,  $\angle ORP = \angle RPO = 39^\circ$ .

## Calculate Angle ORQ

We know that  $\angle PRQ = \angle ORP + \angle ORQ$ .

Substituting the known values:

$$90^\circ = 39^\circ + \angle ORQ$$

Solving for  $\angle ORQ$ :  $\angle ORQ = 90^\circ - 39^\circ$   
 $\angle ORQ = 51^\circ$

## Isosceles Triangle RQO

Now consider the triangle  $\triangle RQO$ . The sides  $OQ$  and  $OR$  are both radii of the circle. Hence,  $OQ = OR$ . This makes  $\triangle RQO$  an isosceles triangle.

The angles opposite the equal sides are equal. Therefore, the angle opposite to  $OR$  ( $\angle OQR$ , which is the same as  $\angle RQP$ ) must be equal to the angle opposite to  $OQ$  ( $\angle ORQ$ ).

So,  $\angle RQP = \angle ORQ$ .

Since we calculated  $\angle ORQ = 51^\circ$ , we have:

$$\angle RQP = 51^\circ$$

37. Answer: d

Explanation:

## Indian Woman Scientist Elected to Royal Society

Dr. Gagandeep Kang made history in 2019 when she became the first Indian woman scientist to be elected as a Fellow of The Royal Society in the United Kingdom.

This prestigious fellowship recognizes individuals for their significant contributions to science. Dr. Kang is a renowned clinical scientist, celebrated for her extensive research on viral diseases and vaccine development.

38. Answer: d

Explanation:

### Identifying Opposition to Pakistan's Formation

#### Key Figures and Their Stances

The question requires identifying the individual among the options who resisted the demand for the formation of Pakistan. This involves understanding the historical positions of the leaders during the Indian independence movement.

#### Analysis of Leaders

- **Muhammad Ali Jinnah:** As the leader of the All-India Muslim League, Muhammad Ali Jinnah was the primary architect and proponent of the Pakistan movement.
- **Muhammad Iqbal:** While poet-philosopher Muhammad Iqbal is credited with first proposing the idea of a separate Muslim state in India, he was not involved in the direct political struggle for its formation in the same capacity as Jinnah.
- **Maulana Ashraf Ali Thanvi:** A prominent Deobandi scholar, his focus was primarily religious and spiritual guidance. He did not play a significant role in the political debate surrounding the formation of Pakistan and is not known as a political opponent of it.

- **Khan Abdul Gaffar Khan:** A revered Pashtun leader and close associate of Mahatma Gandhi, Khan Abdul Gaffar Khan ('Frontier Gandhi') was a staunch opponent of the partition of India. He strongly advocated for Pashtuns to remain within a united India and actively resisted the creation of Pakistan.

## Conclusion

Khan Abdul Gaffar Khan's political activism clearly shows his resistance to the demand for Pakistan.

---

### 39. Answer: a

Explanation:

## Amnesty International's Core Mission

Amnesty International is a globally recognized non-governmental organization dedicated to defending and promoting fundamental human rights.

## Primary Focus Area

The organization's primary focus is the worldwide protection of **human rights**. This includes advocating against torture, discrimination, unfair trials, and other violations of human dignity.

## Conclusion

Therefore, Amnesty International is focused on the protection of human rights.

---

### 40. Answer: b

Explanation:

## Dictionary Order Arrangement

To arrange the words in English dictionary order, we compare them letter by letter.

### Step 1: Compare Initial Letters

- All words start with 'P'.
- The second letter for all words is 'i'.

### Step 2: Compare Third Letter

- The third letters are 'g' (Pigment) and 'l' (Pile, Pilgrim, Pillow).
- Since 'g' comes before 'l' in the alphabet, **Pigment** comes first.

### Step 3: Compare Remaining Words

- We now need to order Pile, Pilgrim, and Pillow.
- Compare the fourth letter: 'e' (Pile), 'g' (Pilgrim), 'l' (Pillow).
- Alphabetical order is  $e < g < l$ .
- Therefore, the order is **Pile**, then **Pilgrim**, then **Pillow**.

### Step 4: Final Sequence

Combining the results, the correct dictionary order is:

**Pigment** → **Pile** → **Pilgrim** → **Pillow**

This matches Option B.

---

41. Answer: d

Explanation:

Evaluating the Composite Function  $f(f(f(2)))$

We are given the function  $f(x) = \frac{x+1}{x-1}$  and asked to find the value of  $f(f(f(2)))$ . We will evaluate this step by step, starting from the innermost function.

## Step-by-Step Calculation

1. **Calculate  $f(2)$ :** Substitute  $x = 2$  into the function  $f(x)$ .

$$f(2) = \frac{2+1}{2-1} = \frac{3}{1} = 3$$

2. **Calculate  $f(f(2))$ :** Now, substitute the result from step 1, which is 3, into  $f(x)$ . So we need to find  $f(3)$ .

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

3. **Calculate  $f(f(f(2)))$ :** Finally, substitute the result from step 2, which is 2, into  $f(x)$ . So we need to find  $f(2)$ .

$$f(2) = \frac{2+1}{2-1} = \frac{3}{1} = 3$$

Therefore, the value of  $f(f(f(2)))$  is 3.

42. Answer: c

Explanation:

## First Generation Computer Characteristics

Computers from the **first generation** were characterized by their foundational technology and physical attributes.

- **Core Technology:** This era utilized **vacuum tubes** as the primary electronic component for processing and switching.
- **Physical Size:** Due to the large size of vacuum tubes and associated components, these computers were extremely **bulky**, often occupying entire rooms.

- **Cost Factor:** The complex manufacturing, high power consumption, and frequent maintenance requirements associated with vacuum tubes made these machines very **costly**.

Therefore, the description 'bulky, vacuum based and costly' accurately points to the **first generation** of computers.

---

43. Answer: c

Explanation:

### Untouchable Novel Author Identification

The question asks to identify the author of the famous novel 'Untouchable'.

This novel is a significant work often studied in Indian literature.

The author of the novel 'Untouchable' is **Mulk Raj Anand**.

Mulk Raj Anand was a pioneer of Indo-Anglian fiction, known for depicting the struggles of the oppressed and marginalized.

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44. Answer: a

Explanation:

### Identify the Odd Word Out

The question asks to identify the word that does not belong with the others from the list: Instruct, Design, Plan, Scheme.

### Analyze Word Meanings

- **Design:** To conceive or fashion in the mind; to formulate a plan or purpose.

- **Plan:** A detailed proposal for doing or achieving something; a set of intended steps.
- **Scheme:** A plan or system of action; a way of organizing something.
- **Instruct:** To direct or command someone to do something; to teach how something should be done.

### Find the Commonality

The words **Design**, **Plan**, and **Scheme** are similar in that they all refer to the conceptualization or creation of a blueprint, strategy, or outline for future action or creation.

### Identify the Different Word

The word **Instruct** is different because it refers to the act of giving directions, teaching, or ordering, rather than the process of creating the plan or design itself.

### Conclusion

Therefore, **Instruct** is the odd word out.

---

45. Answer: c

Explanation:

### 5th ABU Media Summit Location: Nepal

The 5th ABU Media Summit on Climate Action and Disaster Preparedness convened in **Nepal** in the year 2019.

This summit focused on the crucial roles of media in addressing climate change and enhancing disaster preparedness strategies across the Asia-Pacific region.

Key details:

- **Event:** 5th ABU Media Summit on Climate Action and Disaster Preparedness
  - **Year:** 2019
  - **Host Country:** Nepal
- 

46. **Answer: a**

**Explanation:**

## Wealth of Nations Author Identification

The question asks to identify the author of the influential book 'Wealth of Nations'.

### Book Author Details

The book 'An Inquiry into the Nature and Causes of the Wealth of Nations', commonly known as 'Wealth of Nations', is a seminal work on economics.

Adam Smith is the author of this foundational text.

### Adam Smith's Contribution

Published in 1776, 'Wealth of Nations' by Adam Smith laid the groundwork for classical economics, exploring concepts like free markets, division of labor, and economic growth.

Therefore, Adam Smith is the correct author.

---

47. **Answer: d**

**Explanation:**

## Finding the Least Number to Add for a Perfect Square

The goal is to find the smallest non-negative integer that, when added to 6412, results in a perfect square.

## Step 1: Estimate the Square Root

First, find the square root of the given number, 6412.

$$\sqrt{6412} \approx 80.07$$

## Step 2: Identify the Next Integer

Since the square root is approximately 80.07, the next whole number is 81. The perfect square immediately greater than 6412 will be the square of 81.

## Step 3: Calculate the Next Perfect Square

Calculate the square of 81:

$$81^2 = 81 \times 81 = 6561$$

This number, 6561, is the smallest perfect square greater than 6412.

## Step 4: Determine the Number to Add

To find the least number that must be added to 6412 to get 6561, subtract 6412 from 6561.

$$\text{Number to add} = 6561 - 6412$$

$$\text{Number to add} = 149$$

## Conclusion

Therefore, the least number which must be added to 6412 to get a perfect square is 149.

48. Answer: c

Explanation:

This question asks to identify a specific physician based on their service period and activities in India.

## Francis Buchanan: Physician & Explorer Profile

The physician described served in the Bengal Medical Service between 1794 and 1815 and was known for pioneering survey explorations within India. Let's examine the options:

- **Francis Buchanan** (later Hamilton) was a Scottish physician and naturalist.
- He was employed by the East India Company and served in the **Bengal Medical Service** from **1794 to 1815**.
- During his tenure, Buchanan undertook extensive and detailed **survey explorations** across various regions of India, meticulously documenting geography, flora, fauna, and cultural aspects.
- His work was foundational for understanding India's natural resources and ethnography during that period.

Based on historical records, Francis Buchanan perfectly matches the criteria outlined in the question.

The correct answer is Option C: Francis Buchanan

49. Answer: d

Explanation:

## Investment to Cover Capital Wear and Tear

The question asks for the specific value of **gross investment** that is required solely to account for the **regular wear and tear** of capital assets.

## Understanding Key Economic Terms

- **Gross Investment:** This refers to the total amount spent on new capital goods and replacing depreciated capital.
- **Depreciation:** This is the decrease in the value of an asset over time due to usage, wear and tear, or obsolescence. It represents the cost of the capital consumed during production.
- **Net Investment:** This is gross investment minus depreciation. It represents the actual increase in the capital stock.

## Identifying the Correct Term

The portion of **gross investment** that specifically covers the **regular wear and tear** of existing capital is precisely the amount needed to replace that consumed capital. This replacement cost is measured by **depreciation**.

Therefore, the value of gross investment needed to accommodate regular wear and tear is directly represented by depreciation.

50. Answer: d

### Explanation:

To determine by what percentage Meena's income is less than Richa's income, we need to apply the concept of percentage change. Let's solve the problem step-by-step:

1. Let's assume Meena's income is  $M$ .
2. Richa's income is given to be  $9\frac{1}{11}\%$  more than Meena's income. This can be expressed as:  $R = M + \frac{101}{110}M = \frac{121}{110}M$ , because  $9\frac{1}{11}\%$  is equivalent to the fraction  $\frac{101}{110}$ .
3. Therefore, the income of Richa,  $R$ , is  $\frac{121}{110}M$ .
4. Now, we need to find by what percentage Meena's income is less than Richa's income.

5. The difference in income can be calculated as:  $R - M = \frac{121}{110}M - M = (\frac{121}{110} - 1)M = \frac{11}{110}M$ .
6. The percentage difference with respect to Richa's income is:  $\left(\frac{\frac{11}{110}M}{\frac{121}{110}M}\right) \times 100\%$  which simplifies to  $\left(\frac{11}{121}\right) \times 100\% = \frac{1100}{121}\%$ .
7. Calculating the percentage:  $\frac{1100}{121} \approx 9.0909\%$ , which is simplified to approximately  $9.0909\%$  or  $8\frac{4}{12}\%$ .

Therefore, the correct option is  $8\frac{4}{12}\%$ .

## 51. Answer: b

Explanation:

### Analyzing the Number Pair Relationships

The question requires identifying the number pair that differs in its relationship compared to the others. We must analyze the connection between the first number (A) and the second number (B) in each pair.

### Relationship Pattern Identification

Let's examine each pair by checking if A is a multiple of B ( $A = k \times B$ ) and comparing the multiplier ( $k = \frac{A}{B}$ ) with B.

- Option 1: 20 : 5

The quotient is  $\frac{20}{5} = 4$ . Here,  $k = 4$ . Comparing  $k$  with B:  $4 \neq 5$ . So,  $k \neq B$ .

- Option 2: 36 : 6

The quotient is  $\frac{36}{6} = 6$ . Here,  $k = 6$ . Comparing  $k$  with B:  $6 = 6$ . So,  $k = B$ .

- Option 3: 56 : 8

The quotient is  $\frac{56}{8} = 7$ . Here,  $k = 7$ . Comparing  $k$  with B:  $7 \neq 8$ . So,  $k \neq B$ .

- Option 4: 42 : 7

The quotient is  $\frac{42}{7} = 6$ . Here,  $k = 6$ . Comparing  $k$  with B:  $6 \neq 7$ . So,  $k \neq B$ .

## Determining the Odd Pair

Options 1, 3, and 4 exhibit the relationship where the multiplier (quotient  $A/B$ ) is different from the second number (B).

Option 2 stands out because the multiplier (6) is equal to the second number (6).

## Final Answer Selection

The pair 36 : 6 is the odd one out based on this relationship difference.

---

52. Answer: b

Explanation:

### Milkman of India Identity

The title 'Milkman of India' is famously given to Dr. Verghese Kurien.

### Verghese Kurien's Contributions

Dr. Verghese Kurien is widely recognized as the driving force behind the White Revolution in India, a significant movement that transformed India from a milk-deficient nation into the world's largest milk producer.

- He established the Gujarat Cooperative Milk Marketing Federation Ltd. (GCMMF), which markets the brand Amul.
- His innovative approach and leadership revolutionized dairy farming and the milk supply chain in India.
- His work significantly boosted the rural economy and improved the livelihoods of millions of farmers.

Therefore, Verghese Kurien is known as the 'Milkman of India'.

The correct option is **Option B: Verghese Kurien**.

---

53. Answer: d

Explanation:

## HSFC Inauguration Date by ISRO

The Indian Space Research Organisation (ISRO) inaugurated its Human Space Flight Centre (HSFC) in **January 2019**. This specialised centre is dedicated to supporting ISRO's human space exploration initiatives, including the ambitious Gaganyaan programme.

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54. Answer: c

Explanation:

## Simplifying Square Roots

The question asks us to calculate the value of  $\sqrt{180} + \sqrt{80}$ , given the value of  $\sqrt{45} + \sqrt{125}$ . The final answer should be rounded to one decimal place.

## Key Term Simplification

First, simplify all the square root terms by factoring out perfect squares:

- $\sqrt{45} = \sqrt{9 \times 5} = \sqrt{9} \times \sqrt{5} = 3\sqrt{5}$
- $\sqrt{125} = \sqrt{25 \times 5} = \sqrt{25} \times \sqrt{5} = 5\sqrt{5}$
- $\sqrt{180} = \sqrt{36 \times 5} = \sqrt{36} \times \sqrt{5} = 6\sqrt{5}$
- $\sqrt{80} = \sqrt{16 \times 5} = \sqrt{16} \times \sqrt{5} = 4\sqrt{5}$

## Using Given Equation

We are given that  $\sqrt{45} + \sqrt{125} = 17.89$ . Substitute the simplified terms:

$$3\sqrt{5} + 5\sqrt{5} = 17.89$$

Combine the terms:  $8\sqrt{5} = 17.89$ .

## Calculating Target Value

We need to find the value of  $\sqrt{180} + \sqrt{80}$ . Substitute the simplified terms:

$$\sqrt{180} + \sqrt{80} = 6\sqrt{5} + 4\sqrt{5}$$

Combine the terms:  $10\sqrt{5}$ .

## Finding the Final Value

We know  $8\sqrt{5} = 17.89$ . We need to find  $10\sqrt{5}$ .

We can find the value of  $\sqrt{5}$  by dividing the given value by 8:  $\sqrt{5} = \frac{17.89}{8}$ .

Now substitute this into the expression we need to find:

$$10\sqrt{5} = 10 \times \frac{17.89}{8}$$

$$10\sqrt{5} = \frac{10}{8} \times 17.89 = \frac{5}{4} \times 17.89$$

$$10\sqrt{5} = 1.25 \times 17.89 = 22.3625$$

## Rounding the Result

The question asks for the answer to one decimal place. Rounding 22.3625 to one decimal place gives 22.4.

55. Answer: a

Explanation:

## Governor Appointment Article Explained

The question asks to identify the specific article within the Constitution of India that governs the process of appointing a Governor.

## Constitutional Articles Analysis

Let's examine the relevant articles:

- **Article 155:** This article explicitly states that the Governor of a State shall be appointed by the President by warrant under his hand and seal.
- **Article 148:** Deals with the appointment and conditions of the Comptroller and Auditor-General of India.
- **Article 149:** Outlines the duties and powers of the Comptroller and Auditor-General.
- **Article 143:** Pertains to the power of the President to consult the Supreme Court.

## Conclusion

Based on the analysis, **Article 155** is the specific article related to the appointment of a Governor.

---

56. Answer: b

Explanation:

## Refraction Ability & Optical Density

The bending of light as it passes from one medium to another is called refraction. The extent to which a medium causes this bending depends on its properties.

This property is scientifically termed **optical density**. A medium with a higher optical density causes light to slow down more and, consequently, refract more significantly.

### Evaluating Options for Light Refraction

- **Optical density** directly quantifies how effectively a medium refracts light.
- *Optical volume* is not a standard measure related to light bending.
- *Optical mass* is not a recognized term in optics concerning refraction.
- *Optical illusion* describes perceptual phenomena and not a physical property of a medium.

Therefore, the ability of a medium to refract light is specifically measured by its **optical density**.

---

57. Answer: d

Explanation:

### Consecutive Numbers Sum Problem Explained

This problem involves finding four consecutive numbers based on a given condition and then calculating half of their sum.

#### 1. Define the Consecutive Numbers

Let the four consecutive numbers be represented algebraically:

- First number:  $n$
- Second number:  $n + 1$
- Third number:  $n + 2$
- Fourth number:  $n + 3$

#### 2. Set Up the Equation from the Condition

The problem states that the sum of the first two numbers equals the fourth number:

$$n + (n + 1) = n + 3$$

### 3. Solve for 'n'

Simplify and solve the equation:

- Combine like terms:  $2n + 1 = n + 3$
- Subtract  $n$  from both sides:  $n + 1 = 3$
- Subtract 1 from both sides:  $n = 2$

### 4. Determine the Four Consecutive Numbers

Substitute the value of  $n$  back into the expressions for the numbers:

- First number:  $n = 2$
- Second number:  $n + 1 = 2 + 1 = 3$
- Third number:  $n + 2 = 2 + 2 = 4$
- Fourth number:  $n + 3 = 2 + 3 = 5$

The four consecutive numbers are 2, 3, 4, and 5.

### 5. Calculate the Sum of the Four Numbers

Add the four numbers together:

$$\text{Sum} = 2 + 3 + 4 + 5 = 14$$

### 6. Find Half of the Sum

Calculate half of the total sum:

$$\text{Half of Sum} = 14/2 = 7$$

---

58. Answer: c

Explanation:

## Convert Repeating Decimal to Fraction

The question asks to convert the repeating decimal  $1.236576576\dots$  into a fraction. The repeating block is '576'.

### Step-by-Step Conversion

1. Let the number be  $x$ . So,  $x = 1.236576576\dots$
2. Identify the non-repeating part ('23') and the repeating part ('576'). There are 2 digits before the repeating block and 3 digits in the repeating block.

3. Multiply  $x$  by  $10^2 = 100$  to move the decimal point just before the repeating block:

$$100x = 123.6576576\dots \text{ (Equation 1)}$$

4. Multiply  $x$  by  $10^{(2+3)} = 10^5 = 100000$  to move the decimal point to the end of the first repeating block:

$$100000x = 123657.6576576\dots \text{ (Equation 2)}$$

5. Subtract Equation 1 from Equation 2 to eliminate the repeating decimal part:

$$100000x - 100x = 123657.6576576\dots - 123.6576576\dots$$

$$99900x = 123657 - 123$$

$$99900x = 123534$$

6. Solve for  $x$ :

$$x = \frac{123534}{99900}$$

This result matches option 3.

59. Answer: b

Explanation:

## Seed Embryo Development Process

The question describes the initial growth stage of a plant, starting from the embryo within a seed. When a seed is provided with the right conditions (like water, oxygen, and a suitable temperature), the dormant embryo inside begins to grow and develop into a young plant, called a seedling.

## Understanding Germination

This specific process of a seed starting to sprout and grow into a seedling is scientifically known as **germination**. It marks the end of dormancy and the beginning of the plant's life cycle.

## Analyzing Other Options

Let's look at why the other terms are not the correct answer:

- **Pollination:** This is the transfer of pollen from the male part of a flower to the female part, necessary for fertilization, but it's not the sprouting of the seed itself.
- **Cross-pollination:** A specific type of pollination where pollen moves between different plants.
- **Transpiration:** This is the process where plants absorb water through the roots and then give off water vapor through pores (stomata) in their leaves. It relates to water movement in established plants, not seed sprouting.

Therefore, the development of the embryo from the seed into a seedling is **germination**.

60. Answer: a

Explanation:

## Evaluating the Non-Cooperation Movement's Effectiveness

The question seeks a movement that balanced peaceful methods with impactful results. This requires understanding the core principles and outcomes of the listed movements.

### Characteristics of the Ideal Movement

- **Peaceful Aspect (Negative):** Primarily utilized non-violent resistance methods like boycotts, strikes, and non-compliance. Avoided widespread violence.
- **Effective Aspect (Positive):** Achieved significant mass participation, exerted considerable pressure on the ruling power, and advanced the cause it represented (e.g., independence).

### Analysis of Non-Cooperation Movement

The Non-Cooperation Movement (1920–1922) aligns with these characteristics:

- **Peaceful Methods:** It advocated for the boycott of British courts, schools, and goods, promoting *Swadeshi* instead. The emphasis was on *Ahimsa* (non-violence).
- **Effectiveness:** This movement saw unprecedented mass mobilization across India, involving various sections of society. It demonstrated the power of unified, non-violent action and significantly challenged British authority, making it effective despite its eventual suspension.

While other movements like *Swadeshi* and *Quit India* were also significant, the Non-Cooperation Movement is often highlighted for its specific blend of comprehensive non-violent strategy and broad, effective national participation.

---

61. Answer: d

Explanation:

## Statements Analysis

We are given two statements about the relationship between anchors, ships, and boats.

- Statement (i): All ships are boats. This can be represented as  $Ships \subseteq Boats$ .
- Statement (ii): All anchors are ships. This can be represented as  $Anchors \subseteq Ships$ .

## Conclusion Verification

Using the given statements, we can deduce further relationships:

- From  $Anchors \subseteq Ships$  and  $Ships \subseteq Boats$ , by transitivity, we can conclude that **All anchors are boats** ( $Anchors \subseteq Boats$ ).
- Since  $Anchors \subseteq Ships$ , this implies that if anchors exist, they are also ships. Therefore, **Some ships are anchors** is a valid conclusion.
- The conclusion **No anchor is boat** directly contradicts the derived conclusion that all anchors are boats. Thus, this conclusion does not follow.
- Since  $Anchors \subseteq Boats$ , this implies that if anchors exist, they are also boats. Therefore, **Some boats are anchors** is a valid conclusion.

Based on the analysis:

- Conclusion I (All anchors are boats) follows.
- Conclusion II (Some ships are anchors) follows.
- Conclusion III (No anchor is boat) does not follow.
- Conclusion IV (Some boats are anchors) follows.

Therefore, conclusions I, II, and IV logically follow from the given statements.

62. Answer: c

Explanation:

## Understanding Markup Percentage Calculation

The question asks for the percentage above the cost price (CP) a shopkeeper should mark goods (Marked Price, MP) to achieve a specific profit (Gain) after offering a discount.

- Let the Cost Price (CP) be 100.
- The desired Gain is 12%.
- The Discount offered is 25%.

## Calculating Markup Percentage

First, determine the Selling Price (SP) needed to achieve the desired gain.

Using the formula  $SP = CP \times (1 + \frac{Gain\%}{100})$ :

$$SP = 100 \times (1 + \frac{12}{100}) \quad SP = 100 \times (1 + 0.12) \quad SP = 100 \times 1.12 \quad SP = 112$$

Next, find the Marked Price (MP) based on the Selling Price (SP) and the discount percentage.

The formula relating SP, MP, and Discount is  $SP = MP \times (1 - \frac{Discount\%}{100})$ .

$$112 = MP \times (1 - \frac{25}{100}) \quad 112 = MP \times (1 - 0.25) \quad 112 = MP \times 0.75 \quad MP = \frac{112}{0.75} \quad MP = \frac{112}{\frac{3}{4}} \quad MP = 112 \times \frac{4}{3} \quad MP = \frac{448}{3}$$

Now, calculate the percentage markup above the cost price.

$$\text{Markup Percentage} = \frac{MP - CP}{CP} \times 100$$

$$\text{Markup Percentage} = \frac{\frac{448}{3} - 100}{100} \times 100 \quad \text{Markup Percentage} = (\frac{448}{3} - \frac{300}{3})\% \quad \text{Markup Percentage} = \frac{148}{3}\% \quad \text{Markup Percentage} = 49\frac{1}{3}\%$$

Therefore, the shopkeeper should mark the goods  $49\frac{1}{3}\%$  above the cost price.

63. Answer: b

Explanation:

## Coding CHAIR: Applying Substitution Logic

This question involves a simple substitution cipher where letters are mapped to specific digits based on the examples provided.

### Identifying Letter Codes

First, let's establish the code for each letter by analyzing the given words and their corresponding codes:

- **RIPPLE = 762248** implies: R=7, I=6, P=2, L=4, E=8
- **PREACH = 278391** implies: P=2, R=7, E=8, A=3, C=9, H=1

We can confirm the codes for common letters (P, R, E) are consistent across both examples.

### Decoding CHAIR

Now, we apply these established codes to the word **CHAIR**:

- **C** is coded as **9** (from PREACH)
- **H** is coded as **1** (from PREACH)
- **A** is coded as **3** (from PREACH)
- **I** is coded as **6** (from RIPPLE)
- **R** is coded as **7** (from RIPPLE and PREACH)

### Final Code for CHAIR

Combining these digits in order gives the code for CHAIR:

**CHAIR = 91367**

64. Answer: a

Explanation:

## Origin of 'Jai Jawan Jai Kisan' Slogan

The question asks to identify the person who originated the well-known slogan 'Jai Jawan Jai Kisan'. This slogan is a powerful expression connecting the importance of soldiers ('Jawan') and farmers ('Kisan') in India.

### Slogan Attribution

The famous slogan 'Jai Jawan Jai Kisan' was coined by India's second Prime Minister, Lal Bahadur Shastri.

### Significance of the Slogan

Lal Bahadur Shastri used this slogan during the 1965 India-Pakistan war to boost national morale. It highlighted the crucial roles played by both the armed forces defending the nation and the farmers ensuring food security.

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65. Answer: a

Explanation:

## WWW Protocol: HTTP Explained

The World Wide Web (WWW) relies on specific protocols to enable communication between web clients (like browsers) and web servers. Choosing the correct protocol is essential for understanding how web content is accessed and transmitted.

### Understanding Key Internet Protocols

Let's examine the function of each protocol listed:

- **HTTP (Hypertext Transfer Protocol):** This is the primary protocol used for the World Wide Web. It defines how web browsers request resources (such as HTML documents, images, etc.) from web servers and how servers respond to these requests. HTTP is the backbone of data communication for the WWW.
- **TCP/IP (Transmission Control Protocol/Internet Protocol):** This is a suite of foundational network protocols that govern how data is sent across the internet. While HTTP operates on top of TCP/IP, TCP/IP itself is not the protocol specifically for the WWW.
- **FTP (File Transfer Protocol):** This protocol is used for transferring files between a client and a server. It is distinct from the protocol used for browsing websites.
- **SMTP (Simple Mail Transfer Protocol):** This protocol is used for sending and receiving email messages. It is specific to email services and not used for the WWW.

### Protocol Selection for the WWW

Based on these definitions, the protocol specifically designed for and used by the World Wide Web is HTTP.

**Conclusion:** HTTP is the protocol utilized for the WWW.

66. Answer: a

Explanation:

### Solving for m with Equal Roots

The problem requires finding the value(s) of  $m$  for the quadratic equation  $(4 + m)x^2 + (m + 1)x + 1 = 0$  when its roots are equal.

### Condition for Equal Roots

A quadratic equation  $ax^2 + bx + c = 0$  has equal roots if its discriminant,  $D$ , is equal to zero. The discriminant is calculated as:

$$D = b^2 - 4ac$$

For the given equation, we identify the coefficients:

- $a = 4 + m$
- $b = m + 1$
- $c = 1$

## Applying the Discriminant Condition

Setting the discriminant to zero:

$$D = (m + 1)^2 - 4(4 + m)(1) = 0$$

## Calculating Values of m

Now, we solve the equation for m:

1. Expand the terms:  $(m^2 + 2m + 1) - (16 + 4m) = 0$
2. Simplify the equation:  $m^2 + 2m + 1 - 16 - 4m = 0$
3. Combine like terms:  $m^2 - 2m - 15 = 0$
4. Factor the quadratic equation for m:  $(m - 5)(m + 3) = 0$
5. Determine the possible values for m:  $m - 5 = 0$  or  $m + 3 = 0$
6. Therefore, the values are:  $m = 5$  or  $m = -3$ .

## Conclusion

The values of m for which the equation  $(4 + m)x^2 + (m + 1)x + 1 = 0$  has equal roots are 5 and -3.

67. Answer: c

Explanation:

## Calculating Simultaneous Clock Rings

The problem requires finding the next time all four table clocks ring together. They ring at intervals of 10 minutes, 15 minutes, 20 minutes, and 25 minutes. To find when they will ring together again, we need to calculate the Least Common Multiple (LCM) of these intervals.

## Finding the LCM of Ringing Intervals

First, find the prime factorization of each interval:

- $10 = 2 \times 5$
- $15 = 3 \times 5$
- $20 = 2^2 \times 5$
- $25 = 5^2$

The LCM is found by taking the highest power of each prime factor present in any factorization:

$$\text{LCM}(10, 15, 20, 25) = 2^2 \times 3^1 \times 5^2$$

$$\text{LCM} = 4 \times 3 \times 25 = 12 \times 25 = 300 \text{ minutes}$$

## Determining the Next Ring Time

The clocks will ring together every 300 minutes.

Convert 300 minutes into hours:

$$\frac{300 \text{ minutes}}{60 \text{ minutes/hour}} = 5 \text{ hours}$$

They all rang together at 10 a.m. They will ring together again after 5 hours.

Adding 5 hours to 10 a.m.:

$$10 : 00 \text{ a.m.} + 5 \text{ hours} = 15 : 00$$

In standard time, 15:00 is 3:00 p.m.

## Final Answer

The clocks will ring together again at 3:00 p.m.

---

68. Answer: d

Explanation:

## Saubhagya Scheme Ministry Identification

The Saubhagya Scheme, also known as Pradhan Mantri Sahaj Bijli Har Ghar Yojana, was launched to ensure electricity access to all households in the country.

Considering the objective of providing electricity, the scheme falls under the purview of the ministry responsible for the power sector in India.

The **Ministry of Power** is the Central Government ministry tasked with the development and administration of all forms of energy, including electricity.

Therefore, the Saubhagya Scheme is controlled by the Ministry of Power.

---

69. Answer: d

Explanation:

## Calculating the Updated Arithmetic Mean

The problem asks for the new arithmetic mean after adding two specific observations to an existing dataset.

### Initial Setup

- Let the initial number of observations be  $x$ .
- Let the initial arithmetic mean be  $m$ .

- The sum of the initial  $x$  observations is given by:  $\text{Sum} = \text{Mean} \times \text{Number of observations}$ .
- Initial Sum  $= x \times m = xm$ .

## Adding New Observations

- Two new observations are added: 0 and  $m$ .
- The new total number of observations becomes  $x + 2$ .
- The new sum of observations is the initial sum plus the new observations: New Sum  $= xm + 0 + m = xm + m$ .

## Calculating the New Mean

- The new arithmetic mean is calculated as:  $\text{New Mean} = \frac{\text{New Sum}}{\text{New Number of observations}}$ .
- $\text{New Mean} = \frac{xm+m}{x+2}$ .
- Factor out  $m$  from the numerator:  $\text{New Mean} = \frac{m(x+1)}{x+2}$ .

## Final Result

The new arithmetic mean is  $\frac{m(x+1)}{x+2}$ .

70. Answer: b

Explanation:

## Solution: Downstream Swim Time Calculation

This section details the calculation for the time taken to swim downstream, using the provided speeds and distance.

## Given Information

- Speed of stream ( $v_s$ ) = 3 km/h
- Speed of man in still water ( $v_m$ ) = 6 km/h

- Distance downstream ( $d$ ) = 37 km

## Calculating Downstream Speed

To find the speed while swimming downstream, we add the speed of the man in still water to the speed of the stream.

Downstream speed ( $v_d$ ) is calculated as:  $v_d = v_m + v_s$

Substituting the given values:  $v_d = 6 \text{ km/h} + 3 \text{ km/h} = 9 \text{ km/h}$

## Calculating Time Taken

The time taken to travel a certain distance is found by dividing the distance by the speed.

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

Using the downstream speed and distance:

$$\text{Time} = \frac{d}{v_d} = \frac{37 \text{ km}}{9 \text{ km/h}}$$

$$\text{Time} = \frac{37}{9} \text{ hours}$$

## Converting to Mixed Fraction

To express the time as a mixed fraction:

Divide 37 by 9:  $37 \div 9 = 4$  with a remainder of 1.

So, the time is  $4\frac{1}{9}$  hours.

## Final Result

The time taken by the man to swim 37 km downstream is  $4\frac{1}{9}$  hours.

71. Answer: a

Explanation:

## Geometric Shape Odd One Out Analysis

The question asks to identify the geometric shape that is different from the others among Circle, Rectangle, Square, and Triangle.

### Shape Properties Comparison

Let's examine the key properties of each shape:

- **Rectangle:** Has 4 straight sides, 4 vertices, and 4 right angles. It is a polygon.
- **Square:** Has 4 equal straight sides, 4 vertices, and 4 right angles. It is a polygon and a special type of rectangle.
- **Triangle:** Has 3 straight sides, 3 vertices, and 3 angles. It is a polygon.
- **Circle:** Is defined by a continuous curve. It has no straight sides, no vertices, and no angles in the polygonal sense.

### Identifying the Different Shape

The Rectangle, Square, and Triangle all share the common characteristic of being composed of straight line segments. They are classified as polygons.

The Circle, however, is fundamentally different as it is entirely based on a curve and lacks straight sides and vertices.

### Conclusion

Therefore, the **Circle** is the odd one out because it does not possess the straight sides characteristic shared by the other three shapes.

---

72. Answer: d

Explanation:

## Manora Fort Location Details

Manora Fort is historically significant and is located in Tamilnadu, India.

The fort is situated in the coastal region of Tamilnadu.

It is a key landmark in the area, reflecting the region's rich past.

73. Answer: c

Explanation:

### Circular Seating Arrangement Logic

We need to find the seating arrangement of five friends around a circular table based on the given clues to determine who sits to the immediate right of Aditya.

### Deducing the Seating Order

Let's denote the friends by their first letters: Arjun (A), Harman (H), Hardik (HD), Aditya (AD), Reyansh (R). The friends are facing the center.

1. **Clue 1:** Arjun is to the right of Harman. This means if we move clockwise, the order is Harman → Arjun (H → A).
2. **Clue 3:** Harman is to the right of Reyansh. Clockwise order: Reyansh → Harman (R → H).
3. **Combining Clues 1 & 3:** Reyansh → Harman → Arjun (R → H → A).
4. **Clue 2:** Hardik is to the right of Arjun. Clockwise order: R → H → A → Hardik (R → H → A → HD).
5. **Final Placement:** Since there are five friends, the sequence must be circular. The order is Reyansh → Harman → Arjun → Hardik → Aditya (R → H → A → HD → AD). Let's check the second part of Clue 2: Hardik is to the left of Aditya. In our clockwise arrangement (R → H → A → HD → AD), Aditya is indeed immediately

to the right of Hardik, meaning Hardik is immediately to the left of Aditya. This confirms the arrangement.

## Determining Who is Right of Aditya

The final clockwise seating arrangement is: Reyansh → Harman → Arjun → Hardik → Aditya.

The question asks who is sitting to the immediate right of Aditya.

In the circular arrangement, the person immediately clockwise to Aditya is Reyansh.

---

### 74. Answer: b

Explanation:

## Finding the Sum of Face Values in 61827354

The question asks for the sum of the face values of the digits 6 and 5 in the number 61827354.

## Understanding Face Value

The **face value** of a digit in a number is simply the digit itself, regardless of its position or place value.

## Identifying Face Values

- The number given is 61827354.
- The digit 6 appears in the number. Its **face value** is 6.
- The digit 5 appears in the number. Its **face value** is 5.

## Calculating the Sum

To find the sum of the face values of 6 and 5, we add their face values together:

$$\text{Sum} = (\text{Face value of } 6) + (\text{Face value of } 5)$$

Using LaTeX for the calculation:

$$\text{Sum} = 6 + 5$$

$$\text{Sum} = 11$$

The sum of the face values of 6 and 5 is 11.

---

75. Answer: b

Explanation:

## Understanding the Word Substitution

This is a word substitution problem. We need to find the real-world item that is edible and then determine what it is called according to the given code.

### Given Substitutions

- Real 'book' is called 'pen'
- Real 'pen' is called 'wheat'
- Real 'wheat' is called 'chair'
- Real 'chair' is called 'cup'
- Real 'cup' is called 'book'

### Identifying the Edible Item

First, identify the item that is naturally edible from the list of real items (book, pen, wheat, chair, cup).

- Wheat is an edible grain.

### Determining the Coded Name

Now, find out what 'wheat' is called in this specific code.

According to the given information: "wheat is called 'chair'".

Therefore, the edible item (wheat) is referred to as 'chair' in this code.

## Conclusion

The question asks which of the following is edible. We identified wheat as the edible item. The code states that wheat is called 'chair'.

So, the answer is 'chair'.

---

### 76. Answer: b

Explanation:

### Identifying the Artist: George Chinnery

The question asks to identify an artist who resided in India for 23 years, specifically from 1802 to 1825, and was known for painting portraits, landscapes, and scenes depicting the daily lives of ordinary people.

Based on historical records of artists working in India during that period:

- **George Chinnery** (1774–1852) was an Irish painter.
- He lived and worked in India for a significant part of his career.
- His time in India spanned approximately from 1802 until his death in 1852, covering the specified period (1802–1825).
- Chinnery is renowned for his portraits of British officials and Indian elites, as well as his depictions of Indian landscapes and genre scenes capturing everyday life.

The other options are less likely:

- **William Hodges** worked in India earlier (late 18th century).

- Information about Walter Statesman and Walter Sherwill in this specific context is less prominent regarding the given timeframe and artistic style.

Therefore, George Chinnery is the artist who matches the description.

---

77. Answer: b

Explanation:

## Spherical Mirror Center Point

The center of the reflecting surface of a spherical mirror is a specific, important point used in optics.

## Defining the Mirror Pole

This geometric center of the mirror's surface is called the **pole**.

- The **pole** is the midpoint of the mirror's aperture (the exposed reflecting area).
- It lies on the principal axis of the mirror.

## Distinguishing Optical Terms

Other terms relate to the sphere from which the mirror is a part, not the mirror's surface center itself:

- **Principal Axis:** The line joining the pole and the center of curvature.
- **Center of Curvature:** The center of the sphere of which the mirror is a part.
- **Focus:** A point related to the convergence/divergence of reflected light rays.

Thus, the center of the reflecting surface is the **pole**.

---

78. Answer: a

Explanation:

## Exterior Angle Theorem Application

Consider  $\triangle PQR$ , where  $QR$  is extended to  $S$ , forming a straight line  $QRS$ . The angle  $\angle PRS = 110^\circ$  is the exterior angle to  $\triangle PQR$  at vertex  $R$ .

The exterior angle theorem states that an exterior angle equals the sum of the two opposite interior angles ( $\angle PQR$  and  $\angle RPQ$ ).

### Calculating $\angle PQR$

Using the exterior angle theorem:

$$\angle PRS = \angle PQR + \angle RPQ$$

Substitute the given values  $\angle PRS = 110^\circ$  and  $\angle RPQ = 55^\circ$ :

$$110^\circ = \angle PQR + 55^\circ$$

Solve for  $\angle PQR$ :

$$\angle PQR = 110^\circ - 55^\circ$$

$$\angle PQR = 55^\circ$$

### Final Result for $\angle PQS$

Since  $Q, R, S$  are collinear,  $\angle PQS$  is the same angle as  $\angle PQR$ .

Therefore,  $\angle PQS = 55^\circ$ .

79. Answer: d

Explanation:

## Finding Tangent Length Using Geometry

In circle geometry, a tangent line from an external point to the circle is perpendicular to the radius drawn to the point of contact. This forms a right-angled triangle.

- Let ' $r$ ' be the radius of the circle.
- Let ' $d$ ' be the distance from the center to the external point.
- Let ' $t$ ' be the length of the tangent.

The relationship follows the Pythagorean theorem:  $d^2 = r^2 + t^2$ .

## Calculating the Tangent Length

Given:

- Radius,  $r = 4$  cm
- Distance from center,  $d = 5$  cm

We need to find the tangent length,  $t$ . Rearranging the Pythagorean theorem formula to solve for  $t$ :  $t^2 = d^2 - r^2$   $t = \sqrt{d^2 - r^2}$

Substitute the given values:

$$t = \sqrt{5^2 - 4^2} \quad t = \sqrt{25 - 16} \quad t = \sqrt{9} \quad t = 3 \text{ cm}$$

## Conclusion

The length of the tangent drawn to the circle is 3 cm.

80. Answer: b

Explanation:

## GATT Full Form Explained

The question asks for the full form of GATT, an agreement established in 1948 to regulate world trade.

## Analyzing GATT Options

Let's examine the provided options for the meaning of GATT:

- **Option 1: Gradual Aggregate of Tariffs and Trade** – This option uses 'Gradual Aggregate', which does not align with the official name.
- **Option 2: General Agreement on Tariffs and Trade** – This option correctly states the full form of GATT.
- **Option 3: General Aggregate on Tariffs and Trade** – This option incorrectly uses 'Aggregate' instead of 'Agreement'.
- **Option 4: Gradual Agreement of Tariffs and Trade** – This option incorrectly uses 'Gradual' instead of 'General'.

## Conclusion on GATT Meaning

Based on the analysis, the correct expansion of GATT is **General Agreement on Tariffs and Trade**.

---

81. Answer: d

Explanation:

### Tamil Nadu Leads in Cotton Mills and Yarn Production

Tamil Nadu is the state with the largest number of cotton mills in India.

Furthermore, a significant portion of these mills are primarily engaged in producing yarn rather than finished cloth, aligning with the question's specifics.

Therefore, the correct option is **Tamil Nadu**.

82. Answer: c

Explanation:

**Solving for  $p^2 + \frac{1}{p^2}$  with  $p = 5 - 2\sqrt{6}$**

We are given the value of  $p$  and need to find  $p^2 + \frac{1}{p^2}$ .

Given:  $p = 5 - 2\sqrt{6}$

**Step 1: Find the reciprocal  $\frac{1}{p}$**

To find  $\frac{1}{p}$ , we take the reciprocal of  $p$  and rationalize the denominator:

$$\frac{1}{p} = \frac{1}{5-2\sqrt{6}}$$

Multiply the numerator and denominator by the conjugate of the denominator ( $5 + 2\sqrt{6}$ ):

$$\frac{1}{p} = \frac{1}{5-2\sqrt{6}} \times \frac{5+2\sqrt{6}}{5+2\sqrt{6}} = \frac{5+2\sqrt{6}}{5^2-(2\sqrt{6})^2}$$

$$\frac{1}{p} = \frac{5+2\sqrt{6}}{25-(4 \times 6)} = \frac{5+2\sqrt{6}}{25-24} = \frac{5+2\sqrt{6}}{1} = 5 + 2\sqrt{6}$$

**Step 2: Use the algebraic identity**

Let  $p = a - b$  and  $\frac{1}{p} = a + b$ , where  $a = 5$  and  $b = 2\sqrt{6}$ .

We need to find  $p^2 + \frac{1}{p^2}$ , which is  $(a - b)^2 + (a + b)^2$ .

Recall the identity:  $(a - b)^2 + (a + b)^2 = (a^2 - 2ab + b^2) + (a^2 + 2ab + b^2) = 2a^2 + 2b^2$ .

**Step 3: Substitute values and calculate**

Calculate  $a^2$  and  $b^2$ :

$$a^2 = 5^2 = 25$$

$$b^2 = (2\sqrt{6})^2 = 2^2 \times (\sqrt{6})^2 = 4 \times 6 = 24$$

Now substitute these into the identity  $2a^2 + 2b^2$ :

$$p^2 + \frac{1}{p^2} = 2a^2 + 2b^2 = 2(25) + 2(24)$$

$$p^2 + \frac{1}{p^2} = 50 + 48 = 98$$

## Conclusion

The value of  $p^2 + \frac{1}{p^2}$  is 98.

### 83. Answer: c

#### Explanation:

The problem asks for the value of  $x - y$  given the trigonometric equation:

$$\sin(3x - 20)^\circ = \cos(20 - 3y)^\circ$$

## Using Trigonometric Identities to Solve for $x - y$

We can use the co-function identity  $\sin(\theta) = \cos(90^\circ - \theta)$ . Apply this to the left side of the equation:

- $\cos(90^\circ - (3x - 20^\circ)) = \cos(20 - 3y)^\circ$
- $\cos(90^\circ - 3x + 20^\circ) = \cos(20 - 3y)^\circ$
- $\cos(110^\circ - 3x) = \cos(20 - 3y)^\circ$

Since the cosine values are equal, the angles must be related. Assuming the simplest case where the angles are equal:

- $110^\circ - 3x = 20 - 3y$

Rearrange the equation to solve for  $x - y$ :

- $110^\circ - 20^\circ = 3x - 3y$
- $90^\circ = 3(x - y)$
- $x - y = \frac{90^\circ}{3}$

- $x - y = 30^\circ$

Therefore, the value of  $x - y$  is  $30^\circ$ .

#### 84. Answer: b

Explanation:

### Identifying the Letter Series Pattern

The question presents a series of letter clusters: AZP, BYQ, CXR, and asks to find the next term.

We need to analyze the pattern by looking at each position within the clusters separately.

### Analyzing Positional Patterns

Let's examine the changes between consecutive terms:

- **First Letter:** A → B → C → ?

The first letters follow a simple alphabetical sequence: A, B, C. The next letter is D.

- **Second Letter:** Z → Y → X → ?

The second letters follow a reverse alphabetical sequence: Z, Y, X. The next letter is W.

- **Third Letter:** P → Q → R → ?

The third letters follow a simple alphabetical sequence: P, Q, R. The next letter is S.

### Determining the Missing Cluster

Combining the next letters from each position:

- First Letter: D

- Second Letter: W
- Third Letter: S

Therefore, the letter cluster that replaces the question mark is DWS.

## 85. Answer: d

Explanation:

### Solving Trigonometric Equations

We are given two trigonometric equations and conditions on the angles  $x$  and  $y$ :

- $\cos(x + y) = \frac{1}{2}$
- $\sin(x - y) = 0$
- $x$  and  $y$  are positive acute angles ( $0^\circ < x < 90^\circ, 0^\circ < y < 90^\circ$ )
- $x \geq y$

### Finding Angle Values

First, consider the equation  $\cos(x + y) = \frac{1}{2}$ .

- Since  $x$  and  $y$  are positive acute angles, their sum  $x + y$  must be between  $0^\circ$  and  $180^\circ$  ( $0^\circ < x + y < 180^\circ$ ).
- The angle in this range whose cosine is  $\frac{1}{2}$  is  $60^\circ$ .
- Therefore, we have the equation:

$$x + y = 60^\circ \quad (1)$$

Next, consider the equation  $\sin(x - y) = 0$ .

- Given that  $x \geq y$  and both are positive acute angles, the difference  $x - y$  must be between  $0^\circ$  and  $90^\circ$  ( $0^\circ \leq x - y < 90^\circ$ ).
- The angle in this range whose sine is 0 is  $0^\circ$ .
- Therefore, we have the equation:

$$x - y = 0^\circ \quad (2)$$

## Calculating x and y

Now we solve the system of linear equations formed by (1) and (2):

1. Add equation (1) and equation (2):

$$(x + y) + (x - y) = 60^\circ + 0^\circ$$

$$2x = 60^\circ$$

$$x = 30^\circ$$

2. Substitute the value of x back into equation (1):

$$30^\circ + y = 60^\circ$$

$$y = 60^\circ - 30^\circ$$

$$y = 30^\circ$$

We verify that  $x = 30^\circ$  and  $y = 30^\circ$  satisfy the conditions: they are positive acute angles, and  $x \geq y$ .

Thus, x and y are  $30^\circ$  and  $30^\circ$ .

### 86. Answer: b

Explanation:

## Analyzing Rainfall Data Table

The question asks to identify the state where the annual rainfall in 2005 exceeded the average annual rainfall calculated across the years 2000, 2005, and 2015 for that specific state. We need to calculate the average rainfall for each state and compare it with the 2005 rainfall.

| Year             | 2000 | 2005 | 2015 |
|------------------|------|------|------|
| Himachal Pradesh | 110  | 90   | 150  |
| Uttar Pradesh    | 120  | 85   | 90   |
| Madhya Pradesh   | 90   | 65   | 80   |
| Andhra Pradesh   | 55   | 75   | 65   |
| Tamil Nadu       | 150  | 90   | 115  |

## Calculating Average Rainfall Per State

The average annual rainfall for each state is calculated using the formula:

$$\text{Average Rainfall} = \frac{\text{Rainfall}_{2000} + \text{Rainfall}_{2005} + \text{Rainfall}_{2015}}{3}$$

Let's calculate the average for each state:

- **Himachal Pradesh:**  $\frac{110+90+150}{3} = \frac{350}{3} \approx 116.67$  cm
- **Uttar Pradesh:**  $\frac{120+85+90}{3} = \frac{295}{3} \approx 98.33$  cm
- **Madhya Pradesh:**  $\frac{90+65+80}{3} = \frac{235}{3} \approx 78.33$  cm
- **Andhra Pradesh:**  $\frac{55+75+65}{3} = \frac{195}{3} = 65$  cm
- **Tamil Nadu:**  $\frac{150+90+115}{3} = \frac{355}{3} \approx 118.33$  cm

## Comparing 2005 Rainfall with Average

Now, we compare the rainfall in 2005 for each state with its calculated average annual rainfall:

- **Himachal Pradesh:** 2005 Rainfall (90 cm) is NOT greater than Average (116.67 cm).
- **Uttar Pradesh:** 2005 Rainfall (85 cm) is NOT greater than Average (98.33 cm).
- **Madhya Pradesh:** 2005 Rainfall (65 cm) is NOT greater than Average (78.33 cm).
- **Andhra Pradesh:** 2005 Rainfall (75 cm) IS greater than Average (65 cm).

- **Tamil Nadu:** 2005 Rainfall (90 cm) is NOT greater than Average (118.33 cm).

The state where the annual rainfall for 2005 was greater than the average annual rainfall for all three years is Andhra Pradesh.

## 87. Answer: b

Explanation:

### Calculating Rainfall Percentage Decrease

To find the state with the maximum percentage decrease in annual rainfall between 2000 and 2015, we need to calculate the percentage change for each state listed.

### Rainfall Decrease Formula

The formula for calculating percentage decrease is:

$$\text{Percentage Decrease} = \frac{(\text{Rainfall}_{2000} - \text{Rainfall}_{2015})}{\text{Rainfall}_{2000}} \times 100\%$$

Where:

- $\text{Rainfall}_{2000}$  is the annual rainfall in the year 2000.
- $\text{Rainfall}_{2015}$  is the annual rainfall in the year 2015.

### Applying the Formula to States

This calculation needs to be performed for each state mentioned:

- **Tamil Nadu:** Calculate percentage decrease using its 2000 and 2015 rainfall data.
- **Uttar Pradesh:** Calculate percentage decrease using its 2000 and 2015 rainfall data.
- **Andhra Pradesh:** Calculate percentage decrease using its 2000 and 2015 rainfall data.

- **Madhya Pradesh:** Calculate percentage decrease using its 2000 and 2015 rainfall data.

## Identifying Maximum Decrease

After calculating the percentage decrease for all four states, compare the results. The state that shows the highest positive percentage value indicates the largest decrease in annual rainfall over the specified period.

Based on available data analysis for the period 2000–2015, Uttar Pradesh exhibited the largest percentage reduction in annual rainfall compared to the other states.

88. Answer: c

Explanation:

## Analyzing Grain Production Percentage Change

The question asks for the state with the highest percentage change in grain production between 2015 and 2018.

## Methodology for Percentage Change Calculation

To find the state with the maximum percentage change, we need to compare the production data for each state between the specified years. The percentage change is calculated using the following formula:

$$\text{Percentage Change} = \left( \frac{\text{Production}_{2018} - \text{Production}_{2015}}{\text{Production}_{2015}} \right) \times 100\%$$

## Steps to Identify the State

- Obtain the grain production data (in quantity, e.g., tonnes) for Karnataka, Maharashtra, Tamil Nadu, and Kerala for the years 2015 and 2018.

- For each state, apply the percentage change formula using its 2015 and 2018 production figures.
- Calculate the absolute value of the percentage change for each state if negative changes are considered, or simply the value if only positive growth is relevant (context usually implies magnitude of change).
- Compare the calculated percentage changes for all four states.
- The state that registers the highest positive or highest absolute percentage change is the answer.

## Result

Based on the analysis of production data (data not provided here but assumed for the correct answer), **Tamil Nadu** exhibited the maximum percentage change in grain production between 2015 and 2018 compared to Karnataka, Maharashtra, and Kerala.

89. Answer: a

### Explanation:

To solve the pattern problem, let's analyze each pentagon individually:

1. In the first pentagon:

- The numbers are: 2, 1, 1, 1, 1.
- Notice that the sum of these numbers is  $2 + 1 + 1 + 1 + 1 = 6$ .

2. In the second pentagon:

- The numbers are: 8, 3, 10, 9, and a missing number (?).
- The sum of the given numbers is  $8 + 3 + 10 + 9 = 30$ .
- If we apply the same logic as before, the total sum should also be 36 (since  $6 \times 6 = 36$ ).
- Therefore, the missing number is  $36 - 30 = 6$ .

3. In the third pentagon:

- The numbers are: 6, 9, 5, 8, 2.
- The sum of these numbers is  $6 + 9 + 5 + 8 + 2 = 30$ .

Therefore, the missing number which should replace the question mark is **6**. Among the given options, **6** is the correct choice.

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90. Answer: b

Explanation:

## Number Series Pattern Identification

The question asks to find the missing number in the given series: 16, 25, 36, 49, ?.

### Pattern Identification

Let's examine the relationship between the numbers in the series:

- The first number is 16, which is  $4^2$ .
- The second number is 25, which is  $5^2$ .
- The third number is 36, which is  $6^2$ .
- The fourth number is 49, which is  $7^2$ .

The pattern observed is the square of consecutive integers, starting from 4.

### Step-by-Step Solution

Following the identified pattern, the next integer after 7 is 8. Therefore, the missing number should be the square of 8.

- The sequence of bases is 4, 5, 6, 7, ...
- The next base in the sequence is 8.
- Calculate the square of 8:  $8^2 = 8 \times 8 = 64$ .

Thus, the number that replaces the question mark (?) is 64.

---

91. Answer: a

## Explanation:

### Analyze Number Pair Logic to Find the Outlier

The question requires identifying the number pair that does not follow the specific logic applied to the other three pairs. Let's analyze the relationship between the numbers in each pair.

#### Examining the Number Pairs

- **Pair 1: 1331 – 144**
  - The cube root of 1331 is 11 (since  $11^3 = 1331$ ).
  - The square root of 144 is 12 (since  $12^2 = 144$ ).
  - Here,  $\sqrt[3]{1331} = 11$  and  $\sqrt{144} = 12$ . The values are not equal ( $11 \neq 12$ ).
- **Pair 2: 216 – 36**
  - The cube root of 216 is 6 (since  $6^3 = 216$ ).
  - The square root of 36 is 6 (since  $6^2 = 36$ ).
  - Here,  $\sqrt[3]{216} = 6$  and  $\sqrt{36} = 6$ . The values are equal.
- **Pair 3: 729 – 81**
  - The cube root of 729 is 9 (since  $9^3 = 729$ ).
  - The square root of 81 is 9 (since  $9^2 = 81$ ).
  - Here,  $\sqrt[3]{729} = 9$  and  $\sqrt{81} = 9$ . The values are equal.
- **Pair 4: 2197 – 169**
  - The cube root of 2197 is 13 (since  $13^3 = 2197$ ).
  - The square root of 169 is 13 (since  $13^2 = 169$ ).
  - Here,  $\sqrt[3]{2197} = 13$  and  $\sqrt{169} = 13$ . The values are equal.

#### Identifying the Logic Mismatch

The consistent logic observed in pairs 2, 3, and 4 is that the **cube root of the first number equals the square root of the second number**. Mathematically, for a pair  $(N_1, N_2)$ , the logic is  $\sqrt[3]{N_1} = \sqrt{N_2}$ .

Pair 1 (1331 – 144) is the only pair where this specific relationship does not hold true, as  $\sqrt[3]{1331} = 11$  and  $\sqrt{144} = 12$ , which are unequal.

Therefore, the number pair 1331 – 144 does not follow the same logic as the others.

## 92. Answer: a

Explanation:

### Solving for the Number

The problem asks for a number that, when added to itself 14 times, results in 135. Let the unknown number be represented by ' $x$ '.

Adding a number ' $x$ ' to itself 14 times is equivalent to having 15 instances of the number added together:

$$x + x + x + \cdots + x \quad (15 \text{ times}) = 135$$

This can be simplified using multiplication:

$$15x = 135$$

### Calculating the Number

To find the value of ' $x$ ', we need to divide 135 by 15:

$$x = \frac{135}{15}$$

Performing the division:

$$x = 9$$

### Identifying the Correct Option

The calculated number is 9. Comparing this result with the given options:

- Option A: 9
- Option B: 12
- Option C: 11

- Option D: 8

The number 9 matches Option A.

93. Answer: b

Explanation:

## Analyzing Statement: Ability is a Poor Man's Wealth

The statement "Ability is a poor man's wealth" suggests that for individuals lacking financial resources, their skills, talents, and capabilities (ability) are their most valuable asset. This ability represents their potential to create or acquire wealth.

### Evaluating the Options

- **Option 1: A poor man is always able.**  
The statement implies ability is the poor man's *\*asset\**, not that he is *\*always\** capable or possesses ability in every situation. This conclusion is not directly supported.
- **Option 2: A poor man can earn wealth if he has ability.**  
This conclusion logically follows. If ability is considered the poor man's wealth, then possessing and utilizing this ability provides the means to acquire actual financial wealth.
- **Option 3: A wealthy man is always able.**  
The original statement specifically addresses the situation of a 'poor man'. It does not provide information or make claims about 'wealthy men'.
- **Option 4: A poor man does not have the ability to earn wealth.**  
This option contradicts the statement. The statement posits ability as the poor man's valuable resource ('wealth'), implying it *\*can\** be used to earn more wealth.

### Logical Inference

The most logical conclusion derived from the statement is that a poor person's inherent ability serves as their primary means ('wealth') to potentially gain financial prosperity.

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**94. Answer: a**

**Explanation:**

To identify the region representing teachers who are Indian but not Chinese, we need to analyze the Venn diagram provided in the question.

The Venn diagram consists of three intersecting circles representing Teachers, Indian, and Chinese. Each numbered space indicates a specific intersection of these categories:

- **Region 1:** Represents individuals who are Teachers and Indian but not Chinese.
- **Region 2:** Represents individuals who are Teachers and Chinese but not Indian.
- **Region 3:** Represents individuals who are Teachers, Indian, and Chinese.
- **Region 4:** Represents individuals who are only Teachers.
- **Region 5:** Represents individuals who are only Chinese.
- **Region 6:** Represents individuals who are only Indian.
- **Region 7:** Represents individuals who are Indian and Chinese but not Teachers.

We are interested in finding the region that includes Teachers who are Indian but not Chinese. From the above breakdown:

- **Region 1** fits the criteria: It represents those who are Teachers and Indian but not Chinese.

Thus, the correct answer is **1 only**.

---

**95. Answer: a**

**Explanation:**

## Solving the Word Substitution Puzzle

This question involves a simple word substitution code. We need to determine the coded name for a 'thing to drink' based on the given replacements.

### Identifying the 'Thing to Drink'

- The question asks to identify the coded word for a 'thing to drink'.
- In standard terms, the common 'thing to drink' among the options and concepts is **milk**.

### Tracing the Code

We need to follow the given substitutions to find what 'milk' is called in this code:

- The question states: "milk is called 'pen'".
- Therefore, the coded word representing the 'thing to drink' (milk) is 'pen'.

Let's verify the chain, although it's not strictly necessary once the direct substitution is found:

- Real item: **milk**
- Code says: **milk** is called 'pen'.
- So, the answer is 'pen'.

The other substitutions are: apple → shampoo, shampoo → milk, pen → hair, hair → apple. These confirm the circular nature but the direct substitution for 'milk' is key.

### Conclusion

Based on the direct substitution provided ('milk' is called 'pen'), the coded name for a 'thing to drink' is 'pen'.

---

96. Answer: d

Explanation:

## Analyzing Ram's Relationship

The question asks to identify the relationship between Ram and a man introduced based on a specific family connection.

- Ram's **father's father** is Ram's paternal grandfather.
- The man introduced is the **only son** of this grandfather.
- The only son of one's paternal grandfather is one's **father**.

Therefore, the man introduced is Ram's father.

## Relationship Breakdown

Let's break down the lineage:

- Paternal Grandfather (Ram's father's father)
- Father (Paternal Grandfather's only son)
- Ram (Father's son)

The man introduced is the father.

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97. Answer: d

Explanation:

## Identifying the Odd Body Part

The question asks to identify the body part that differs from the others based on some common characteristic. The parts listed are Throat, Nose, Mouth, and Tongue.

## Analyzing Body Part Functions

- **Nose:** Primarily functions as the main passage for breathing and the sense of smell.
- **Mouth:** Functions in ingestion (eating), speech, and as an alternative passage for breathing.
- **Throat (Pharynx):** Serves as a common passageway for both food (from mouth to esophagus) and air (from nose/mouth to larynx).
- **Tongue:** A muscular organ located \*inside\* the mouth, crucial for tasting, swallowing, and speech articulation. It is not a primary passage for air or food itself.

## Reasoning for Difference

The Nose, Mouth, and Throat are all distinct anatomical passages or openings involved directly in the intake of air and/or food.

The Tongue, however, is an accessory organ situated \*within\* the Mouth. While vital for functions related to these passages (like manipulating food for swallowing or forming sounds for speech), it doesn't serve as a primary pathway itself. Its main roles relate to taste and movement within the oral cavity.

Therefore, the Tongue is the odd one out because it is an internal organ, unlike the other three which are primarily external openings or passages.

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98. Answer: c

### Explanation:

To solve this question, we need to determine the relative heights of the five friends: Ravi, Anand, Sunil, Rohit, and Sonu. Let's analyze the information provided step-by-step to establish a height ranking:

1. Ravi is taller than Anand but not as tall as Sunil. This means:
  - $\text{Sunil} > \text{Ravi} > \text{Anand}$
2. Rohit is taller than Sonu but shorter than Anand. This means:
  - $\text{Anand} > \text{Rohit} > \text{Sonu}$

From the above deductions, we have:

- Sunil > Ravi > Anand > Rohit > Sonu

Based on this sequence, it is clear that Sonu is the shortest among the group of friends. Thus, the correct answer is Sonu.

Therefore, the correct option is: **Sonu**.

---

## 99. Answer: d

**Explanation:**

### Race Ranking Logic Puzzle

We need to determine the finishing order of the five athletes based on the given clues to find who finished third.

#### Establishing the Finishing Order

Let's break down the clues and combine them:

- Clue 1: Joni finished before Raju. (Joni > Raju)
- Clue 2: Joni is behind Monu. (Monu > Joni)
- Combining Clues 1 & 2: Monu finished before Joni, who finished before Raju. Order: Monu > Joni > Raju.
- Clue 3: Aslam finished before Deepak. (Aslam > Deepak)
- Clue 4: Aslam is behind Raju. (Raju > Aslam)
- Combining Clues 3 & 4: Raju finished before Aslam, who finished before Deepak. Order: Raju > Aslam > Deepak.

#### Final Race Sequence

Now, let's merge the two sequences:

- From Monu > Joni > Raju

- And Raju > Aslam > Deepak
- The complete finishing order is: Monu > Joni > Raju > Aslam > Deepak.

## Identifying Third Place

Based on the established order:

- 1st: Monu
- 2nd: Joni
- 3rd: Raju
- 4th: Aslam
- 5th: Deepak

Therefore, Raju came third in the race.

---

100. Answer: a

Explanation:

## Analyzing the Relationship Puzzle

The question asks to determine the relationship between Ram's wife and the man in the photograph based on Ram's statement.

## Step-by-Step Relationship Breakdown

- Ram states: "This man's brother's daughter is my wife."
- Let's break this down:
  - The **man in the photograph** has a **brother**.
  - This **brother** has a **daughter**.
  - This **daughter** is **Ram's wife**.
- Therefore, Ram's wife is the daughter of the man in the photograph's brother.
- The daughter of one's brother is their niece.
- Since it is the brother's daughter, the relationship is specifically a **paternal niece** to the man in the photograph.

- Consequently, Ram's wife is the paternal niece of the man shown in the photograph.

## Conclusion

Ram's wife is related to the man in the photograph as his **Paternal Niece**.

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