

## Answers

### 1. Answer: b

#### Explanation:

Rudrasena II was a ruler of the Vakataka dynasty. He married Prabhavatigupta, a princess of the Gupta dynasty, thereby forming a political alliance between the two dynasties.

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### 2. Answer: a

#### Explanation:

Madhuri Barthwal is from Uttarakhand. She is known for her contribution to the preservation of the folk music of the state and was recognized with the Padma Shri award in 2022.

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### 3. Answer: d

#### Explanation:

The Parliament of India is the legislative organ of the Union government. It consists of the President, the Lok Sabha, and the Rajya Sabha and is responsible for making laws.

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### 4. Answer: d

#### Explanation:

Silicon is classified as a metalloid due to its properties that are intermediate between metals and non-metals. It is commonly used in semiconductors.

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**5. Answer: a**

**Explanation:**

The concept of a Republic in the Indian Constitution, where the head of the state is elected and not a hereditary monarch, is borrowed from the French Constitution.

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**6. Answer: c**

**Explanation:**

Odisha introduced a social security scheme for registered newspaper hawkers in 2021 to support them during the pandemic and acknowledge their role in the unorganized sector.

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**7. Answer: c**

**Explanation:**

Land degradation in Jharkhand and Chhattisgarh is primarily caused by deforestation due to mining activities, which disrupts the soil and vegetation.

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**8. Answer: c**

**Explanation:**

The Accelerated Female Literacy Programme targeted districts where the female literacy rate was below 30% as per the 2001 census, aiming to bridge the gender literacy gap.

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**9. Answer: c**

**Explanation:**

The Amazon basin is the largest drainage basin in the world, covering approximately 7,000,000 km<sup>2</sup>. It is primarily located in South America and drains into the Atlantic Ocean.

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**10. Answer: d**

**Explanation:**

National Sports University is located in Manipur, India. It is dedicated to promoting education and research in sports and physical education.

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**11. Answer: b**

**Explanation:**

Aves (birds) are characterized by laying eggs. They do not give birth to live young ones, which makes option 2 incorrect. Other features like being warm-blooded and having four-chambered hearts are true for Aves.

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**12. Answer: a**

**Explanation:**

Rail transport development is less in Sikkim due to its hilly terrain and challenging geographical conditions, which make laying tracks and infrastructure development difficult.

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**13. Answer: c**

**Explanation:**

The Discovery of India is written by Jawaharlal Nehru, not Subhash Chandra Bose, making option 3 incorrectly paired. Other pairs are correct.

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**14. Answer: d**

**Explanation:**

Rabindranath Tagore won the Nobel Prize for Literature in 1913 for his collection of poems titled "Gitanjali." He was the first non-European to win this prestigious award.

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**15. Answer: a**

**Explanation:**

The National Institute of Kathak Dance, also known as Kathak Kendra, was established in 1964 to promote and preserve the traditional Indian dance form of Kathak.

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**16. Answer: d**

**Explanation:**

As of 2020–21, Chhattisgarh reported the lowest unemployment rate among persons aged 15 years and above, reflecting its relatively stable job market.

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**17. Answer: a**

**Explanation:**

The Indian Hockey Federation (IHF) was established in 1925 as the governing body for field hockey in India. It played a significant role in promoting hockey in the country.

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**18. Answer: d**

**Explanation:**

Peroxisomes are small round organelles that perform oxidation reactions, producing hydrogen peroxide as a byproduct. They play a key role in lipid metabolism and detoxification.

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**19. Answer: a**

**Explanation:**

Redox reactions are driven by the transfer of electrons between two reactants. Oxidation refers to the loss of electrons, while reduction refers to the gain of electrons.

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**20. Answer: b**

**Explanation:**

Sangken is a Buddhist festival celebrated in Arunachal Pradesh. It marks the traditional New Year and involves water sprinkling rituals symbolizing purification.

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**21. Answer: b**

**Explanation:**

The Mukhya Mantri Sukh Ashray Yojana in Himachal Pradesh aims to benefit orphans, specially abled children, destitute women, and senior citizens by providing them with social security and support.

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**22. Answer: c**

**Explanation:**

The PM Ujjwala 2.0 Yojna aims to provide 10 million LPG connections to economically weaker sections to promote cleaner fuel usage and improve health outcomes.

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**23. Answer: b**

**Explanation:**

The MG Music Awards are presented annually by Nagaland to honor excellence in music and recognize local talent in the state.

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**24. Answer: b**

**Explanation:**

When the assets of a bank exceed its liabilities, the difference is recorded as net worth, representing the bank's financial strength and equity.

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**25. Answer: b**

**Explanation:**

Balban reorganized the Diwan-i-Arz department, which was responsible for military administration and recruitment during the Delhi Sultanate period.

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**26. Answer: d**

**Explanation:**

Simplify the given equation step by step. First, solve division and multiplication:  $15 + 4A - 2 + 4 = 1$ . Combine like terms:  $17 + 4A = 1$ . Solve for A:  $4A = -16$ , so  $A = -4$ .

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**27. Answer: a**

**Explanation:**

From the bar graph, the investment in 2018 is 78 million dollars, and in 2015 it is 72 million dollars. The ratio is 78 : 72, which simplifies to 13 : 12.

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**28. Answer: c**

**Explanation:**

The product of the radii of the two circles is given by the formula:  $r_1 r_2 = \frac{L^2 - L_i^2}{4}$ , where  $L$  is the external tangent and  $L_i$  is the internal tangent. Substituting the

values:  $r_1 r_2 = (9^2 - 5^2) / 4 = (81 - 25) / 4 = 56 / 4 = 14$ .

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29. Answer: d

**Explanation:**

From the congruence  $\triangle PQR \cong \triangle MON$ , corresponding angles are equal. So,  $\angle MON = 51^\circ = (5y - 8)$ . Solve for  $y$ :  $51 = 5y - 8 \Rightarrow 5y = 59 \Rightarrow y = 12$ . Similarly,  $ON = 24 = 3x + y \Rightarrow 24 = 3x + 12 \Rightarrow 3x = 12 \Rightarrow x = 4$ . Thus,  $x + y = 4 + 12 = 20$ .

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30. Answer: b

**Explanation:**

A number divisible by 5 must end in 0 or 5. For divisibility by 8, the last three digits must form a number divisible by 8. Check 626840:  $840 \div 8 = 105$  (divisible). Thus,  $*$  = 4 and  $\#$  = 0.

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31. Answer: d

**Explanation:**

The area of a square is  $\text{side}^2$ . Factorize the given quadratic:  $16x^2 + 40x + 25 = (4x + 5)^2$ . The side of the square is  $4x + 5$ . Perimeter =  $4 \times \text{side} = 4 \times (4x + 5) = 16x + 20 = 2(8x + 10)$ .

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32. Answer: c

**Explanation:**



The formula for the sum of squares of the first  $n$  natural numbers is  $n(n+1)(2n+1) / 6$ .  
For  $n = 45$ :  $\text{Sum} = 45 \times 46 \times 91 / 6 = 31,185$ .  $\text{Average} = \text{Sum} / n = 31,185 / 45 \approx 697.67$ .

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**33. Answer: b**

**Explanation:**

When the paper is rolled along its breadth, the height of the cylinder is 22 cm, and the circumference is 50 cm, giving radius  $r = 50 / (2\pi) \approx 7.96$  cm.  $\text{Volume} = \pi r^2 h = \pi (7.96)^2 (22) \approx 1,925 \text{ cm}^3$ .

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**34. Answer: a**

**Explanation:**

We use the identity  $(x - y)^2 = x^2 + y^2 - 2xy$  and  $(x + y)^2 = x^2 + y^2 + 2xy$ . Substituting the given values:  $(x - y)^2 = 280 - 240 = 40$  and  $(x + y)^2 = 280 + 240 = 520$ . So,  $(x - y) / (x + y) = \sqrt{40} / \sqrt{520} = 1 / \sqrt{3}$ .

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**35. Answer: a**

**Explanation:**

In downstream, effective speed =  $18 + 3 = 21$  km/h. In upstream, effective speed =  $18 - 3 = 15$  km/h. Time taken =  $(105 / 21) + (105 / 15) = 5 + 7 = 12$  hours.

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**36. Answer: d**

**Explanation:**

Let the principal be ₹P, rate = 5N, and  $SI = P / 5$ . For 6 years,  $SI = 5600 \times (33 / 100) \times 6 = ₹4368$ .

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**37. Answer: c**

**Explanation:**

Successive discounts are applied on the marked price as follows: First discount = ₹1,000  $\times$  0.8 = ₹800; Second discount = ₹800  $\times$  0.7 = ₹560; Third discount = ₹560  $\times$  0.9 = ₹504.

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**38. Answer: d**

**Explanation:**

From 6 a.m. to 9 a.m., only P and Q are active:  $(1/10 + 1/15) \times 3 = 1/6$  of the tank is filled. After 9 a.m., P, Q, and R are active:  $(1/10 + 1/15 - 1/12) \times t = 5/6$ . Solve for t:  $t = 6$  hours. Total time = 9 a.m. + 6 hours = 3 p.m.

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**39. Answer: a**

**Explanation:**

For the lines to have no solution, their slopes must be equal but intercepts different. Comparing coefficients,  $k = 2/7$  satisfies this condition.

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**40. Answer: b**

**Explanation:**

The length of the transverse common tangent is given by:  $\sqrt{d^2 - (r_1 + r_2)^2}$ , where  $d = 17$ ,  $r_1 = 5$ , and  $r_2 = 10$ . Substituting,  $\sqrt{(17^2 - (10 + 5)^2)} = \sqrt{(289 - 225)} = \sqrt{64} = 8$  cm.

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**41. Answer: a**

**Explanation:**

The total hours in a day are 24. The time spent at school is 6 hours. The percentage =  $(6 / 24) \times 100 = 25\%$ .

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**42. Answer: b**

**Explanation:**

The total number of valid votes =  $64,974 / 0.78 \approx 83,300$ . The total number of votes cast =  $83,300 / 0.98 \approx 85,000$ . The total number of voters =  $85,000 / 0.85 = 1,00,000$ .

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**43. Answer: d**

**Explanation:**

From the population table, the increase in 2016 compared to 2015 is the highest:  $(100.6 - 83.8) / 83.8 \times 100 \approx 20\%$ . No other year has a higher percentage increase.

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**44. Answer: d**

**Explanation:**

Using complementary angle identities:  $\sin(90^\circ - \theta) = \cos\theta$ . Simplify the numerator and denominator to get  $5 / 5 = 1$ .

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45. Answer: a

**Explanation:**

From  $7\tan\theta = 3$ ,  $\tan\theta = 3 / 7$ . Use Pythagoras to find  $\sin\theta = 3 / \sqrt{58}$  and  $\cos\theta = 7 / \sqrt{58}$ . Substituting these values gives  $(5 \times 3 - 7) / (5 \times 3 + 2 \times 7) = 8 / 29$ .

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46. Answer: a

**Explanation:**

From the given equation, solve for  $\tan\theta$  and  $\sec\theta$ . Substituting into the expression gives the result  $\sqrt{2} + 2$ .

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47. Answer: d

**Explanation:**

For the first mixture, milk ratio =  $10 / 16$ . For the second mixture, milk ratio =  $8 / 12$ . The ratio of milk in the two mixtures is  $(10/16) : (8/12) = 15 : 16$ .

---

48. Answer: a

**Explanation:**

Let the marked price = ₹100. Selling price after 20% discount = ₹80. If the gain is 10%, cost price =  $₹80 / 1.1 = ₹72.72$ . The ratio of cost price to marked price is  $8 : 11$ .

---

49. Answer: d

**Explanation:**

From the table, total arrears = ₹25,200. Total bonus = ₹12,450. Percentage =  $(25,200 / 12,450) \times 100 \approx 202.42\%$ .

---

50. Answer: c

**Explanation:**

Given area =  $209 \text{ cm}^2$  and perimeter = 63 cm. Using the formula for sector area and perimeter, solve for the central angle using  $\theta = (2 \times \text{area}) / (\text{radius}^2)$ . The result is approximately  $49.5^\circ$ .

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51. Answer: d

**Explanation:**

Claustrophobia is the fear of closed spaces. The other options refer to different phobias.

---

52. Answer: c

**Explanation:**

The passive voice construction is correct as "We are told by historians how this country was divided into three."

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**53. Answer: a**

**Explanation:**

The correct spelling is "components," which refers to parts or elements of a system.

---

**54. Answer: c**

**Explanation:**

The correct arrangement is POQR: "Technology has revolutionised every aspect of our lives, and it has transformed the way we communicate and connect."

---

**55. Answer: c**

**Explanation:**

The antonym of "exit" is "entry," which fits the context of the sentence.

---

**56. Answer: d**

**Explanation:**

"Care a hang" means showing no interest or concern about something.

---

**57. Answer: a**

**Explanation:**

The sentence is correctly expressed in passive voice as: "The new product will be launched by the company next month, and it is already being promoted through various marketing channels."

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**58. Answer: d**

**Explanation:**

The antonym of "mechanical" is "manual," which refers to work done by hand or involving human effort.

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**59. Answer: b**

**Explanation:**

"Taintless" means faultless, which refers to being free from any flaw or defect.

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**60. Answer: b**

**Explanation:**

The segment "as her" is grammatically incorrect. It should be "when she was 23."

---

**61. Answer: a**

**Explanation:**

A "foreword" is a short introductory section that leads to or explains the main part of a book.

**62. Answer: d**

**Explanation:**

The correct spelling is "Verifiability." The other options are correctly spelled.

---

**63. Answer: c**

**Explanation:**

"Aptitude" is the correct substitute as it means a natural ability or talent, especially for learning or understanding something.

---

**64. Answer: a**

**Explanation:**

"Dilemma" refers to a situation where one has to choose between two unsatisfactory alternatives.

---

**65. Answer: d**

**Explanation:**

The error lies in "still 10 p.m." It should be "until 10 p.m." to make the sentence grammatically correct.

---

**66. Answer: d**



**Explanation:**

"Spill the beans" means to reveal secret information, which fits the context of the sentence.

---

**67. Answer: d**

**Explanation:**

"Mendacious" means misleading or untruthful, which fits the context of the sentence.

---

**68. Answer: d**

**Explanation:**

The correct answer is "weight" as it refers to the physical property of the coin that amazed the travellers.

---

**69. Answer: b**

**Explanation:**

"Assess" is a synonym for "evaluate," meaning to judge or estimate the value or quality of something.

---

**70. Answer: c**

**Explanation:**

"Either" correctly fits the sentence to indicate two possible choices.

---

**71. Answer: b**

**Explanation:**

"Transition" refers to the shift or change to digital training, which fits the context of the sentence.

---

**72. Answer: a**

**Explanation:**

"Numerous" correctly describes a large number of courses affected by digital training.

---

**73. Answer: d**

**Explanation:**

"Pandemic" refers to a global outbreak, such as Covid-19, which has impacted education worldwide.

---

**74. Answer: a**

**Explanation:**

"Suspend" accurately reflects the interruption in studies caused by the pandemic.

---

75. Answer: b

**Explanation:**

"Whose" is used to refer to children whose core learning was weak, fitting the context of the sentence.

---

76. Answer: d

**Explanation:**

We hypothesize the relationship involves an arithmetic or positional rule:

Sum the digits:

- 121:  $1+2+1=4$
- 93:  $9+3=12$
- 214:  $2+1+4=7$

Examine differences:

- $121+93=214$  which matches exactly.

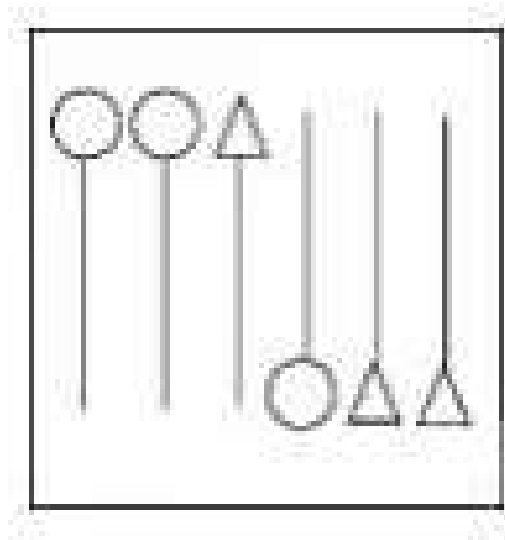
The relationship in the given set is based on a pattern observed in whole numbers. The correct set that follows the same relationship is (97, 112, 209).

---

77. Answer: d

**Explanation:**

By observing the pattern in the series, Option 4 correctly completes the sequence of transformations in the given figures.



78. Answer: a

**Explanation:**

From the positions of the dice, 8 is opposite to 4 because no common faces share the same alignment.

79. Answer: d

**Explanation:**

The given figure contains overlapping squares, which add up to a total of 13 squares.

80. Answer: b

**Explanation:**

The pair "Concise : Verbose" represents an antonym relationship similar to "Infinite : Cosmic".

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**81. Answer: b**

**Explanation:**

Based on the positions shown, N is opposite to M on the dice.

---

**82. Answer: c**

**Explanation:**

After interchanging the operations, the equation becomes:  $15 + 9 \div 7 \times 26 + 13 = 76$ .

---

**83. Answer: b**

**Explanation:**

Using the coding rules:  $5 - 2$  (brother)  $\times 4$  (wife)  $\div 3$  (father), 5 is identified as the Mother's brother.

---

**84. Answer: b**

**Explanation:**

EJM:

- Positions:  $E=5, J=10, M=13$
- Differences:  $J-E=5, M-J=3$

**DIM:**

- Positions: D=4, I=9, M=13
- Differences: I-D=5, M-I=4

**FKN:**

- Positions: F=6, K=11, N=14
- Differences: K-F=5, N-K=3

**CHK:**

- Positions: C=3, H=8, K=11
- Differences: H-C=5, K-H=3

### Step 2: Identify the odd one out

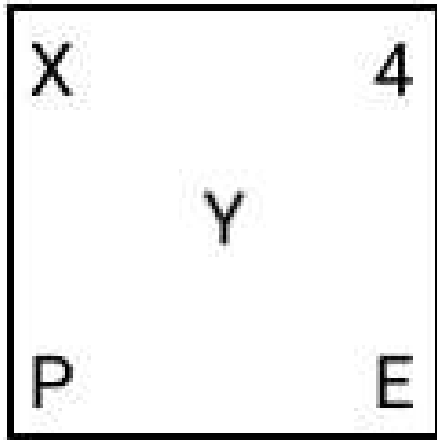
- **EJM, FKN, and CHK** all follow the pattern of differences +5,+3
- **DIM** breaks this pattern, as its differences are +5,+4

Among the options, DIM does not follow the same pattern of alphabetical sequence differences as the other groups.

**85. Answer: d**

### Explanation:

Based on the transformations observed in the sequence, Option 4 completes the pattern logically.



86. Answer: b

Explanation:

Examine the given pairs

62→79 The difference is:

1.  $79 - 62 = 17$

98→119 The difference is:

1.  $119 - 98 = 21$

The difference increases by 4 (from 17 to 21)

The relationship involves a mathematical pattern applied to the numbers. Following the same logic, 14 is related to 23.

87. Answer: d

Explanation:

## Break down the series

Each letter in the cluster can be examined based on its position in the alphabet:

- NUT: N=14, U=21, T=20
- RYX: R=18, Y=25, X=24
- VCB: V=22, C=3, B=2
- ZGF: Z=26, G=7, F=6

## Step 2: Analyze the pattern for each position

### 1st Letter:

- N=14, R=18, V=22, Z=26
- Increment by +4 each time: 14→18→22→26→30
- 30 corresponds to D (wrap around the alphabet).

### 2nd Letter:

- U=21, Y=25, C=3, G=7
- Increment by +4 each time: 21→25→3→7→11
- 11 corresponds to K.

### 3rd Letter:

- T=20, X=24, B=2, F=6
- Increment by +4 each time: 20→24→2→6→10
- 10 corresponds to J

The pattern involves shifting letters based on a specific alphabetic rule. The missing cluster is DKJ.

88. Answer: b

Explanation:



The series represents square numbers:  $2^2$ ,  $3^2$ ,  $5^2$ ,  $7^2$ ,  $11^2$ ,  $13^2$ , and  $17^2$ . Thus, the missing numbers are 9 and 25 ( $3^2$  and  $5^2$ ).

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89. Answer: c

Explanation:

When 'WISDOM' is alphabetically arranged, it becomes 'DIMOSW.' The letters in question are 'I' and 'S,' and there are five letters between them.

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90. Answer: a

Explanation:

The correct mirror image is depicted in Option 1, which accurately reflects the figure when mirrored along MN.



91. Answer: d

Explanation:

After interchanging the operations, the equation becomes:  $11 \times 12 + 78 \div 6 - 57 = 88$ .

---

92. Answer: b

**Explanation:**

In 52-68-51 the differences are:

$$68-52=16, 51-68=-17$$

The magnitudes of the differences are nearly equal (+16 and -17).

In all other options, the differences vary significantly in magnitude, forming a distinct pattern.

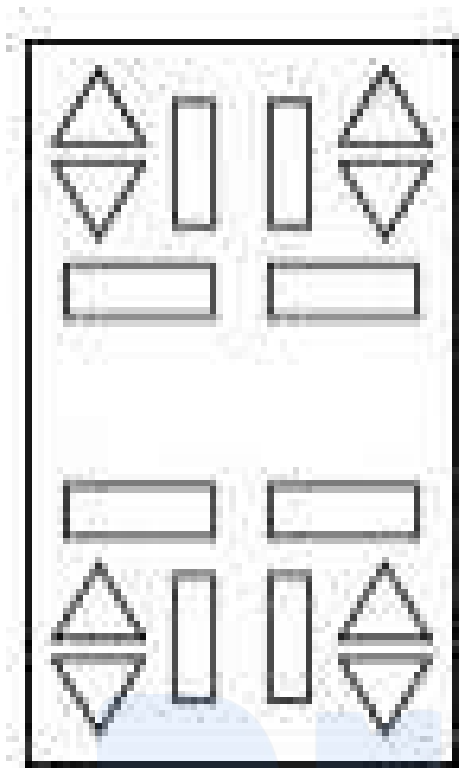
Option 2 does not follow the same mathematical pattern as the other groups. The logic involves specific mathematical relationships between the numbers in the sets.

---

**93. Answer: d****Explanation:**

The correct unfolded figure is represented by Option 4. It shows the accurate placement of cuts as per the sequence of folds.

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94. Answer: c

**Explanation:**

The correct sequence is formed by filling in the blanks with PASPP. This maintains the logical repetition and structure of the given series.

95. Answer: a

**Explanation:**

The pattern involves rearranging the letters in a specific way. Following the same logic, DRINK becomes RDNIK.

96. Answer: d

**Explanation:**

From the Venn diagram, 18 women entrepreneurs belong to the category of being non-Indian.

---

97. Answer: c

**Explanation:**

From the given information, the common word in both phrases is 'more,' and its corresponding code is 'gq.'

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98. Answer: d

**Explanation:**

**Analyze the given sets**

173→246

- Difference:  $246 - 173 = 73$

148→196

- Difference:  $196 - 148 = 48$

The differences (73,48) suggest the relationship may involve specific increments.

Now check the options:

- (142, 176): Difference = +34
- (169, 247): Difference = +78

- (127, 194): Difference = +67
- (154, 208): Difference = +54

option 4 is the correct answer.

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**99. Answer: d**

**Explanation:**

In the code language, each letter is mapped to a specific number. Based on the mappings provided, 'A' is coded as '8.'

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**100. Answer: d**

**Explanation:**

To determine how many smart people are polite, we look for the overlap between the "Smart" circle and the "Polite" circle in the Venn diagram.

- The intersection between "Smart" and "Polite" includes:
  - The region shared by both circles but not the "Educated" circle, which is 12.
  - The region where all three circles overlap (Smart, Polite, and Educated), which is 7.

Thus, the total number of smart people who are polite is:

$$12+7=19 \quad 12 + 7 = 19 \quad 12+7=19$$