

Patterns

Notes

- Parity
- Arithmetic Sequence and Sum
- Triangular Numbers

Discussion Questions



1. There are five men in a room. Each of them is either a liar that always lies or a knight that always tells the truth. Each of them was asked the question: "How many liars are among you?" The answers were: "one," "two," "three," "four," "five." How many liars were in that room?






2. A theatre contains 25 rows of seats. The first row contains 25 seats. Each succeeding row has one more seat than the row immediately before it. How many seats does the theatre have?

3. Using two transformations, the letter R is changed as shown: $R \rightarrow \text{Я} \rightarrow \text{Я.}$
 Using the same two transformations, the letter L is changed as shown: $L \rightarrow \text{Г} \rightarrow \text{Г.}$
 Using the same two transformations, the letter G is changed to ____

- (A) G (B) Я (C) Я (D) G (E) Я

4. In a "Fibonacci" sequence of numbers, each term beginning with the third, is the sum of the previous two terms. The first number in such a sequence is 2 and the third is 9. What is the eighth term in the sequence?

5. A 4×4 square grid can be entirely covered by three non-overlapping pieces made from 1×1 squares. If the first two pieces are  and  the third piece is ____

- (A)  (B)  (C)  (D)  (E) 

6. Five people are in the room for a meeting. When the meeting ends, each person shakes hands with each of the other people in the room exactly once. What is the total number of handshakes that occurs?

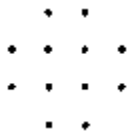
Practice Questions

7. Using an equal-armed balance, if $\square\square\square\square$ balances oo and oo balances $\triangle\triangle$, which of the following would not balance $\triangle\square\square$?

- (A) $\triangle\square\square$ (B) $\square\square\square\triangle$ (C) $\square\square oo$ (D) $\triangle\triangle\square$ (E) $oo\square\square\square$

8. Consider flipping a fair coin four times. We need to determine how many of the possible outcomes result in an even number of tails.

9. Twelve points are marked on a rectangular grid, as shown. How many squares can be formed by joining four of these points?



10. The sum of all the digits of the integers from 98 to 101 is

$$9 + 8 + 9 + 9 + 1 + 0 + 0 + 1 + 0 + 1 = 38$$

What is the sum of all of the digits of the integers from 1 to 100?