

**Question 1 (Clock Problem)**

How many times do the hour hand and minute hand of a standard clock meet each other in 24 hours?

- A. 22
- B. 24
- C. 25
- D. 26
- E. None of the above

Ans: A

**Question 2 (Numerical reasoning, inequalities)**

If  $x - y > x$  and  $x + y > y$ , then what can we conclude?

- A.  $x > 0, y > 0$
- B.  $x < 0, y < 0$
- C.  $y > x > 0$
- D.  $x < 0, y > 0$
- E.  $x > 0, y < 0$

Ans: E

**Question 3 (Counting Numbers)**

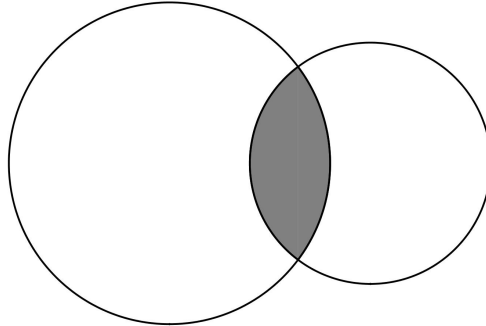
How many numbers  $n$  have the property that both  $\frac{n}{2}$  and  $2n$  are four-digit whole numbers?

- A. 1499
- B. 1500
- C. 2499
- D. 2500
- E. None of the above

Ans: B

**Question 4 (Ratio)**

The area of the shaded region is equal to  $\frac{1}{7}$  of the area of the big circle, and is equal to  $\frac{1}{5}$  of the area of the small circle. The difference between the area of the big circle and the small circle is  $18 \text{ cm}^2$ . What is the area of the small circle?



- A.  $36 \text{ cm}^2$
- B.  $72 \text{ cm}^2$
- C.  $90 \text{ cm}^2$
- D.  $126 \text{ cm}^2$
- E. None of the above

Ans: E

**Question 5 (Pattern)**

If the odd numbers are grouped in the following way:

$$\{1\};\{3,5\};\{7,9,11\};\{13,15,17,19\};\dots$$

what is the middle number in the 15<sup>th</sup> group?

- A. 113
- B. 209
- C. 211
- D. 225
- E. None of the above

Ans: D

**Question 6 (Volume)**

If the height of a cube is increased by 3 cm, it will become a cuboid (rectangular box) and the total surface area will be increased by  $72 \text{ cm}^2$ . What is the volume of the cube?

- A.  $27 \text{ cm}^3$
- B.  $64 \text{ cm}^3$
- C.  $125 \text{ cm}^3$
- D.  $216 \text{ cm}^3$
- E.  $343 \text{ cm}^3$

Ans: D

**Question 7 (Percentage)**

The original price of a ticket was \$10. When the price of the ticket was reduced, the number of customers increased by 50%, but the amount of money received only increased by 20%. What is the reduced ticket price?

- A. 1
- B. 2
- C. 3
- D. 4
- E. None of the above

Ans: E

**Question 8 (Ratio)**

The ratio of the difference, the sum and the product of two numbers is 1 : 7 : 24. What is the product of the two numbers?

- A. 24
- B. 48
- C. 72
- D. 96
- E. None of the above

Ans: B

**Question 9 (Fraction)**

In the following,  $x, y, z$  are whole numbers greater than 0. What is the product of  $x, y$  and  $z$ ?

$$x + \frac{1}{y + \frac{1}{z + \frac{1}{4}}} = 1 - \frac{1}{4 + \frac{1}{4 + \frac{1}{4}}}$$

- A. 6
- B. 8
- C. 12
- D. 24
- E. None of the above

Ans: C

**Question 10 (HCF, LCM)**

The highest common factor of two whole numbers is 20. The lowest common multiple of these two numbers is 200. If the sum of these two numbers is 140, what is the difference of these two numbers?

- A. 60
- B. 100
- C. 120
- D. 180
- E. None of the above

Ans: A

**Question 11 (Simultaneous equation)**

The table shows the price of tickets for groups of people.

Number of people	1 to 25	26 to 50	51 and above
Price per person	\$20	\$18	\$16

Peter and Tom each brought a group of tourists to visit some attractions. Peter's group has fewer people than Tom's group. If they buy the tickets separately, they will pay \$1322 in total. If they buy the tickets together, they only need to pay \$1136. How many people are there in Peter's group?

- A. 19
- B. 20
- C. 21
- D. 22
- E. 23

Ans: D

**Question 12 (Remainder)**

What is the remainder when  $1234^{2017}$  is divided by 7?

- A. 1
- B. 2
- C. 3
- D. 4
- E. None of the above

Ans: B

**Question 13 (Logic)**

In a particular year, the birthdays of Alan, Benedict, Dennis and Edgar fell on Tuesday, Wednesday, Thursday and Friday (not in order). Their birthdays in that year were also special days: Labour Day, Teachers' Day, Children's Day and National Day (not in order). Furthermore, in that year:

- i. Dennis' birthday falls before Labour Day but later than Teachers' Day.
- ii. Benedict's birthday does not fall on Teachers' Day.
- iii. Friday was either Alan's birthday or Children's Day (or both).
- iv. Edgar's birthday does not fall on Tuesday.
- v. Dennis' birthday does not fall on National day.

If they have different birthdays, determine each of their birthdays in that year.

- A. Alan – Wednesday, Benedict – Tuesday, Dennis – Thursday, Edgar – Friday
- B. Alan – Friday, Benedict – Wednesday, Dennis – Tuesday, Edgar - Thursday
- C. Alan – Friday, Benedict – Tuesday, Dennis – Thursday, Edgar – Wednesday
- D. Alan – Thursday, Benedict – Wednesday, Dennis – Tuesday, Edgar – Friday
- E. None of the above

Answer: E

**Question 14 (Algebra)**

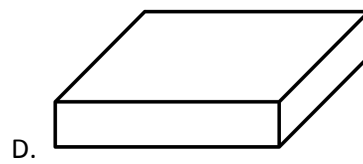
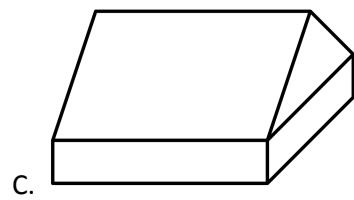
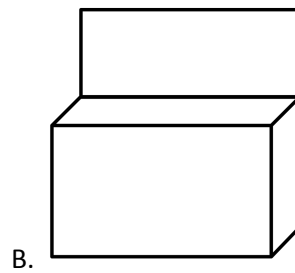
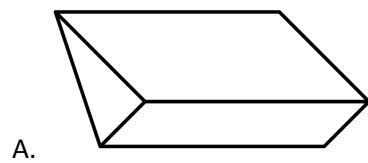
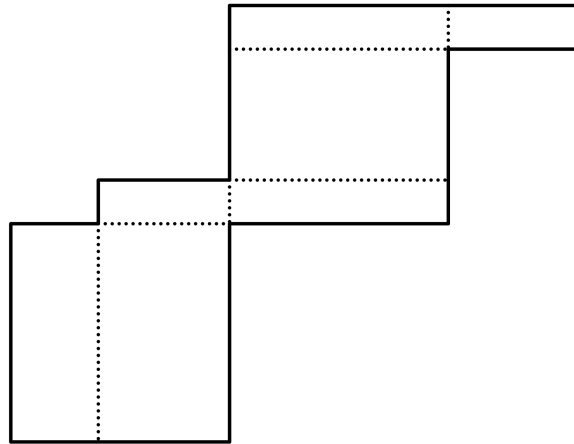
Which one of the following integers can be expressed as the sum of 100 consecutive positive integers?

- A. 3,579,111,300
- B. 2,345,678,910
- C. 1,627,384,950
- D. 4,692,581,470
- E. 5,815,937,260

Ans: A

**Question 15 (Spatial Visualization)**

Which one of the following objects can be folded from the diagram below?



E. None of the above

Ans: B

**Question 16 (Arithmetic)**

It is given that  $A = 1.01 \times 1.19 + 1.02 \times 1.18 + 1.03 \times 1.17 + \dots + 1.10 \times 1.10$ . Find the value of A. Leave your answer to the nearest whole number.

Ans: 12

**Question 17 (Combinatorics)**

There are 6 points on a circle. How many quadrilaterals can be formed by joining 4 of these points on the circle?

Ans: 15

**Question 18 (Work Rate)**

Team A takes 10 days to complete a project. Team B takes 30 days to complete the same project. The two teams now work together on the same project. Meanwhile, Team A rests for 2 days and Team B rest for 8 days. None of the team rests on the same day. How many days are needed to complete the same project?

Ans: 11 days

**Question 19 (Primes, Number logic)**

What is the smallest positive integer that cannot be equal to the difference between two positive prime numbers?

Ans: 7

**Question 20 (Cryptarithm)**

After adding the digit '4' on the right of a 4-digit number, a new 5-digit number is formed. The difference between these two numbers is 9787. What is the value of the original 4-digit number?

Ans: 1087

**Question 21 (Remainder)**

When 14, 53 and 79 are divided by a whole number X, each gives the same remainder. What is the largest possible value of X?

Ans: 13

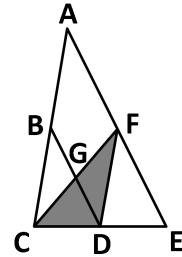
**Question 22 (Perfect Square)**

In a 4-digit perfect square, the first two digits are the same, and the last two digits are also the same. What is the value of this 4-digit number?

Ans: 7744

**Question 23 (Area)**

In the diagram, the area of triangle ACE is  $56 \text{ cm}^2$ , which is twice the area of the parallelogram ABDF. What is the area of the triangle CDF?



Ans:  $14 \text{ cm}^2$

**Question 24 (Factorisation)**

It is given that the 4-digit number  $\overline{abab}$  has 6 factors. What is the smallest possible value of  $\overline{abab}$ ?

Ans: 2525

**Question 25 (Calculation, Pattern)**

Evaluate the expression below.

$$\frac{51}{1+2} + \frac{51}{1+2+3} + \frac{51}{1+2+3+4} + \frac{51}{1+2+3+4+5} + \dots + \frac{51}{1+2+3+\dots+50}$$

Ans: 49