

Question 1

Lewis is playing with his calculator. He starts with the number 12. He multiplies or divides the number, by either 2 or 3, 60 times in a row. Which of the following results cannot be obtained?

- A. 12 B. 18 C. 36 D. 72 E. 108

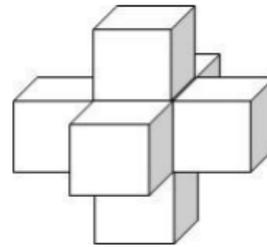
Question 2

The product of two positive integers is equal to twice their sum. This product is also equal to six times the difference between the two integers. What is the sum of these two integers?

- A. 6 B. 7 C. 8 D. 9 E. 10

Question 3

Seven cubes of the same size are glued together face to face as shown. What is the surface area of the solid if its volume is 1512 cm³?



- A. 180 cm² B. 720 cm² C. 1080 cm² D. 1296 cm² E. 6480 cm²

Question 4

Before her last test, Jontelle's average score for all her tests was 74%. For her last test, she scored 84%, which increased her average score to 76%. Now Jontelle has only one more test to take. What is her highest possible average after this last test?

- A. 80% B. 88% C. 76% D. 86% E. 96%

Question 5

Andrei's watch is 10 minutes slow, but he believes that it is 5 minutes fast. Zakirya's watch is 5 minutes fast, but he believes that it is 10 minutes slow. At the same moment, each of them looks at his own watch. Andrei thinks it is 12:00. What time does Zakirya think it is?

- A. 11:30 B. 11:50 C. 12:00 D. 12:20 E. 12:30

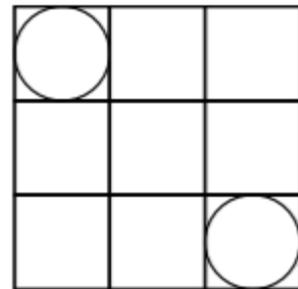
Question 6

Little Red Riding Hood is delivering waffles to her two grandmas. She starts with a basket full of waffles. Just before she enters each of the grannies' houses, the Big Bad Wolf eats half of the waffles in her basket. When she leaves the second grandma's house, she has no waffles left. She delivers the same number of waffles to each grandma. Which of the following numbers definitely divides the number of waffles she started with?

- A. 4 B. 5 C. 6 D. 7 E. 9

Question 7

The 3×3 table is divided into 9 squares with side length 1, and two circles are inscribed in two of them (see figure). What is the distance between the two nearest points of these circles?



- A. $2\sqrt{2} - 1$ B. $\sqrt{2} + 1$ C. $2\sqrt{2}$ D. 2 E. 3

Question 8

My friend wants to use a special seven digit password. The digits of the password occur exactly as many times as its digit value. The same digits of this number are also always grouped together. For example 4444333 or 1444422 are okay, but 4434343 is not. How many possible passwords can he choose from?

- A. 6 B. 7 C. 10 D. 12 E. 13

Question 9

Gemma calculated the sum of the interior angles of a convex polygon. She missed one of the angles and so her result was 2018° . What angle did she miss?

- A. 36° B. 52° C. 95° D. 126° E. 142°

Question 10

A bag contains eight yellow marbles, seven red marbles, and five black marbles. Without looking in the bag, Filip removes n marbles all at once. If he is to be sure that, no matter which choice of n marbles he removes; there are at least four marbles of one colour and at least three marbles of another colour, left in the bag, what is the maximum possible value of n ?

- A. 10 B. 9 C. 8 D. 7 E. 6

Question 11

What is the units/ones digit of the number $2018^{2018} - 2018$?

- A. 0 B. 2 C. 4 D. 6 E. 8

Question 12

The number of right angles in a convex pentagon is n . Which is the complete list of all of the possible values of n ?

- A. 1, 2, 3 B. 0, 1, 2, 3, 4 C. 0, 1, 2, 3 D. 0, 1, 2 E. 1, 2

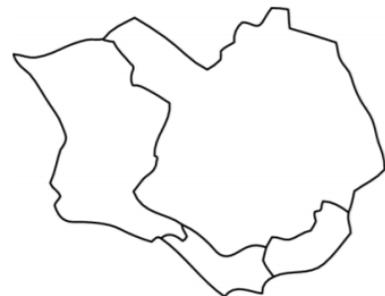
Question 13

A company makes two types of biscuits. The first type are circles with radius r and area **A**. The second type are a circle of radius r , with a smaller circle of radius $r/2$ removed from the centre, which have a total area **B**. Which expression shows the correct relationship between the areas **A** and **B**?

- A. $3A = 4B$ B. $3A = 2B$ C. $4A = 2B$ D. $2A = 4B$ E. $2A = 3B$

Question 14

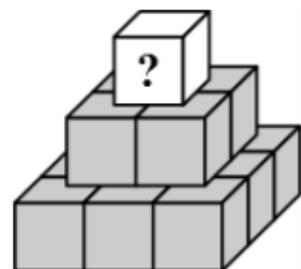
Renee has four different coloured pencils. She wants to use some or all of them to colour the map of an island, divided into four nations as shown in the picture below. If on the map, two nations with a common border cannot have the same colour, how many ways can she colour the map?



- A. 18 B. 24 C. 30 D. 36 E. 48

Question 15

Auriel writes a different positive integer on each of the fourteen cubes in the pyramid. The sum of the nine integers written on the bottom cubes is equal to 50. The integer written on each other cube is equal to the sum of the integers written on the four cubes underneath it. What is the greatest possible integer that can be written on the top cube?



- A. 80 B. 98 C. 104 D. 110 E. 118

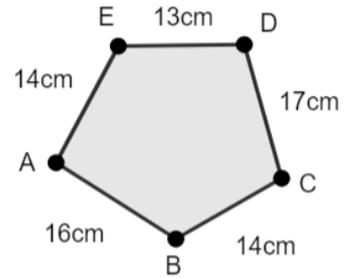
Question 16

An unknown number of different positive integers are written on a blackboard. The product of the smallest two is 16. The product of the largest two is 225. What is the sum of all the integers?

- A. 38 B. 42 C. 44 D. 58 E. 243

Question 17

The diagram shows a pentagon. Sosaia draws five circles with centres A, B, C, D, and E, such that the two circles on each side of the point touch. The lengths of the sides of the pentagon are given. Which point is the centre of the largest circle that he draws?



- A. A B. B C. C D. D E. E

Question 18

Yesterday I wrote down my friend Rashneil's telephone number. The telephone number on my note has six digits, but I remember that Rashneil said that the number had seven digits. I have no idea what digit I forgot to write down, or its position in the number. How many different telephone numbers do I have to try to be sure that I use the correct one? (Note that a telephone number may start with any digit, including 0).

- A. 10 B. 60 C. 64 D. 70 E. 80

Question 19

Four brothers have different heights. Kharl is shorter than Neeraj by x cm. Kharl is taller than Matthew by x cm. Lucas is shorter than Matthew by x cm. Kharl is 184cm tall and the average height of all the four brothers is 178cm. How tall is Lucas?

- A. 160 cm B. 166 cm C. 172 cm D. 184 cm E. 190 cm

Question 20

Isaac has seven pieces of wire with lengths 1 cm, 2 cm, 3 cm, 4 cm, 5 cm, 6 cm and 7 cm. He uses some pieces to make a hollow wire cube with edges of length 1 cm without any overlaps. The pieces can be bent, but not cut, in order to form the cube. What is the smallest number of these pieces that he can use?

- A. 1 B. 2 C. 3 D. 4 E. 5

Question 21

Which of the following is neither a square number nor a cube number?

- A. 6^{99} B. 5^{25} C. 4^{15} D. 3^{30} E. 2^{60}

Question 22

Three people; Abbie, Bianca, and Christian, worked together to paint a mural. If the painting was done by only one person, the time needed for Abbie, Bianca or Christian would have been 9 hours, 10 hours or 12 hours respectively. Abbie and Bianca together painted for 3 hours after which Abbie rested. Bianca and Christian then continued with the painting. What was the total time taken to complete the mural?

- A. 2 hours B. 3 hours C. 4 hours D. 5 hours E. 6 hours

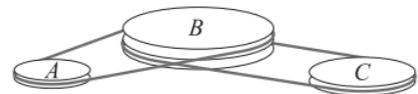
Question 23

What is the largest possible remainder that can be obtained when a two-digit number is divided by the sum of its digits?

- A. 13 B. 14 C. 15 D. 16 E. 17

Question 24

A belt drive system consists of the wheels *A*, *B* and *C*, which rotate without slippage. *B* turns 4 full rounds when *A* turns 5 full rounds, and *B* turns 6 full rounds when *C* turns 7 full rounds. Find the perimeter of *A*, if the perimeter of *C* is 30 cm.



- A. 27 cm B. 28 cm C. 29 cm D. 30 cm E. 31 cm

Question 25

Ten students played Paper-Scissors-Rock to choose one overall winner. Every student played against each of the other students once. In each game, the winner received 3 points, the loser received 0 points, and for games with a draw, each of the two students received 1 point each. The total number of points given was 114. How many games ended with a draw?

- A. 12 B. 21 C. 24 D. 33 E. 78

Question 26

Which of the following is a counter-example to the statement 'If n is prime then exactly one of the numbers $n - 2$ and $n + 2$ is prime'?

- A. $n = 11$ B. $n = 19$ C. $n = 21$ D. $n = 29$ E. $n = 37$

Question 27

Each digit in the sequence starting with 2, 7, 4, 8, 2 is obtained in the following way: the first two digits are 2 and 7 and following this each digit is the last digit of the product of the two preceding digits in the sequence. What is the 2018th digit in the sequence?

- A. 2 B. 4 C. 6 D. 7 E. 8

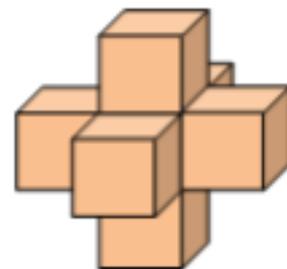
Question 28

There are 42 pupils in a class. In a mathematics test consisting of 4 questions, 29 pupils answer Question 1 correctly, 34 answer Question 2 correctly, 33 answer Question 3 correctly and 38 answer Question 4 correctly. At least how many pupils answer all 4 questions correctly?

- A. 0 B. 29 C. 13 D. 27 E. 8

Question 29

Seven standard dice are glued together to make the solid shown. The faces of the dice that are glued together have the same number of dots on them. How many dots are on the surface of the solid?



- A. 24 B. 90 C. 95 D. 105 E. 126

Question 30

Lara always tells the truth on Mondays, Tuesdays, Wednesdays, and Thursdays. Zara always tells the truth on Mondays, Fridays, Saturdays, and Sundays. On the rest of the days, they may tell the truth or they may lie. One day last week, Lara and Zara both said, "I lied yesterday." On which day of the week did that happen?

- A. Monday B. Tuesday C. Thursday D. Friday E. Saturday