Mathematics Short Answer Problems

Country: _____ Name: _____ No.: _____ Score: _____

Instructions:

- Write down your name and country on the answer sheet.
- Write your answer on the answer sheet.
- For problems involving more than one answer, points are given only when ALL answers are correct.
- Each question is worth 1 point. There is no penalty for a wrong answer.
- You have 60 minutes to work on this test.
- Use black or blue colour pen or pencil to write your answer.

SHORT ANSWER PROBLEMS

(1) Calculate 9+99+999+9999+99999+999999+9999999+99999999+999999999.

(2) The income of a taxi driver is the sum of the regular salary and some tips. The tips are $\frac{5}{4}$ of his salary. What is the fraction of his income which comes from his tips?

(3) The base of a large triangle is two times the altitude of a small triangle, and the altitude of the large triangle is three times the base of the small triangle. What is the ratio of the area of the large triangle to the area of the small triangle?

(4) In an election, only 80% of people planned to vote. However only 85% of those who planned to vote actually vote. What is the percentage of the people who actually vote?

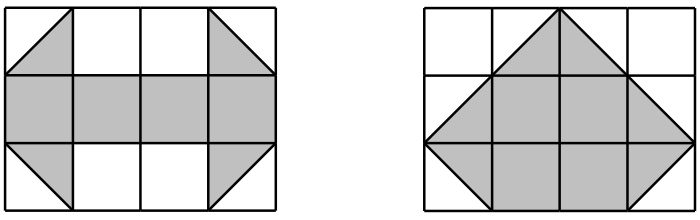
(5) INTERNUTS company offers internet service with an initial payment of 300000 rupiahs and a monthly fee of 72000 rupiahs. Another company, VIDIOTS, offers internet service with no initial payment but a monthly fee of 90000 rupiahs. Johnny prefers INTERNUTS company. What is the minimum number of months he should subscribe in order to pay less than the subscription with VIDIOTS company?

(6) Twelve identical squares are put together in a 6×2 configuration to form a rectangle. If the perimeter of each square is 6 cm, what is the perimeter of the rectangle?

(7) The sum of two 2-digit numbers is also a 2-digit number. What is the maximum value of the product of those three 2-digit numbers?

(8) How many positive integers less than 2014 such that the sum of the digits of each is a multiple of 5?

(9) The diagram below shows two 3×4 pieces of paper, part of which is shaded. A student copies both figures on the same 3×4 piece of paper. What is the fraction of this piece of paper which is shaded?



(10) In total: Alice and Brian have 377 cards, Brian and Colin have 685 cards, Colin and Alice have 546 cards. How many cards does Brian have?

(11) Write down six positive integers whose sum is 100 such that each integer contains at least one digit 6.

(12) $ABCD$ is a square piece of paper. M and N are the respective midpoints of AB and CD. P is a point on AM such that if the piece of paper is folded along DP, then A lands on a point Q on the segment MN. What is the degree of $\angle ADP$?

(13) The sum of five different positive integers is 364, and the largest one is 95. What is the maximum possible value of the smallest integer of these five integers?

(14) Alice gives $\frac{1}{4}$ of her apples to Brian and $\frac{1}{3}$ of the remaining apples to Colin. The leftover apples of hers are worth 13500 rupiahs. What is the worth of Colin's apples received from Alice?

(15) $ABCD$ is a rectangle with $AD = 8$ cm and $CD = 12$ cm. P is the point on CD such that $DP = AD$ and Q is the point on AD such that $DQ = CP$. What is the area of the quadrilateral $ABPQ$?

(16) Each pair of five positive integers is added, so there are ten sums, which are 110, 112, 113, 114, 115, 116, 117, 118, 120 and 121. What is the largest integer among these five integers?

(17) What is the sum of all multiples of 6 each of which has exactly ten positive divisors?

(18) What is the smallest positive integer which leaves remainders of 3, 4 and 5 when divided respectively by 5, 7 and 9?

(19) What is the remainder when $1 \times 2 \times 3 \times \cdots \times 14 \times 15$ is divided by $1 + 2 + 3 + \cdots + 14 + 15$?

(20) We want to draw a number of straight lines such that for each square of a chessboard, at least one of the lines passes through an interior point of the square. At least how many lines we need for a 3×3 chessboard?

(21) Three children go on an 84 km trip. Each can walk at 5 km/h or ride a bicycle at 20 km/h, but they only have two bicycles among them. At any moment, a bicycle can take only one rider. Also, bicycles can safely be left on the roadside. At least how many hours for all three children to finish the trip?

(22) An ant crawls along the surface of a $3 \times 3 \times 3$ cube from one corner to the farthest corner. It must travel along exactly 9 unit segments on the edges of the cube or on the faces of the cube separating two 1×1 squares. How many such routes are there?

(23) Andy writes a positive integer using each of the digits 1, 2, 3, 4, 5, 6, 7, 8 and 9 exactly once. Any sequence of two adjacent digits in it forms an integer which is divisible by either 7 or 13. Write down all possible integers that Andy could write.

(24) In triangle ABC, the bisector of $\angle B$ intersects CA at E and the bisector of $\angle C$ intersect AB at F. If $\angle BEF = 24°$ and $\angle CFE = 18°$, what is the degree of $\angle CAB$?

(25) ABC is a triangle such that $AB = 1$ cm and $BC = 1.5$ cm. D is a point on the line through A parallel to BC, such that $CD = 4$ cm. Write down all possible integral values of the length of AD.