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# SHORT ANSWER PROBLEMS

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Country: \_\_\_\_\_ Name: \_\_\_\_\_ ID: \_\_\_\_\_ 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.



**“Smart, Skilled, and Creative In a Joyful Competition for Excellence”**

## SHORT ANSWER PROBLEMS

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- (1) Alex and Benito make 880 pies in 8 hours working together. Alex makes 10 more pies in one hour than Benito. Find the number of pies made by Alex in one hour.
- (2) Divide 108 students into four groups such that two times the number of students in group 1 is
- half of the number of students in group 2,
  - 2 less than the number of students in group 3.
  - 2 more than the number of students in group 4.
- Find the number of students in group 1.
- (3) In the diagram below,  $C$ ,  $D$  and  $E$  are points on the line  $AB$ . Given  $AB = 9.2$  cm and  $CE = 4.7$  cm, find the sum of the lengths of all ten line segments determined by these five points.

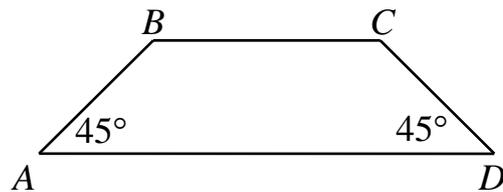


- (4) Four cube with edge length 1 m are cut up into cubes each with edge length 4 cm. If all these cubes were placed one on the right of the other to form a line, find the length of the line, in m.
- (5) Michael wanted to tie 20 ropes. The length of each rope was 50 cm. 5 cm of one end of a rope was tied to 5 cm of one end of another rope. Each of the resulting knots was 5 cm long. What was the length of the new rope?
- (6) Class A and Class B have the same number of students.
- The number of students in class A who took part in a mathematics competition is  $\frac{1}{3}$  of the students in class B who did not take part.
  - The number of students in class B who took part in a mathematics competition is  $\frac{1}{5}$  of the students in class A who did not take part.

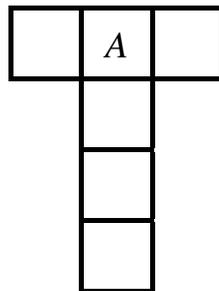
Find the ratio of the number of students in class A who did not take part in this competition to the number of students in class B who did not take part.

- (7) What number can be added to both 170 and 30 so that the sums are in the ratio 3: 1?

- (8) Two different shirts at a shop were sold at the same price. While one shirt made a profit of 30%, the shop had incurred a 30% loss for the other one. Did the shop record a profit or loss from these two transactions, and by how many %?
- (9) A television show has 483 episodes. If the show starts on Saturday and broadcasts everyday with three episodes each day, on what day will the last episode be broadcasted?
- (10) Find the area, in  $\text{cm}^2$ , of the isosceles trapezoid  $ABCD$ , given that  $AD = 16 \text{ cm}$ ,  $BC = 8 \text{ cm}$ ,  $AB = CD$  and  $\angle A = \angle D = 45^\circ$ .

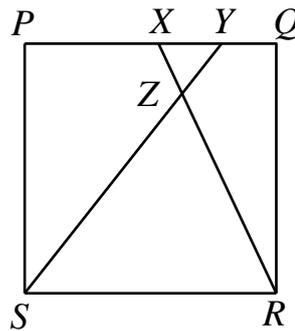


- (11) On her 40<sup>th</sup> birthday, Mrs. Sharma makes gifts to her two sons whose ages are prime numbers. She gives to one son a number of dollars equal to the square of his age, and to the other son a number of dollars equal to his age. She gives 300 dollars in total. Find the sum of the ages of Mrs. Sharma's two sons.
- (12) The numbers 5, 6, 7, 8, 9, 10 are to be filled in the squares so that the sum of the numbers in the row is equal to the sum of the numbers in the column. How many different possible values of  $A$  are there?



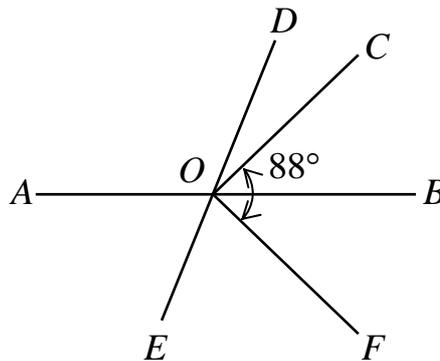
- (13) A farmer harvested 2016 apples. He wishes to pack them as many boxes as possible, not necessarily packing all the apples, with each box a whole number of apples. The second box must be 10 more than the first, the third 10 more than the second and so on. What is the smallest number of apples left unpacked?
- (14) Three containers A, B, and C contain a total of 48 apples. First, 6 apples are taken from A and are put into B. Second, 9 apples are taken from B and are put into C. Now, each container has the same number of apples. What is the original number of apples in container A?

- (15) The square  $PQRS$  has area of  $400 \text{ cm}^2$ . The points  $X$  and  $Y$  divide  $PQ$  into 3 parts.

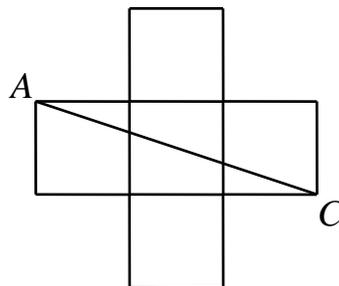


If the perimeter of triangle  $XYZ$  is  $\frac{1}{4}$  of the perimeter of triangle  $SRZ$ , find the area, in  $\text{cm}^2$ , of  $\triangle XYZ$ .

- (16) In the diagram, line  $AB$  and line  $DE$  meet in  $O$  and  $\angle COF = 88^\circ$ . Given that  $OE$  is the angle bisector of  $\angle AOF$  and  $OB$  is the angle bisector of  $\angle COF$ . Find the measure, in degrees, of  $\angle COD$ .



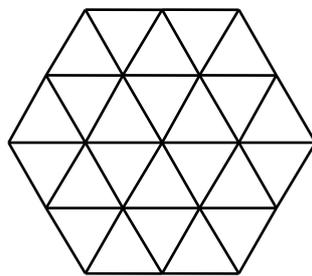
- (17)  $\overline{243a688} \div \overline{31b2} = 764$ , find the value for  $a \times b$ .
- (18) Find the area of the cross made of five identical squares in the figure below, given that the length of  $AC$  is 12 cm.



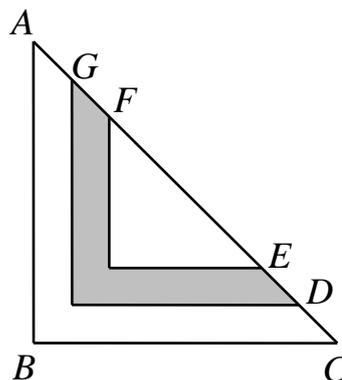
- (19) Three positive two-digit integers and 63 are arranged in a  $2 \times 2$  table. For each row and column of the table, the product of the two numbers in this row or column is calculated. When all four such products are added together, the result is 2016. What is the largest possible number in the square  $A$  of the table?

$A$	
	63

- (20) Ali has 5 consecutive numbers while Ben has 7 consecutive numbers, none of the Ali's number is in the group of Ben's numbers. If the second number of Ali's number is 5 and the sum of Ali's and Ben's numbers are 128. What is the largest number of Ben's number?
- (21) Sam, Tom and Una are three chefs of a restaurant. One day, they cooked 320 plates of spaghetti and in this day, Sam cooked for 6 hours, Tom cooked for 8 hours and Una cooked for 5 hours. They also cook spaghetti at different speeds, with Sam cooking 5 plates for every 3 plates Tom cooks and every 2 plates Una cooks. How many plates of spaghetti did Sam cook this day?
- (22) How many equilateral triangles are in the figure below, in all possible sizes and directions?



- (23) With the appropriate order of the digits 1, 2, 3, 4, 5, 6, 7, 8, and 9, find the smallest 9-digit number that is divisible by 99.
- (24) In the diagram shown below,  $ABC$ ,  $DGH$  and  $EFI$  are isosceles right triangles. Given  $AG = GF = CD = DE = 1$  cm and  $FE = 4$  cm. Find the ratio of area of shaded region to the area of triangle  $ABC$ .



- (25) Whenever Sam reads a date like 20/11/2016, he incorrectly interprets it as two divisions, with the second one evaluated before the first one:

$$20 \div (11 \div 2016) = \frac{40320}{11} = 3665 \frac{5}{11}$$

For some dates, like this one, he does not get an integer, while for others, like 20/8/2016, he gets  $20 \div (8 \div 2016) = 5040$ , an integer. How many dates this year (day/month/year) give him a non-integer?