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MATHEMATICS OLYMPIAD COMPETITION
SELECTION TEST FOR THE NATIONAL LEVEL TRAINING POOL - 2016

General Instructions.

Index No: 2016 /OLY/I/.....

This question paper consists of two parts. Answer all questions in both parts.

PART I – 15 questions

- Write the answer on the dotted line given under each question and it is necessary to mention the relevant units if any with the answer

PART II – 2 questions

- Answers to be written only on papers provided. Write your index number on the top right hand corner of each paper.
- How the answers were obtained has to be given step by step. No marks will be awarded if the answers are not clear.

Note – Diagrams are not to scale.

Time: 1 hour 30 minutes

Part I

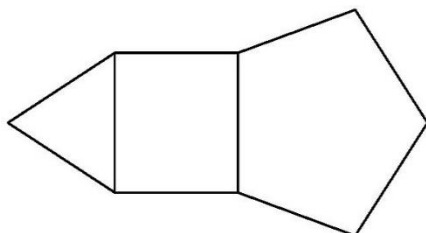
1. The sum of three different positive integers is 7.What is their product?

Answer -

2. Find the sum of the two consecutive prime numbers which are located between 1 and 100 while having the maximum difference between each other

Answer -

3. What is the sum of all interior angles of the figure shown bellow?



Answer -

4. If $2^a - 2^b = 2016$, find the whole number values for a and b

Answer - $a =$

$b =$

5. An “abundant” number is a positive integer N , such that the sum of the factors of N (excluding N itself) is greater than N . What is the smallest abundant number?

Answer - -----

6. The mean of the first three numbers from left in this list is equal to the mean of the last four numbers in the list. What is the number denoted by x ?

616, x , 576, 672, 444, 360, 200, 520, 380, 916

Answer - -----

7. Find the number of zeros in the answer as end digits in the product of

$$1 \times 5 \times 10 \times 15 \times 20 \times 25 \times \dots \dots \dots 70 \times 75 \times 80 \times 85 \times 90 \times 95$$

Answer - -----

8. If the sum of six consecutive numbers is 75, write down that numbers in ascending order

Answer - -----

9. All the people except the three persons stand between the 21st person from the front end and the 12th person from the tail end in a straight line queue are ladies. Write the all possible values represent the number of ladies in such a queue.

Answer - -----

10. Find three consecutive numbers of which the sum is 3^5 and write them in descending order.

Answer - -----

11. What is the least number of cuts needed to cut the $12 \text{ cm} \times 18 \text{ cm}$ bar chocolate into $3 \text{ cm} \times 4 \text{ cm}$ pieces without moving any piece?

Answer - -----

12. Using only the digits 1,3,5,7 and 9 it has to write numbers as much as possible. It is allowed to use one digit, several digits or all the five digits. But none of the digit can be repeated in a same number. How many numbers can be written in that manner?

Answer - -----

13. Give that

$$x + y + z = 1$$

$$x + y - z = 2$$

$$x - y - z = 3$$

What is the value of the product xyz ?

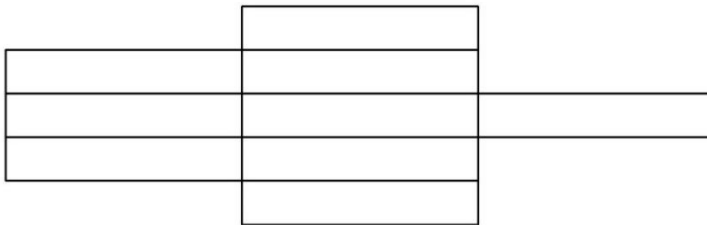
Answer - -----

14. Below is a magic square. What is the value of x

	x	$\frac{4}{5}$
	$\frac{1}{2}$	$\frac{1}{10}$
$\frac{1}{5}$		

Answer -

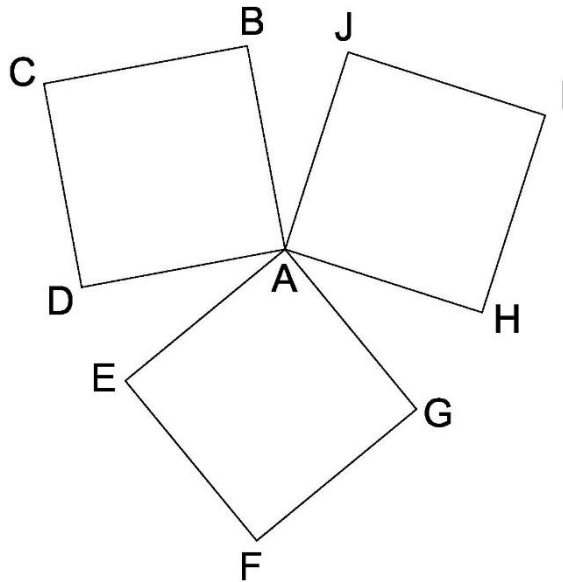
15. How many rectangles are there in the following diagram.



Answer -

Part II

- (1) Three identical, non overlapping squares with side length $\sqrt{2}cm$, ABCD, AEFG and AHIJ are jointed at the point A, and are equal spread. So that $\hat{JAB}=\hat{DAE}=\hat{GAH}$



- (a) Calculate the angle \hat{GBA}
- (b) To which direction and what is the minimum angle to be rotated the square ABCD around point A so that D, A and H lie on a straight line ?
- (c) Which points are coincide then ?
- (d) After that If the AEFG square is rotated by minimum angle around A, so that G and H points coincide, find the distance between C and F.
- (2) When father gave out pocket money, Nimal received twice as much as his first brother, three times as much as the second, four times as much as the third and five times as much as the fourth (the last) brother. Kamal complained that he has received, Rs 30 less than Pasan. amount received by each of them is in rounded figure of rupees. Kamal and Pasan are two persons among the Nimal's brothers.
- (a) Use this information to find all the possible amount of money that could have received by Nimal.
- (b) How much is the highest difference between the amounts received by two of them belong to those five brothers.
- (c) If the amount received by Nimal is Rs.360 which places Kamal and Pasan get respectively in the Nimal's brothers' list?