AIMS Maths Competition 2021
Junior Round 2

START: 10:30am
END TIME : 12:00pm

No calculators are allowed.
All answers should be written as decimal. (For example, if the answer is 1/2 please write 0.5)

1. Find the sum $\frac{1}{2} + \frac{3}{10} + \frac{4}{100}$ as a fraction.
2. Find x if $\frac{x-3}{x} + \frac{x}{x-2} = 0$.
3. $1 + 3 + 5 + ... + 97 + 99 = 2500$ What is the value of $7 + 21 + ... + 679 + 693$?
4. An orange is 80% water. If 75% of the water is evaporated, what % of the orange is now water?
5. How many words of length 4 can be formed from the letters *AABC* (the words don't have to make sense, for example, *AACB* or *BACA*.)
6. What is the last (ones) digit of $3^{27} \times 7^{28}$?
7. The mean of $\{1, x^2, 3, 5, 7\}$ is 5 find the value of the positive number x
8. A rectangle has area and perimeter both equal to 16. Find the length of the longest side.
9. If $x = 5$ and $y = x + 3$ and $z = 3y + 1$, what is the value of z ?
10. In Triangle ABC, D is the midpoint of AB and $|DC| = |AD|$. If $\angle ABC = 34^o$ what is $\angle BAC$?
11. How many ordered triples (a, b, c) of odd positive integers satisfy $a + b + c = 9$?
12. $ABCD$ is a trapezoid with AB parallel to CD. The diagonals AC and BD meet at P . If the area of ABP is 16 and the area of CDP is 25, what is the area of the trapezoid?
13. Find the number of subsets of $\{1, 2, 3, 4, 5, 6\}$ that are subsets of neither $\{1, 2, 3, 4\}$ nor $\{3, 4, 5, 6\}$.
14. Consider a square $ABCD$ with $|AB| = 3$. on AB, there is a point E such that $|AE| = 1$ and $|EB| = 2$. AC and DE intersect at point H. What is the area of $\triangle CDH$
15. How many positive integers less than 200 are relatively prime to both 15 and 24? (two numbers are said to be relatively prime if their common factor is 1.)