

Sample questions for  
Foundation Mathematics Olympiad Training Program

1. How many fractions in the below sequence have integer values?

$$\frac{1}{99}, \frac{2}{98}, \frac{3}{97}, \frac{4}{96}, \dots, \frac{95}{5}, \frac{96}{4}, \frac{97}{3}, \frac{98}{2}, \frac{99}{1}$$

2. Find 4 distinct digits in the place of A, B, C, D such that

$$\begin{array}{r} \text{A B C D} \\ \times \quad \quad 4 \\ \hline \text{D C B A} \end{array}$$

3. Let  $\frac{a}{3} = \frac{b}{4} = \frac{c}{5}$  and  $abc = 1620$ . Then find the value of  $a, b$  &  $c$ .

4. Find all prime numbers  $p$  &  $q$  such that  $p^2 - 2q^2 = 1$

5. A sequence has first three terms as 1, 2, 3. From the fourth term, every term is the sum of the earlier three. Find the 10<sup>th</sup> term in the sequence.

6. Let  $n$  be a positive integer and  $S(n)$  denote the sum of digits of  $n$ . Find the largest and the smallest value of  $\frac{n}{S(n)}$  for  $10 \leq n \leq 99$ .

7. A polygon has five times as many diagonals as it has sides. How many vertices does the polygon have?

8. There are two square shaped farms with integer sides, away from each other. Their total perimeter is 40  $m$  and total area is 58  $m^2$ . Find their sides.

9. Old Mac Donald has 32 animals on his farm, all pigs and hens. Together they have 108 legs. Find the number of pigs and hens.

10. Find the sum of  $\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} + \frac{1}{56} + \frac{1}{72} + \frac{1}{90}$ .