Arpon Basu,School: AECS-4,Mumbai-400094
Solution for problem O436

Let $y = x + a$,$z = y + b$ for some $a, b \in \mathbb{Z}$

$$\begin{aligned}
&\therefore a^2 + b^2 + (a + b)^2 = 2018 \\
&\Rightarrow a^2 + b^2 + ab = 1009 \\
&\Rightarrow a = \frac{-b \pm \sqrt{4 \cdot 1009 - 3b^2}}{2}
\end{aligned} \tag{1}$$

Now,

$$\begin{aligned}
4 \cdot 1009 = 4036 &= 3 \cdot 8^2 + 62^2 \\
&= 3 \cdot 27^2 + 43^2 \\
&= 3 \cdot 35^2 + 19^2
\end{aligned}$$

$\therefore b \in \{-35, -27, -8, 8, 27, 35\}$
Plugging values of b in equaion 1 we obtain following values of a

$$\begin{aligned}
(a, b) =&(27, -35), (8, -35), (35, -27), (-8, -27), \\
&(35, -8), (-27, -8), (27, 8), (-35, 8), \\
&(-35, 27), (8, 27), (-8, 35), (-27, 35)
\end{aligned}$$

For every ordered pair (a, b) $(\mathbf{x}, \mathbf{x} + \mathbf{a}, \mathbf{x} + \mathbf{a} + \mathbf{b})$ will be the triplet satisfying the equation.