(vi) $p, p+90, p+180, p+270, \ldots$ Where, $p = (999)^{999}$

Here,

First term (a) = p

$a_1 = p+90$

$a_2 = p+180$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_1 - a = a_2 - a_1$

Here,

$a_1 - a = p+90-p$
$\quad\quad = 90$

Also,

$a_2 - a_1 = p+180-p-90$
$\quad\quad = 90$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $\boxed{d = 90}$

(vii) $1.0, 1.7, 2.4, 3.1, \ldots$

Here,

First term (a) = 1.0

$a_1 = 1.7$

$a_2 = 2.4$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_1 - a = a_2 - a_1$

Here,

$a_1 - a = 1.7 - 1.0$
$\quad\quad = 0.7$

Also,

$a_2 - a_1 = 2.4 - 1.7$
$\quad\quad = 0.7$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $\boxed{d = 0.7}$

(viii) $-225, -425, -625, -825, \ldots$

Here,

First term (a) = −225

$a_1 = -425$

$a_2 = -625$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_1 - a = a_2 - a_1$

Here,

$a_1 - a = -425 - (-225)$
$\quad\quad = -200$

Also,

$a_2 - a_1 = -625 - (-425)$
$\quad\quad = -200$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $\boxed{d = -200}$

(ix) $10, 10+2^5, 10+2^6, 10+2^7, \ldots.$

Here,

First term (a) = 10

$a_1 = 10+2^5$

$a_2 = 10+2^6$

$a_3 = 10+2^7$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_2 - a_1 = a_3 - a_2$

Here,

$$\begin{aligned} a_2 - a_1 &= 10+2^6-10-2^5 \\ &= 64-32 \\ &= 32 \end{aligned}$$

Also,

$$\begin{aligned} a_3 - a_2 &= 10+2^7-10-2^6 \\ &= 128-64 \\ &= 64 \end{aligned}$$

Since $a_1 - a \neq a_2 - a_1$

Hence, the given sequence is not an A.P

(x) $a+b, (a+1)+b, (a+1)+(b+1), (a+2)+(b+1), (a+2)+(b+2), \ldots.$

Here,

First term (a) = a + b

$a_1 = (a+1)+b$

$a_2 = (a+1)+(b+1)$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_1 - a = a_2 - a_1$

Here,

$$\begin{aligned} a_1 - a &= a+1+b-a-b \\ &= 1 \end{aligned}$$

Also,

$$\begin{aligned} a_2 - a_1 &= a+1+b+1-a-1-b \\ &= 1 \end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $\boxed{d=1}$

(xi) $1^2, 3^2, 5^2, 7^2 \ldots.$

Here,

First term (a) = 1^2

$a_1 = 3^2$

$a_2 = 5^2$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_1 - a = a_2 - a_1$

Here,

$$\begin{aligned} a_1 - a &= 3^2 - 1^2 \\ &= 9-1 \\ &= 8 \end{aligned}$$

Also,

$$\begin{aligned} a_2 - a_1 &= 5^2 - 3^2 \\ &= 25 - 9 \\ &= 16 \end{aligned}$$

Since $a_1 - a \neq a_2 - a_1$

Hence, the given sequence is not an A.P

(xii) $1^2, 5^2, 7^2, 73....$

Here,

First term (a) = 1^2

$a_1 = 5^2$

$a_2 = 7^2$

Now, for the given to sequence to be an A.P,

Common difference (d) $= a_1 - a = a_2 - a_1$

Here,

$$\begin{aligned} a_2 - a_1 &= 5^2 - 1^2 \\ &= 25 - 1 \\ &= 24 \end{aligned}$$

Also,

$$\begin{aligned} a_3 - a_2 &= 7^2 + 5^2 \\ &= 49 - 25 \\ &= 24 \end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P with the common difference $\boxed{d = 24}$.

*********** END **********