

Some Questions on unit digit :-

$$Q_1 \rightarrow 123 + 345 + 780 + 65 + 44$$

$$\underline{3} + \underline{5} + \underline{0} + \underline{5} + \underline{4} \rightarrow 17$$

7 is the answer.

$$Q_2 \rightarrow 676 \times 543 \times 19 \rightarrow 6 \times 3 \times 9$$

$$\rightarrow 162$$

2 is the answer.

$$Q_3 \rightarrow 2^{35}$$

cycle of 2 is 4. then
$$\begin{array}{r} 4 \overline{) 35} \\ \underline{32} \\ 3 \end{array}$$

$$2^3 \rightarrow \underline{8} \text{ Ans}$$

$$Q_4 \rightarrow 2^{36} \rightarrow \begin{array}{r} 4 \overline{) 36} \\ \underline{36} \\ 0 \end{array}$$

$$\rightarrow 2^4 \rightarrow \underline{16} \text{ Ans}$$

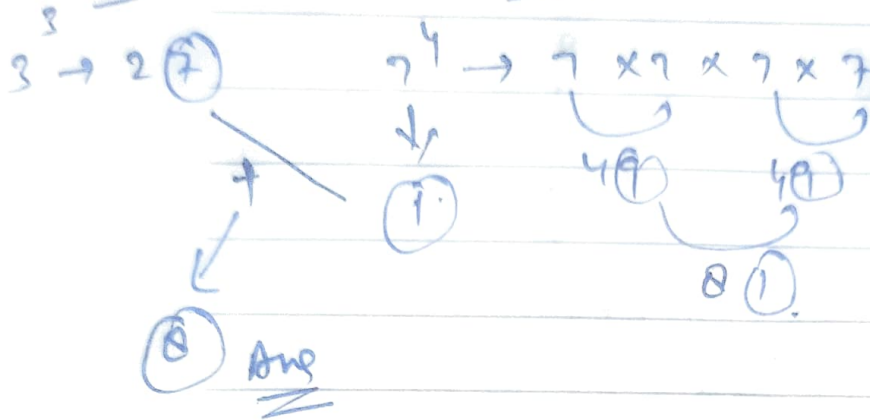
$$Q_5 \rightarrow (12)^{78} \rightarrow 2^{78} \rightarrow \begin{array}{r} 4 \overline{) 78} \\ \underline{4} \\ 38 \\ \underline{36} \\ 2 \end{array}$$

$$2^2 \rightarrow \underline{4} \text{ Ans}$$

Q10
 $5^{47} + 7^{52}$

$$\begin{array}{r} 4) 48 \text{ (11)} \\ \underline{4} \\ 7 \\ \underline{4} \\ 3 \end{array}$$

$$\begin{array}{r} 4) 52 \text{ (13)} \\ \underline{4} \\ 12 \\ \underline{12} \\ 0 \end{array}$$



Q11 Find the unit digit of $111!$

Sol $\rightarrow 1 \times 2 \times 3 \times 4 \times 5 \times \dots$
 (A bracket underlines 2, 3, 4, 5 with '10' written below it.)

\rightarrow that means last digit will be zero

Note $5!$ to \dots all value with $!$ last digit will zero.

Q12 \rightarrow Find the unit digit of the product of all prime number b/w 1 and $(11)''$

Prime no $\rightarrow (1, 2, 3, 5, 11, 13, \dots, 11)''$
 \downarrow
 10 (circled)

So, It will give the 0 as the unit digit.

Q1 → Find last digit of $222^{800} + 808^{222}$

Soln

$$222^{800}$$

$$\Rightarrow 2^{800}$$

$$\Rightarrow 2^4 \rightarrow 16$$

222

$$8 \rightarrow$$

$$8^2 \rightarrow 64$$

$$6+4 \rightarrow 10$$

$$\rightarrow 4) 888 (222$$

$$\begin{array}{r} 0 \\ \hline 8 \\ 8 \\ \hline 8 \\ 8 \\ \hline 0 \end{array}$$

$$4) 222 (55$$

$$\begin{array}{r} 20 \\ \hline 22 \\ 20 \\ \hline 2 \end{array}$$

Q2 → Find last digit of

$$1^2 + 2^2 + 3^2 + \dots + 100^2$$

$$1 \quad 1$$

$$2 \quad 1$$

$$3 \quad 1$$

$$4 \quad 1$$

$$\vdots$$

$$\vdots$$

$$10 \quad 1$$

$$20 \quad 30 \quad \dots$$

$$1^2 + 2^2 + 3^2 + 4^2 + \dots + 10^2$$

$$\Rightarrow 1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 + 81 + 100$$

$$\Rightarrow \underline{45}$$

Last digit is 5 that will similar to 10 column.
 Then $5 \times 10 \rightarrow 50 \rightarrow \boxed{0}$ is the unit digit.

Note

1	11	1	91
2	12	1	1
1	1	1	1
1	1	1	1
10	20	1	100

Q! $\rightarrow 1^1 + 2^2 + 3^3 + 4^4 + \dots + 10^{10}$ find the unit digit.

$1^1 \rightarrow 1$	$6^6 \rightarrow 6$
$2^2 \rightarrow 4$	$7^7 \rightarrow 3$
$3^3 \rightarrow 7$	$8^8 \rightarrow 6$
$4^4 \rightarrow 6$	$9^9 \rightarrow 9$
$5^5 \rightarrow 5$	$10^{10} \rightarrow 0$

$$1 + 4 + 7 + 6 + 5 + 6 + 3 + 6 + 9 + 0$$

$$\Rightarrow \underline{47} \rightarrow \boxed{7} \text{ is the answer.}$$

Q! $\rightarrow \frac{10!}{100}$ find unit digit

$$\frac{10!}{100} = \frac{1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10}{2^2 \times 5^2}$$

$$\Rightarrow 1 \times 2^6 \times 3^4 \times 7 \Rightarrow$$

$$1 \times 4 \times 1 \times 7 \rightarrow 2 \times 8 \rightarrow \boxed{8} \text{ is the answer.}$$

Q: what is the unit digit of the sum of first 111 whole number.

Solⁿ

$$0 + 1 + 2 + 3 + \dots + 110$$
$$\frac{n(n+1)}{2} \rightarrow \frac{110 \times 111}{2} \rightarrow 55 \times 111$$

\rightarrow (5) is the answer.

Q: find the unit digit of sum of first 111 natural number.

Solⁿ

$$1 + 2 + 3 + \dots + 111$$
$$\frac{n(n+1)}{2} \rightarrow \frac{111 \times 112}{2} \rightarrow 111 \times 56 \rightarrow (6) \text{ is the answer}$$

Q: find the unit digit in $1! + 2! + 3! + 4! + \dots + 50!$

Solⁿ \rightarrow $1! + 2! + 3! + 4! + 5! + \dots + 50!$

$$\begin{array}{l} 1! \rightarrow 1 \\ 2! \rightarrow 2 \\ 3! \rightarrow 6 \\ 4! \rightarrow 24 \\ 5! \rightarrow 120 \\ \vdots \\ 50! \rightarrow \boxed{0} \end{array}$$

$$1 + 2 + 6 + 4$$

\rightarrow (3) is the answer.

Note! → for find the no. of Perfect Square b/w two number
at first near by Perfect Sq. search and then subtract them.

Q1 → How many Perfect Sq. having digit 6 at the unit place between 1 to 600.

Solⁿ 1 to 600

✓ $4 \rightarrow 16$ ✓ $24 \rightarrow 576$

✓ $6 \rightarrow 36$

✓ $14 \rightarrow 196$ So, there are total 5 perfect Sq.

✓ $16 \rightarrow 256$

Q2 → if $a + \frac{1}{a} = 14.281$ of 42, then find the unit digit of the expression $a^2 + \frac{1}{a^2}$

Solⁿ $a + \frac{1}{a} \Rightarrow \left(a + \frac{1}{a}\right)^2 \Rightarrow a^2 + \frac{1}{a^2} + 2 \cdot a \cdot \frac{1}{a}$

$$a^2 + \frac{1}{a^2} + 2 = K \quad \Bigg| \quad a^2 + \frac{1}{a^2} = K - 2 \quad \dots i)$$

$a + \frac{1}{a} = 14.28 \text{ of } 42 \Rightarrow \frac{1}{a} \times 42$

$a + \frac{1}{a} = (6) \rightarrow (K) \quad \boxed{(6^2 = 36)}$

$a^2 + \frac{1}{a^2} = 36 - 2 = 3(4)$

4 is the answer.