

# How to Solve: Last Two Digits of Numbers ending with 1, 3, 7, 9

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YouTube Video Link to this Post is [Here](#)

Following is Covered in the Video

## ▸ Theory of Last Two Digits of Numbers Ending with 1

- Find Last two digits of  $131^{345}$  ?
- Theory of Last Two Digits of Numbers Ending with 3
- Find Last two digits of  $3^{241}$  ?
- Find Last two digits of  $783^{402}$  ?
- Theory of Last Two Digits of Numbers Ending with 7
- Find Last two digits of  $7^{282}$  ?
- Find Last two digits of  $847^{422}$  ?
- Theory of Last Two Digits of Numbers Ending with 9
- Find Last two digits of  $9^{243}$  ?
- Find Last two digits of  $1269^{436}$  ?

## Theory of Last Two Digits of Numbers Ending with 1

- Units' digit of the number = 1
- Tens' digit of the number = Tens' digit of the base \* Units' digit of the exponent

### **Q1. Find Last two digits of $131^{345}$ ?**

**Sol:** Base = 131  
Exponent = 345

=> Units' digit = 1  
=> Tens' digit =  $3 * 5$  [ $131 * 345$ ]  
= 5  
=> Last two digits = 51

### Theory of Last Two Digits of Numbers Ending with 3

- $3^4=81$
- We need to express the power of two into product of  $3^{\text{MultipleOf4Power}} * 3^{\text{SmallerPower}}$
- We will have last two digits as  $81^{\text{SomePower}} * 3^{\text{SmallerPower}}$
- We can use Logic of Last Two Digits of Exponents ending with 1 \* last two digits of  $3^{\text{SmallerPower}}$

### **Q2. Find Last two digits of $3^{241}$ ?**

**Sol:**  $3^{241} = 3^{240+1}$   
 $= 3^{4*60} * 3^1$   
 $= (3^4)^{60} * 3$   
 $= (81)^{60} * 3$   
 $= 01 * 3 = 03$   
 $\Rightarrow$  Last two digits = 03

### **Q3. Find Last two digits of $783^{402}$ ?**

**Sol:**  $(261*3)^{402}$   
 $= (261)^{402} * 3^{400+2}$   
 $= 21 * (3^4)^{100} * 3^2$   
 $= 21 * (81)^{100} * 9$   
 $= 21 * 01 * 9$   
 $= 89$   
 $\Rightarrow$  Last two digits = 89

### Theory of Last Two Digits of Numbers Ending with 7

- Last two digits of  $7^4=01$
- We need to express the power of two into product of  $7^{\text{MultipleOf4Power}} * 7^{\text{SmallerPower}}$
- We will have last two digits as  $01^{\text{SomePower}} * 7^{\text{SmallerPower}}$
- We can use Logic of Last Two Digits of Exponents ending with 1 \* last two digits of  $7^{\text{SmallerPower}}$

**Q4. Find Last two digits of  $7^{282}$ ?**

**Sol:**  $7^{282} = 7^{280+2}$   
 $= 7^4 * 70 * 7^2$   
 $= (7^4)^{70} * 49$   
 $= (01)^{70} * 49$   
 $= 01 * 49 = 49$   
 $\Rightarrow$  Last two digits = 49

**Q5. Find Last two digits of  $847^{422}$  ?**

**Sol:**  $(121*7)^{422}$   
 $= (121)^{422} * 7^{420+2}$   
 $= 41 * (7^4)^{107} * 7^2$   
 $= 41 * (01)^{107} * 49$   
 $= 41 * 01 * 49$   
 $= 09$   
 $\Rightarrow$  Last two digits = 09

**Theory of Last Two Digits of Numbers Ending with 9**

- Last two digits of  $9^2=81$
- We need to express the power of two into product of  $9^{\text{EvenPower}} * 9^{\text{SmallerPower}}$
- We will have last two digits as  $81^{\text{SomePower}} * 9^{\text{SmallerPower}}$
- We can use Logic of Last Two Digits of Exponents ending with 1 \* last two digits of  $9^{\text{SmallerPower}}$

**Q6. Find Last two digits of  $9^{243}$  ?**

**Sol:**  $9^{242+1}$   
 $= 9^2 * 121 * 9^1$   
 $= (9^2)^{121} * 9$   
 $= (81)^{121} * 9$

$$= 81 * 9 = 29$$

=> Last two digits = 29

**Q7. Find Last two digits of  $1269^{436}$ ?**

**Sol:**  $(141 * 9)^{436}$

$$= (141)^{436} * 9^{2 * 218}$$

$$= 41 * (9^2)^{218}$$

$$= 41 * (81)^{218}$$

$$= 41 * 41$$

$$= 81$$

=> Last two digits = 81

[Link to Theory for Units' digit of exponents here.](#)

Hope it helps!