

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

By [BrushMyQuant](#)



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!