



How to Solve: Last Two Digits of Numbers ending with 2, 4, 6, 8

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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 2
- Find Last two digits of 2^{4274} ?
- Theory of Last Two Digits of Numbers Ending with 4
- Find Last two digits of 4^{501} ?
- Find Last two digits of 1684^{8101} ?
- Theory of Last Two Digits of Numbers Ending with 6
- Find Last two digits of 6^{321} ?
- Find Last two digits of 486^{422} ?
- Theory of Last Two Digits of Numbers Ending with 8
- Find Last two digits of 8^{201} ?
- Find Last two digits of 1768^{821} ?

Theory of Last Two Digits of Numbers Ending with 2

- Express the Number as $(2^{10})^{\text{Power}} * 2^{\text{SmallerPower}}$
- Now we know that $2^{10} = 1024$ and we have expressed the number 1024^{Power}
- 24^{OddPower} will have last two digits as 24
- $24^{\text{EvenPower}}$ will have last two digits as 76
- If we have power of power then we can use last two digits of $76^{\text{AnyPositiveInteger}}$ is 76

Q1. Find Last two digits of 2^{4274} ?

Sol: $2^{4274} = 2^{4270+4} = 2^{10*427} * 2^4$
 $= (2^{10})^{427} * 16 = 1024^{427} * 16$
 $= 1024^{\text{Odd}} * 16$
 \Rightarrow Last two digits $24 * 16$
 \Rightarrow Last two digits = 84

Theory of Last Two Digits of Numbers Ending with 4

- We will convert the number from $4^{\text{SomePower}}$ to $2^{2 * \text{SomePower}}$
- Apply the rule for power of 2 as described above

Q2. Find Last two digits of 4^{501} ?

Sol: $4^{501} = 2^{2 * 501}$
 $= 2^{1002}$
 $= 2^{1000+2}$
 $= 2^{10*100} * 2^2$
 $= (2^{10})^{100} * 4$
 $= (1024)^{\text{Even}} * 4$
 $= 76 * 4$
 $= 04$
 \Rightarrow Last two digits = 04

Q3. Find Last two digits of 1684^{8101} ?

Sol: $(421*4)^{8101} = (421)^{8101} * 2^{2 * 8101}$
 $= 21 * 2^{16202}$
 $= 21 * 2^{16200+2}$
 $= 21 * 2^{10*1620} * 2^2$
 $= 21 * (2^{10})^{1620} * 4$
 $= 21 * (1024)^{\text{Even}} * 4$
 $= 84 * 76$
 $= 84$
 \Rightarrow Last two digits = 84

Theory of Last Two Digits of Numbers Ending with 6

- We will convert the number from $6^{\text{SomePower}}$ to $2^{\text{SomePower}} * 3^{\text{SomePower}}$
- Apply the rule for power of 2 and 3 to get the answer

[[Use this link](#) to learn how to find last two digits of numbers ending with 3]

Q4. Find Last two digits of 6^{321} ?

$$\begin{aligned}\text{Sol: } 6^{321} &= 2^{321} * 3^{321} \\ &= 2^{320+1} * 3^{320+1} \\ &= 2^{10 * 32} * 2^1 * 3^{4 * 80} * 3^1 \\ &= (2^{10})^{32} * 2 * (3^4)^{80} * 3 \\ &= (1024)^{\text{Even}} * 2 * (81)^{80} * 3 \\ &= 76 * 6 * 01 \\ &= 56 \\ &=> \text{Last two digits} = 56\end{aligned}$$

Q5. Find Last two digits of 486^{422} ?

$$\begin{aligned}\text{Sol: } (243*2)^{422} &= (3^5)^{422} * 2^{420+2} \\ &= 3^{5 * 422} * 2^{10 * 42} * 2^2 \\ &= 3^{2110} * 1024^{\text{Even}} * 4 \\ &= 3^{2108+2} * 76 * 4 \\ &= 3^{4 * 527} * 3^2 * 04 \\ &= 81^{527} * 9 * 04 \\ &= 61 * 36 \\ &= 96 \\ &=> \text{Last two digits} = 96\end{aligned}$$

Theory of Last Two Digits of Numbers Ending with 8

- We will convert the number from $8^{\text{SomePower}}$ to $2^3 * \text{SomePower}$
- Apply the rule for power of 2 as described above

Q6. Find Last two digits of 8^{201} ?

Sol: $8^{201} = 2^3 * 201$
 $= 2^{603}$
 $= 2^{600+3}$
 $= 2^{10*60} * 2^3$
 $= (2^{10})^{60} * 8$
 $= (1024)^{\text{Even}} * 8$
 $= 76 * 8$
 $= 08$
 \Rightarrow Last two digits = 08

Q7. Find Last two digits of 1768^{821} ?

Sol: $(221*8)^{821}$
 $= (221)^{821} * 2^3 * 821$
 $= 21 * 2^{2463}$
 $= 21 * 2^{2460+3}$
 $= 21 * 2^{10*246} * 2^3$
 $= 21 * (2^{10})^{246} * 8$
 $= 21 * (1024)^{\text{Even}}$
 $= 68 * 76$
 $= 68$
 \Rightarrow Last two digits = 68

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

Hope it helps!