How to Solve: Units' Digit of Power of 7
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YouTube Video Link to this Post is [Here](#)

Following is Covered in this post

Theory of Units' Digit of Power of 7

> ☞ **Find Units' digit of 7^{81}?**
>
> ☞ **Find Units' digit of 7^{37} ?**
>
> ☞ **Find Units' digit of 7^{52} ?**
>
> ☞ **Find Units' digit of 7^{80a+51} (given that a is a positive integer)?**
>
> ☞ **Find Units' digit of 1297^{2041} ?**

Theory of Units' Digit of Power of 7

● **To find units' digit of any positive integer power of 7**

We need to find the cycle of units' digit of power of 7	
7^1 units' digit is 7	7^5 units' digit is 7
7^2 units' digit is 9	7^6 units' digit is 9
7^3 units' digit is 3	7^7 units' digit is 3
7^4 units' digit is 1	7^8 units' digit is 1

=> The power repeats after every 4_{th} power
=> **Cycle of units' digit of power of 7 = 4**
=> We need to divide the power by 4 and check the remainder
=> Units' digit will be same as Units' digit of $7^{Remainder}$

NOTE: If Remainder is 0 then units' digit = units' digit of 7^{Cycle} = units' digit of 7^4 = 1

Q1. Find Units' digit of 7^{81}?

Sol: We need to divided the power (81) by 4 and get the remainder
81 divided by 4 gives 1 remainder
=> Units' digit of 7^{81} = Units' digit of 7^1 = 7

Q2. Find Units' digit of 7^{37}?

Sol: 37 divided by 4 gives 1 remainder
=> Units' digit of 7^{37} = Units' digit of 7^1 = 7

Q7. Find Units' digit of 7^{52}?

Sol: 52 divided by 4 gives 0 remainder
=> Units' digit of 7^{52} = Units' digit of 7^4 = 1

Q4. Find Units' digit of 7^{80a+51} (given that a is a positive integer)?

Sol: Remainder of 80a + 51 divided by 4 = Remainder of 80a by 4 + Remainder of 51 by 4
= 0 + 3 = 3
=> Units' digit of 7^{80a+51} = Units' digit of 7^3 = 3

Q5. Find Units' digit of 1297^{2041}?

Sol: Units' digit of power of any number = Units' digit of power of the units' digit of that number
=> Units' digit of 1297^{2041} = Units' digit of 7^{2041}

=> Remainder of 2041 divided by 4 = Remainder of last two digits by 4

Watch this video to **Master Divisibility Rules**

=> Remainder of 41 by 4 = 1
=> Units' digit of 1297^{2041} = Units' digit of 7^1 = 7

Hope it helps!