



How to Solve: Units' Digit of Power of 8

By [BrushMyQuant](#)

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

Following is Covered in this post

Theory of Units' Digit of Power of 8

- Find Units' digit of 8^{91} ?
- Find Units' digit of 8^{57} ?
- Find Units' digit of 8^{88} ?
- Find Units' digit of $8^{40a + 41}$ (given that a is a positive integer)?
- Find Units' digit of 1738^{8979} ?

Theory of Units' Digit of Power of 8

- To find units' digit of any positive integer power of 8

We need to find the cycle of units' digit of power of 8

8^1 units' digit is 8

8^2 units' digit is 4

8^3 units' digit is 2

8^4 units' digit is 6

8^5 units' digit is 8

8^6 units' digit is 4

8^7 units' digit is 2

8^8 units' digit is 6

=> The power repeats after every 4th power

=> **Cycle of units' digit of power of 8 = 4**

=> We need to divide the power by 4 and check the remainder

=> Units' digit will be same as Units' digit of $8_{\text{Remainder}}$

NOTE: If Remainder is 0 then units' digit = units' digit of 8_{Cycle} = units' digit of $8^4 = 1$

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Q1. Find Units' digit of 8^{91} ?

Sol: We need to divided the power (91) by 4 and get the remainder

91 divided by 4 gives 3 remainder

=> Units' digit of $8^{91} = \text{Units' digit of } 8^3 = 2$

Q2. Find Units' digit of 8^{57} ?

Sol: 57 divided by 4 gives 1 remainder

=> Units' digit of $8^{57} = \text{Units' digit of } 8^1 = 8$

Q8. Find Units' digit of 8^{88} ?

Sol: 88 divided by 4 gives 0 remainder

=> Units' digit of $8^{88} = \text{Units' digit of } 8^4 = 1$

Q4. Find Units' digit of $8^{40a + 41}$ (given that a is a positive integer)?

Sol: Remainder of $40a + 41$ divided by 4 = Remainder of $40a$ by 4 + Remainder of 41 by 4

= $0 + 1 = 1$

=> Units' digit of $8^{40a + 41} = \text{Units' digit of } 8^1 = 8$

Q5. Find Units' digit of 1738^{8979} ?

Sol: Units' digit of power of any number = Units' digit of power of the units' digit of that number

=> Units' digit of $1738^{8979} = \text{Units' digit of } 8^{8979}$

=> Remainder of 8979 divided by 4 = Remainder of last two digits by 4

Watch this video to Master Divisibility Rules

=> Remainder of 79 by 4 = 3

=> Units' digit of $1738^{8979} = \text{Units' digit of } 8^3 = 2$

Hope it helps!