TIPS AND TRICKS TO FIND UNIT DIGIT

Numbers are classified into three categories to find unit digit.
1. Digits 0,1,5,6
2. Digits 4,9
3. Digits 2,3,7,8

Digits 0,1,5,6

When we have these numbers (0,1,5,6) in the unit place, we get the same digit itself at the unit place when raised to any power, i.e. $0^n=0$, $1^n=1$, $5^n=5$, $6^n=6$. Let us apply this concept to the following questions.

Example: Find the Unit place digit of the following numbers:
1. 360^{244}

   Answer= 0
2. 2974281^{307}

   Answer=1
3. $4575^{400000666}$

   Answer=5
4. $5687686^{265749375}$

   Answer=6

Digits 4 & 9

Both these numbers have a cyclicity of only two different digits as their unit's digit.

In the case of 4 & 9
- If the Power of 4 is Even, the result will be 6
- If the Power of 4 is Odd, the result will be 4
- If the Power of 9 is Even, the result will be 1
- If the Power of 9 is Odd, the result will be 9

	Power 1	Power 2	Power 3	Power 4	Power 5	Power 6
Unit place 4	4	6	4	6	4	6
Unit Place 9	9	1	9	1	9	1

Example: Find the Unit place digit of the following numbers:
1. $4568474^{26734258}$

   Answer= 6

2. $34564^{45767843}$

Answer= 4

3. $54857465789^{5768454}$

Answer= 1

4. $4576348567895627369^{765787}$

Answer= 9

Digits 2,3,7,8

For Digit 2

When we have number 2 in the unit place then follow the given steps to find the unit digit.

Step 1- Divide the last two digits of the power of a given number with 4

Step 2- You get the remainder n

Step 3- Since you have got n as a remainder, put it as the power of 2, i.e $(2)^n$

Step 4- Have a look at the table below and mark your answer.

Power	Unit Digit
$(2)^1$	2
$(2)^2$	4
$(2)^3$	8
$(2)^4$	6

Example: Find the Unit place digit of the following numbers:

1. **46572^{33}**

Here, the unit place is 2 and power is 33. To solve follow the given steps

Step 1- Divide 33 by 4.

Step 2- You get remainder 1.

Step 3- Since you have got remainder 1, put it as a power of 2, i.e $(2)^1$

Step 4- Have a look at the table above, $(2)^1=2$.

Answer= 2

2. **76578456782^{35}**

Here, the unit place is 2 and power is 33. To solve follow the given steps

Step 1- Divide 35 by 4.

Step 2- You get remainder 3.

Step 3- Since you have got remainder 3, put it as a power of 2, i.e $(2)^3$

Step 4- Have a look at the table above, $(2)^3=8$.

Answer= 8

For the digits 3,7,8

Repeat the steps

When we have the numbers 3,7,8 in the unit place then follow the given steps to find the unit digit.

Step 1- Divide the last two digits of the power of a given number with 4

Step 2- You get the remainder n

Step 3- Since you have got n as a remainder, put it as the power of 3,7,8, i.e $(3)^n$, $(7)^n$, $(8)^n$

Step 4- Have a look at the table below and mark your answer.

For Digit 3

Power	Unit Digit
$(3)^1$	3
$(3)^2$	9
$(3)^3$	7
$(3)^4$	1

Example: Find the Unit place digit of the following numbers:

1. 46573^{33}

   Here, the unit place is 3 and power is 33. To solve follow the given steps

   Step 1- Divide 33 by 4.

   Step 2- You get remainder 1.

   Step 3- Since you have got remainder 1, put it as a power of 3, i.e $(3)^1$

   Step 4- Have a look at the table above, $(3)^1=3$.

   Answer= 3

For Digit 7

Power	Unit Digit
$(7)^1$	7
$(7)^2$	9
$(7)^3$	3
$(7)^4$	1

Example: Find the Unit place digit of the following numbers:

1. 46577^{18}

   Here, the unit place is 7 and power is 18. To solve follow the given steps

   Step 1- Divide 18 by 4.

   Step 2- You get remainder 2.

   Step 3- Since you have got remainder 2, put it as a power of 7, i.e $(7)^2$

   Step 4- Have a look at the table above, $(7)^2=9$.

   Answer= 9

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For Digit 8

Power	Unit Digit
$(8)^1$	8
$(8)^2$	4
$(8)^3$	2
$(8)^4$	6

Example: Find the Unit place digit of the following numbers:

1. **46578^{59}**

    Here unit place is 8 and power is 59. To solve follow the given steps

    Step 1- Divide 59 by 4.

    Step 2- You get remainder 3.

    Step 3- Since you have got remainder 3, put it as a power of 8, i.e $(8)^3$

    Step 4- Have a look at the table above, $(8)^3$=2.

    Answer= 2