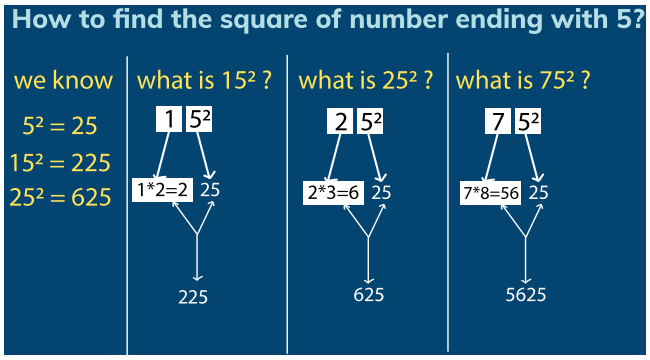
Squares And Cubes

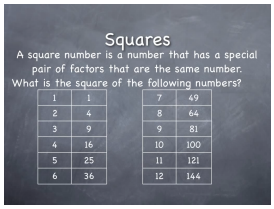
Time Spent : 00 Hours 11 Minutes 42 Seconds

Maths Squares Tricks And Shortcut Methods

- Shortcut methods are explained to find out the square value of a given number in an easier and convenient way and to save your valuable time in examinations.
- These methods will definitely help you in time management when compared to the traditional method of solving square values of a given number.
- Please note that it is better to learn square values atleast up to 50 and maximum up to 100 as it is necessary for solving complicated problems quickly and efficiently.



Squares



Square Roots

More from Hebeon

Model 1: Maths Squares Tricks And Shortcut Methods

- Example: 38^2 =?
- A).Assume a=8, b=3. (from unit digit side)
- Apply the formula **$(a+b)^2 = a^2+2ab+b^2$.**
- $a^2 = 8^2$ =64, keep 4 at the unit digit and carry 6 to the next step.
- 2ab=2x8x3=48 add the carried value 6 to this value i.e. 48+6=54.Keep 4 at the tens digit place and carry over 5.
- $b^2 = 3^2$ =9,9+ carried value 5=14.
- Answer=1444.

(or)

- 1^2=1=1,
- 2^2=4=1+3,
- 3^2=9=1+3+5,
- 4^2=16=1+3+5+7,
- 5^2=25=1+3+5+7+9,

Note: By observing the above examples, we observe that given number is “n” and to find out “n^2”, we take the sum of the first “n” odd numbers and the resultant sum will be the required answer..

More Examples:

- Example: Find out 6^2 =?

  As usually for 6^2, the sum of first 6 odd numbers will give the answer. But if you know the value of 5^2 you can directly calculate 6^2 as 5^2+2(6)-1, because to find **n^{th} odd number,2n-1** gives the value.
- So finally 5^2+2(6)-1= 25+11=36.
- Similar Examples: 1)31^2 = $(30)^2$ + 31^{st}odd number= 900+61=961.
- 2)36^2 = $(35)^2$ +36^{th}odd number=125+71=1296.
- 3)41^2 =$(40)^2$+41^{st}odd number =1600+81=1681.
- Maths Squares Tricks and Shortcut Methods

</> Model 2: Finding The Square Value Of A Number Having Every Digit As 1.

- Example: 11^2 =?
- **Step 1:** Count the number of digits in the given number (11 having 2 digits).
- **Step 2:** Write the numbers in ascending order up to the highest counted digit value i.e. 2, either from the right or left hand side and continue in descending order from the highest counted digit value. So, 121 becomes the answer.
- Example: 111^2 =?
- **Step 1:** Count the number of digits in the given number **(111 having 3 digits).**
- **Step 2:** Write the numbers in ascending order up to the highest counted digit value i.e. 3, either from the right or left hand side and continue in descending order from the highest counted digit value. So, 12321 becomes the answer.
- Note: In 12321, the highest value is 3 so from 1, we write numbers in ascending order upto 3 as 1,2 ,3 and after 3 we write the rest in descending order as 2,1 and we end the answer at 1.

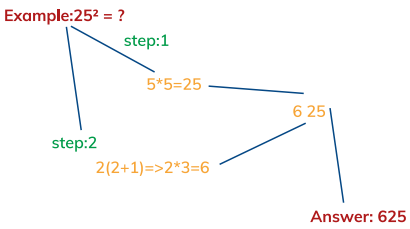
</> Model 3: If Any Given Number Has Similar Digits Like $(2222)^2$, $(3333)^2$, $(444444)^2$, $(55555)^2$ Etc.

- **Step 1:** Take the similar digits common from the number like 2$(1111)^2$, 3 $(1111)^2$, 4 $(111111)^2$, 5 $(11111)^2$ respectively.
- **Step 2:** Then, follow the procedure shown in the above model for the number in brackets and after doing so, multiply the result with the number which was taken common in step 1. i.e. 2 x 1234321, 3 x 1234321, 4 x 12345654321, 5 x 123454321 respectively to obtain the required answers.
- Maths Squares Tricks and Shortcut Methods

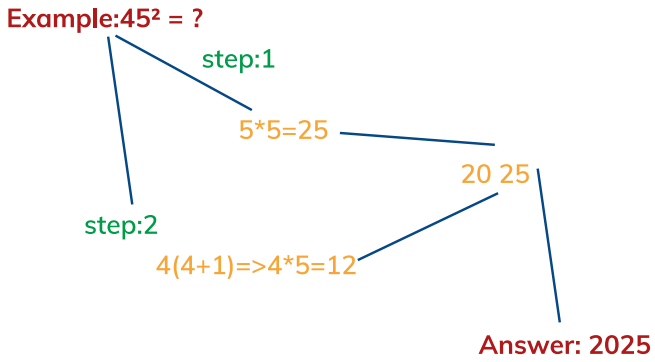
</> Model 4: Finding The Square Value Of A Number Ending With 5 At Unit's Place.

- Example: 25^2 =?
- **Step 1:** First, square the unit digit of the given number **(i.e. 5 is the unit digit of 25, so square 5 [5^2 =25])** Keep this square value of the unit digit at the end of the answer.
- **Step 2:** Multiply the digit before the unit digit number with (the same number + 1), (i.e. 2 is before the unit digit , so multiply 2 with (2+1=3). We obtain 2 x 3= 6. Keep this value before the unit digit's square value obtained in the above step. The final answer will be 625.

Method



Example 2:



Example 3:

- Maths Squares Tricks and Shortcut Methods

Model 5: Find Out The Square Of A Number That Is Near To 10^N (N =1, 2, 3, Etc)

- Example: $(97)^2$ =?
- **Step 1:** 97 is near to 10^2 =100.
- **Step 2:** We know that (100-97=3); lets assume that x=97, y=3(difference between base and given value), now use the formula $x^2=(x^2-y^2)+y^2$.
- $x^2=(x+y)(x-y)+y^2$
- **Step 3:** $97^2 = (97+3)(97-3)+3^2$ =>100 x 94+9=9409.
- Example: $(102)^2$ =?
- **Step 1:** 102 is near to 10^2 =100.
- **Step 2:** We know that(102-100=2); lets assume that x=102, y=2 (difference between base and given value),now use the formula $x^2=(x^2-y^2)+y^2$).
- $x^2=(x+y)(x-y)+y^2$
- **Step 3:** $102^2 = (102+2)(102-2)+2^2$ => 104X100+4=10404.
- These are a few shortcut methods and maths tricks of square numbers to find the square value of a given number.

Square Root Formula And Square Root Shortcut Tricks

- Square root Shortcut Tricks- Square root formula helps to solve many problems in the simplification section of quantitative aptitude as a majority of the questions asked from this section are related to finding the square root value of a given number.
- It takes much longer to solve these questions using traditional old methods and aren't the best option for time management in competitive exams. To deal with problems of this type, some math tricks come in handy to solve problems rapidly and helps a lot in time management.
- For this, it is mandatory to learn some of the square values, which are given below in the square value table and this will make it is easy for you to solve problems rapidly without much calculation.
- One thing to keep in mind is the following table of the unit digits of square values from 1 to 10.
- **Simplification** section of quantitative aptitude is related to problems including finding the square root value of a given number.

Square Root Shortcut Tricks

- From the table given, we can observe that, whenever the unit digit of a given squared number is 9,the unit digit of the square root of that number will definitely be 3 or 7. (Refer sidelines in the table)

Similarly, If The Unit Digit Of A Squared Number Is 1,Then Its Square Root's Unit Digit Will Either Have 1 Or 9.

- For a squared number with unit digit 4,the unit digit of its square root will be 2 or 8.
- For a squared number with unit digit 6,the unit digit of its square root will be 4 or 6.
- For a squared number with unit digit 5,the unit digit of its square root will be only 5.

Table Of 1 To 10 Square Values Unit Digits

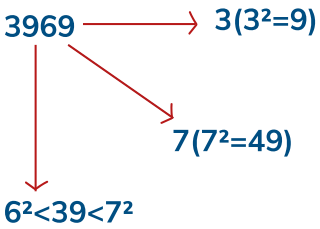
Number	unit digit of square value from 1 to 10
1^2	1
2^2	4
3^2	9
4^2	16
5^2	25
6^2	36
7^2	49
8^2	64
9^2	81
10^2	100

keep in mind that red coloured underlined unit digits are sidelines in table indicates same unit digit value

Method 1: How To Find The Square Root Of Four Digit Number?

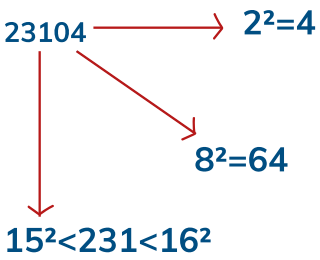
- **Step 1:** Divide the 4 digit number(here, 3969) into two parts i.e 39 and 69. Observe that the unit digit in the given number 396 9 is 9. From the table we can say for unit digit 9, the unit digit of the square root will definitely be 3 or 7.
- **Step 2:** Now we will take the square root of a perfect square which is the nearest to 39 and lesser than it, similarly we will take another square root whose perfect square is the nearest as well as greater than 39. Here it will be 6^2 and 7^2. We will be considering the lower square root to be the digit placed before the possible unit digits(3 or 7).
- **Step 3:** Now consider 6 and 7 (6×7=42); 39 is less than 42. So the unit digit will be having 3, the least value in 3 and 7. So finally, the procedure gives an answer; 63 is the square root of √3969.

Example: $\sqrt{3969} = ?$



Method 2: How To Find The Square Root Of Five Digit Number?

Example: $\sqrt{23104} = ?$



- **Step 1:** Divide the 5 digit number (here,23104) into two parts i.e 231 and 04. Observe that the unit digit in the given number 2310 4 is 4. From the table we can say that for unit digit 4, the unit digit of the square root will definitely be 2 or 8.
- **Step 2:** Now we will take the square root of a perfect square which is the nearest to 231 and lesser than it, similarly we will take another square root whose perfect square is the nearest as well as greater than 231. Here it will be 15^2 and 16^2. We will be considering the lower square root to be the digit placed before the possible unit digits(2 or 8). .
- **Step 3:** Now consider 15 and 16 (15×16=240); 231 is less than 240. So the unit digit will be having 2, the least value in 2 and 8.
- **Step 4:** From the above procedure, we can confirm that the square of 152 will be

Shortcut Tricks To Find The Cube Root Of Any Number:

- Dear students,here, we will help you to you learn Shortcut Tricks to Find the Cube Root with Cube Root Formulas within seconds and save your time in competitive examinations when dealing with such problems.
- If you follow the tricks given below, you can learn how to quickly solve cquestions related to this topic.
- But before starting this concept, it is better to revise and keep in mind the cube and cube root values from the cube chart which is given below. You will need to remember the following table of unit digits of cubic values as well.

Shortcut Tricks To Find Cube Roots

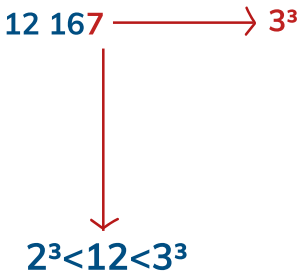
From The Above Table, We Observe That The Unit Digit (From 1 To 10) Of A Given Number Lets Us Know It's Respective Cube Value Unit Digit As:

- For unit digit 1 in the given number, it's cube value unit digit will be 1,
- For unit digit 2 in the given number, it's cube value unit digit will be 8,
- For unit digit 3 in the given number, it's cube value unit digit will be 7,
- For unit digit 4 in the given number, it's cube value unit digit will be 4,
- For unit digit 5 in the given number, it's cube value unit digit will be 5,
- For unit digit 6 in the given number, it's cube value unit digit will be 6,
- For unit digit 7 in the given number, it's cube value unit digit will be 3,
- For unit digit 8 in the given number, it's cube value unit digit will be 2,
- For unit digit 9 in the given number, it's cube value unit digit will be 9,
- For unit digit 10 in the given number, it's cube value unit digit will be 0,
- Note: Here, you must have observed that for unit digits 4,5,6,9 of a number, their respective cube value unit digits are also 4,5,6,9, respectively.

Table Of Cube Value Unit Digits From 1 To 10.

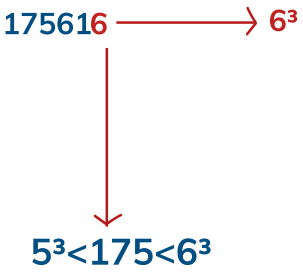
Number	Cube Value
1^3	1
2^3	8
3^3	27
4^3	64
5^3	125
6^3	216
7^3	343
8^3	512
9^3	729
10^3	1000

Method 1: Find Out The Cube Root Of A 5 Digit Number



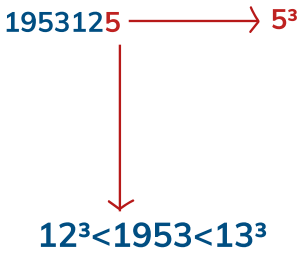
- Example: $\sqrt[3]{12167}$ =?
- **Step 1:** In the given number (here 12167),divide the number into two parts, 12 and 167, considering the unit digit to be in the second part, which is 7 in this case. From the above table, we observe that 7 is the cube value unit digit for the number 3 (i.e $3^3 = 27$). So this means that the unit digit of the required answer is 3.
- **Step 2:** Once this is done, take the number whose cube is nearest to 12, which is the first part of our number. Here 12 is nearest to 2^3 and 3^3 ($2^3 < 12 < 3^3$).
- **Step 3:** Then, take the least value from 2 and 3 (2)which is to be placed before the unit digit,which is 3. So the final answer for $\sqrt[3]{12167}=23$.

Method 2: Find Out The Cube Root Of 6 Digit Number



- Example: $\sqrt[3]{175616}$ =?
- **Step 1:** In the given number (here 175616),divide the number into two parts, 175 and 616, considering the unit digit to be in the second part, which is 6 in this case. From the above table, we observe that 6 is the cube value unit digit for the number 6 (ie $6^3 = 216$). So this means that the unit digit of the required answer is 6.
- **Step 2:** Once this is done, take the number whose cube is nearest to 175, which is the first part of our number.Here 175 is nearest to 5^3 and 6^3 ($5^3 < 175 < 6^3$).
- **Step 3:** Then, take the least value from 5 and 6 (5) which is to be placed before the unit

Method 3: Find Out The Cube Root Of 7 Digit Number



- Example: ∛1953125 =?
- **Step 1:** In the given number (here 1953125),divide the number into two parts, 1953 and 125[NOTE THAT the second part of the number MUST have THREE DIGITS], considering the unit digit to be in the second part, which is 5 in this case. From the above table, we observe that 5 is the cube value unit digit for the number 5 (ie 5^3= 125). So this means that the unit digit of the required answer is 5.
- **Step 2:** Once this is done, take the number whose cube is nearest to 1953, which is the first part of our number. Here 1953 is nearest to 12^3 and 13^3 (12^3 <1953 <13^3)
- **Step 3:** Then, take the least value from 12 and 13 (12) which is to be placed before the unit digit, which is 5. So the final answer for ∛1953125=125.

  These are a few shortcut methods used to Find the Cube Root of a Number using a Cube Root Trick.

</> Conclusion

- In this section, we have covered squares and square roots, also known as radicals. We have looked at a few problems and learnt how to solve them using shortcut methods.

We have also learnt a few new tricks and methods on how to find cube roots,

We hope this information will help you do your best, best of luck!

N	SQUARE	CUBE	SQUARE ROOT	CUBE ROOT
1	1	1	1.00000	1.00000
2	4	8	1.41421	1.25992
3	9	27	1.41421	1.44225
4	16	64	1.73205	1.58740
5	25	125	2.00000	1.70998
6	36	216	2.44949	1.81712
7	49	343	2.64575	1.91293
8	64	512	2.82843	2.00000
9	81	729	3.00000	2.08008
10	100	1000	3.16228	2.15443
11	121	1331	3.31662	2.22398
12	144	1728	3.46410	2.28943
50	2500	125000	7.07107	3.68403
100	10000	1000000	10.00000	4.64159
1000	1000000	1000000000	31.62278	10.00000

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