

Class 8-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

Chapter 3

SQUARES AND SQUARE ROOTS (Continued)

LONG DIVISION METHOD: Long division method is used to find square roots of large numbers, decimals, numbers which are not perfect squares, etc...

The step by step procedure of long division method is described below.

e.g. Find the square root of 2401:

1) Place a bar over every pair of digits from right to left.

2) Take the first pair of digits. In this case it is **24**.

Find the greatest number whose square is less than or equal to **24**. Such a number is **4**. Write **4** on top in the quotient and also in the divisor. Subtract $4 \times 4 = 16$ from **24**. The remainder is **8**.

$$\begin{array}{r}
 \overline{49} \text{ ---- Square root} \\
 4 \overline{) 24 \ 01} \\
 \underline{-16} \\
 89 \\
 \underline{80} \\
 801 \\
 \underline{801} \\
 0
 \end{array}$$

3) Bring down the next pair of digits (i.e. **01** in this case). The new dividend is **801**.

4) Double the quotient (i.e. $2 \times 4 = 8$) and enter it with a blank at the place of the new divisor.

5) Find the largest possible digit to fill the blank which will also become the new digit in the quotient such that when the new divisor is multiplied by this new digit the product is less than or equal to the new dividend. In this case $9 \times 89 = 801$. So we choose the new digit as **9**. Subtract and get remainder **0**.

Now $\sqrt{2401} = 49$.

Exercise 3.4

Q1. Find the square root by long division method.

i) Solved above

ii) 4489

$$\begin{array}{r}
 \overline{67} \\
 6 \overline{) 44 \ 89} \\
 \underline{-36} \\
 127 \\
 \underline{-88} \\
 0 \\
 1
 \end{array}$$

$$\sqrt{4489} = 67$$

iii) 106929

$$\begin{array}{r}
 \overline{327} \\
 3 \overline{) 10 \ 69 \ 29} \\
 \underline{-9} \\
 62 \\
 \underline{-12} \\
 647 \\
 \underline{647} \\
 0
 \end{array}$$

$$\sqrt{106929} = 327$$

Q2. Find the square root of decimals:

iii) 18.4041

$$\begin{array}{r}
 \hline
 4.29 \\
 \hline
 4 \overline{) 18.40\ 41} \\
 \underline{-16} \\
 82 \\
 \underline{-164} \\
 849 \\
 \underline{-7641} \\
 0
 \end{array}
 \quad \sqrt{18.4041} = 4.29$$

iv) 5.774409

$$\begin{array}{r}
 \hline
 2.403 \\
 \hline
 2 \overline{) 5.77\ 44\ 09} \\
 \underline{-4} \\
 44 \\
 \underline{-176} \\
 4803 \\
 \underline{-14409} \\
 0
 \end{array}$$

(If the new digit is 0, then immediately bring down The next pair of digits and find out the new digit With the same procedure)

$$\sqrt{5.774409} = 2.403$$

Q3. Find the Square roots up to 2 places of decimal

i) Refer the you tube video.

iv) $\sqrt{2}$

$$\begin{array}{r}
 \hline
 1.414 \\
 \hline
 1 \overline{) 2.00\ 00\ 00} \\
 \underline{-1} \\
 24 \\
 \underline{-96} \\
 281 \\
 \underline{-281} \\
 2824 \\
 \underline{-2824} \\
 \\
 \\

 \end{array}$$

$$\sqrt{2} = 1.414... = 1.41 \text{ approx.}$$

Q4. Hint: Change the given fractions into decimals and then use long division method.

Q5. i) Refer the YouTube video.

iii)

$$\begin{array}{r|l} & 94 \\ 9 & \overline{89\ 34} \\ & -81 \quad \downarrow \\ \hline 184 & 8\ 34 \\ & -7\ 36 \\ \hline & 98 - \text{Remainder.} \end{array}$$

The number to be subtracted = 98 (Remainder)
i.e, $8934 - 98 = 8836$ is a perfect square.
 $\sqrt{8836} = 94$

Q6. i.

$$\begin{array}{r|l} & 41 \\ 4 & \overline{17\ 50} \\ & -16 \quad \downarrow \\ \hline 81 & 1\ 50 \\ & -81 \\ \hline & 69 \end{array}$$

Clearly $41^2 < 1750$
The next perfect square = $42^2 = 1764$
 \therefore The number to be added = $1764 - 1750$
= 14
Required square root = 42.

Home work: Solve the unsolved questions from [exercise 3.4 Questions 1 to 6](#) and Practise Long division method.