SQUARES AND SQUARE ROOTS

ESTIMATING SQUARE ROOT

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Let's move on to see some square root examples, and learn how to find answers for square roots. You'll first have to keep in mind the steps to finding square roots and they are:

- Estimate: Get as close as possible to the number you're trying to square root by finding two perfect square roots that gives a close number.
- 2. Divide: Divide your number by one of the square roots you've chosen from the previous step.
- 3. Average: Take the average of step 2 and the root.
- 4. Repeat: Keep repeating steps 2 and 3 using the results you got from step 3 until you get a number that's accurate enough for you to answer the question.

So in simpler words, to estimate square roots which are not perfect squares without using a calculator, we'll need to know the perfect square numbers well. We will first put the number inside the square root sign in the middle of a number line, and then find the two closest perfect square numbers on its left and right hand side to make the best estimation. Take a look at some of the below examples of square roots.

• Square root of 5

Step 1: Estimate

The square numbers of 2 and 3 are 4 and 9 respectively. The number 5 lies between these two numbers.

Step 2: Divide

Divide 5 by either 2 or 3. In this case, let's choose 2. We'll get 2.5.

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Step 3: Average

Average 2.5 and 2, which gives us 2.25.

Step 4: Repeat

To get a more accurate number, keep repeating step 2 and 3. In that case we'd take 5 and divide it by 2.25, which equals 2.222. Average out 2.22 and 2.25, giving us 2.235. You may repeat steps 2 and 3 as many times needed to get a more accurate number.

The final answer for the square root of 5 is approximately 2.23

• Square root of 8

Step 1: Estimate

8 lies between perfect squares of 2² and 3².

Step 2: Divide

Divide 8 by 3. We get 2.6666666

Step 3: Average

Average 2.66666666 and 3, which gives us 2.8333333

Step 4: Repeat

To get a more accurate number, keep repeating step 2 and 3.

You should get a final answer of 2.83.

• Square root of 10

Step 1: Estimate

10 lies between perfect squares of 3² and 4².

Step 2: Divide

Divide 10 by 3. We get 3.33

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Step 3: Average

Average 3.33 and 3, which gives us 3.1667

Step 4: Repeat

To get a more accurate number, keep repeating step 2 and 3.

You should get a final answer of 3.16.

• Square root of 6

Step 1: Estimate

6 lies between perfect squares of 2² and 3².

Step 2: Divide

Divide 6 by 2. We get 3.

Step 3: Average

Average 3 and 2, which gives us 2.5

Step 4: Repeat

To get a more accurate number, keep repeating step 2 and 3.

You should get a final answer of 2.45.

• Square root of 12

Step 1: Estimate

12 lies between perfect squares of 3² and 4².

Step 2: Divide

Divide 12 by 4. We get 3.

Step 3: Average

Average 3 and 4, which gives us 3.5.

Step 4: Repeat

To get a more accurate number, keep repeating step 2 and 3.

You should get a final answer of 3.46.

• Square root of 20

Step 1: Estimate

20 lies between perfect squares of 4² and 5².

Step 2: Divide

Divide 20 by 5. We get 4.

Step 3: Average

Average 4 and 5, which gives us 4.5.

Step 4: Repeat

To get a more accurate number, keep repeating step 2 and 3.

You should get a final answer of 4.47.

• Square root of 0

As a final note, we wanted to explore what the square root of 0 is. You can't take the square root of a negative number, but 0 is not a negative number. The square root of 0 is actually 0!