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)

SQUARE ROOTS: The square root of a number '**n**' is that number which when multiplied by itself gives '**n**' as the product.

If '**m**' is the square root of '**n**'

Then $m^2 = n$

Or m $= \sqrt{n}$

e.g. $7^2 = 49 \Rightarrow \sqrt{49} = 7$

$6^2 = 36 \Rightarrow \sqrt{36} = 6$

Note: In fact a number can have two square roots. One positive and another negative.

e.g. $5 \times 5 = 25$ and $-5 \times -5 = 25$

i.e. $\sqrt{25} = 5$ or -5 (± 5)

FINDING SQUARE ROOT BY PRIME FACTORISATION:

e.g. Find square root of 784

2	784
2	392
2	196
2	98
7	49
7	7
	1

[Splitting the given number into prime factors.]

$784 = \underline{2\times2}\times\underline{2\times2}\times\underline{7\times7}$ [Making pairs of prime factors]

$\sqrt{784} = 2\times2\times7$ [Multiplying factors from each pair]

$= 28$ Ans.

Exercise 3.3

1. Find the square roots by prime factorisation:

vi) 8836

2	8836
2	4418
47	2209
47	47
	1

$8836 = 2\times2\times47\times47$

$\sqrt{8836} = 2\times47$

$= 94$

2. Find the square root of :
   iii. 1.96

$$\sqrt{1.96} \qquad = \sqrt{\frac{196}{100}}$$

$$= \sqrt{\frac{14 \times 14}{10 \times 10}}$$

$$= \frac{14}{10} \qquad = 1.4$$

3. i. 588

2	588
2	294
3	147
7	49
7	7
	1

588= 2×2×3×7×7

Since 3 is left unpaired, we have to multiply the given number by 3 to make it a perfect square.

i.e. 588×3 = 2×2×3×7×7 ×**3**

      = 2×2×3×3×7×7

Required square root = 2×3×7 = 42

4. v. 61347

3	61347
11	20449
11	1859
13	169
13	13
	1

61347 = 3×11×11×13×13

Since 3 is left unpaired, we have to divide the given number by 3 to make it a perfect square.

i.e. $\dfrac{61347}{3}$ = $\dfrac{3 \times 11 \times 11 \times 13 \times 13}{3}$

     = 11×11×13×13

Required square root = 11×13 = 143.

5. i)

2	3, 6, 10, 15
3	3, 3, 5, 15
5	1, 1, 5, 5
	1, 1, 1, 1

L.C.M of 3, 6, 10, 15   = 2×3×5

         =30

The smallest number that is divisible by 3,6,10, 15 is 30. But it is not a square as the prime factors are not paired. To make it a square Multiply 30 by 2×3×5 so that a perfect square is made.

i.e. 2×3×5 ×2×3×5 =2×2×3×3×5×5 = 900 . This is the required number.

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6. Total number of plants   = 4225

     Let the number of rows be x.

     Number of plants in each row =x

     $X \times X$ =4225

     X^2 =4225

     X $=\sqrt{4225}$

               $=\sqrt{5 \times 5 \times 13 \times 13}$

               =5×13

               =65

Number of plants in each row = 65.

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9. Total number of students   =2000

  Number of students accommodated

     in the arrangement   =2000-64 =1936

  Let the number of rows and columns be x each.

     Then $x \times x$ = 1936

         X^2 $=\sqrt{1936}$

         X   = 44   [Find the square root by prime factorisation]

Number of rows   = 44

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12. Let the numbers be 2x, 3x and 5x.

     A/Q, $(2x)^2+(3x)^2 +(5x)^2$ = 950

             $4x^2 + 9x^2 + 25x^2$ = 950

             $38x^2$ =950

             X^2 $=\dfrac{950}{38}$

                     = 25

             X $=\sqrt{25}$ = 5

             Required numbers are : 2×5=10

                              3×5=15

                              5×5=25

Home work: All the unsolved questions from exercise 3.3