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Natural numbers: All the counting numbers are called natural numbers.

Ex: 1) Count the number of books you read in class VII.

2) Count the number of note books you have used in class VII.

3) Count the number of friends you have.

So, the natural numbers are 1,2,3,4,5 and so on.

Now , take an example ,   4 X 4 = 4^2 = 16

We say that 4 to the power 2 or 4 squared is 16.

Now, Area of a square having each side 4 units

=side X side

= 4 X 4 = 4^2 =16 square units

So ,Square of a number: The square of a number is the product of the number with the number itself.

For a given number x , the square of x = x X x = x^2

If x = -2, then square of (-2) = (-2)X (-2) = $(-2)^2$ =4

If x = 5, then square of 5 = 5X5 = 5^2 = 25

Perfect square or a square number: A natural number is called a perfect square or a square number if it is

the square of some natural numbers. These numbers are exact squares and do not involve any decimals or fractions.

Ex: $1=1 \times 1=1^2$, $4=2 \times 2=2^2$, $9=3 \times 3=3^2$, $16=4 \times 4=4^2$ and so on. So, 1,4,9,16,25,etc are the perfect squares

Now , all of you must remember the following perfect squares:

$1 \times 1=1^2=1$	$11 \times 11=11^2=121$	$21 \times 21=21^2=441$
$2 \times 2=2^2=4$	$12 \times 12=12^2=144$	$22 \times 22=22^2=484$
$3 \times 3=3^2=9$	$13 \times 13=13^2=169$	$23 \times 23=23^2=529$
$4 \times 4=4^2=16$	$14 \times 14=14^2=196$	$24 \times 24=24^2=576$
$5 \times 5=5^2=25$	$15 \times 15=15^2=225$	$25 \times 25=25^2=625$
$6 \times 6=6^2=36$	$16 \times 16=16^2=256$	$26 \times 26=26^2=676$
$7 \times 7=7^2=49$	$17 \times 17=17^2=289$	$27 \times 27=27^2=729$
$8 \times 8=8^2=64$	$18 \times 18=18^2=324$	$28 \times 28=28^2=784$
$9 \times 9=9^2=81$	$19 \times 19=19^2=361$	$29 \times 29=29^2=841$
$10 \times 10=10^2=100$	$20 \times 20=20^2=400$	$30 \times 30=30^2=900$

Steps to find out whether a given number is a perfect square or not.

Step 1: Find the Prime factorisation of the number.

Step 2: Write the number as a Product of its Prime factors.

Step 3: If these factors exist in pairs then the number is a

        Perfect square, otherwise not.

Example 1: Is 256 a perfect square?

Solution: By Prime factorisation of 256, we get,

256= (2X2) X (2X2) X (2X2) X (2X2)

So, Prime factors of 256 can be grouped into

Pairs and no factor is left out.

So, 256 is a perfect square.

Example 2: Check whether 720 is a perfect square or not.

Solution: By Prime factorisation of 720,we get,

720= (2X2) X (2X2) X (3X3) X 5

In Prime factors of 720, factor 5 is left ungrouped.

So, 720 is not a perfect square.

Example 3: Show that 1764 is a perfect square. Find the

number whose square is 1764.

Solution: By prime factorisation of 1764, we get,

1764= (2X2) X (3X3) X(7X7)

So, prime factors of 1764 can be grouped into

pairs and no factor is left out.

So, 1764 is a perfect square.

Now, 1764= 2^2 X 3^2 X 7^2 =$(2X3X7)^2$ =42^2

So, 42 is the number whose square is 1764.

Example 4: By what least number should 3675 be multiplied

to get a perfect square number? Also, find the

number whose square is the new number.

Solution: By prime factorisation of 3675, we get,

3675= 3X (5X5) X (7X7) = 3X 5^2 X 7^2

So, prime factor 3 does not form a pair.

So, 3 is the least number to be multiplied to get a

Perfect square number.

New number = 3^2 X 5^2 X 7^2 = $(3X5X7)^2$ = 105^2

So, the number whose square is the new number

is 105.

Example5: By what least number should 6300 be divided

to get a perfect square number? Find the

number whose square is the new number.

Solution : By prime factorisation of 6300, we get,

6300= (3X3) X (5X5) X (2X2) X7 = 3^2 X 5^2 X 2^2 X 7

So, prime factor 7 does not form a pair .

So, 7 is the least number to be divided to get a

perfect square number.

New number = (3^2 X 5^2 X 2^2 X7) / 7

= 3^2 X 5^2 X 2^2 = $(3X5X2)^2$= 30^2

So, the number whose square is the new number

is 30

Home Assignments:

1) Check whether the following numbers are perfect squares or not. Justify your answer.
   a) 154   b) 576
2) Show that 6292 is not a perfect square.
3) Is 196 a perfect square? If so, find the number whose square is 196.
4) By what least number should the given numbers be multiplied to get a perfect square number? In each case , find the number whose square is the new number.
   a) 9075   b) 3380

5) By what least number should the given numbers be divided to get a perfect square number? In each case , find the number whose square is the new number.
   a) 1575   b) 8820
6) Find the largest number of 2 digits which is a Perfect square.
7) Find the largest number of 3 digits which is perfect square.