NCERT SOLUTIONS OF square and square roots Exercise 2

Question 1

Find the square of the following numbers.

(i) 32

(ii) 35

(iii) 86

(iv) 93

(v) 71

(vi) 46

Answer

i) 32^2
We can find the square using direct multiplication
= 32 x 32 = 1024

But above method can be cumbersome to calculate. We can calculate such values in the another better way f

Since, 32 can be written as (30+2)

So, $32^2 = (30+2)^2 = (30+2)(30+2)$

Now we know the identity

$(a+b)^2 = a^2 + b^2 + 2ab$

$= 30^2 + 2 \times 30 \times 2 + 2^2$

= 900 + 120 + 4 = 1024

ii) $(35)^2 = (30+5)^2$
Solving on similar lines as above

$= 30^2 + 2 \times 30 \times 5 + 5^2$

$= 900 + 300 + 25 = 1225$

iii) $86^2 = (80 + 6)^2$

$= 80^2 + 2 \times 80 \times 6 + 6^2$

$= 6400 + 960 + 36 = 7396$

iv) $93^2 = (90+3)^2$

$= 90^2 + 2 \times 90 \times 3 + 3^2$

$= 8100 + 540 + 9 = 8649$

v) $71^2 = (70 + 1)^2$
$= 70^2 + 2 \times 70 \times 1 + 1 \times 1$

$= 4900 + 140 + 1 = 5040 + 1 = 5041$

vi) $46^2 = (40+6)^2$
$= 40^2 + 2 \times 40 \times 6 + 6^2$

$= 1600 + 480 + 36 = 2080 + 36 = 2116$

Question: 2

Write a Pythagorean triplet whose one member is:

(i) 6

(ii) 14

(iii) 16

(iv) 18

Answer

As we know $2n$, $n^2 + 1$ and $n^2 - 1$ form a Pythagorean triplet for any number, $n > 1$.

i) If we take $n^2 + 1$ or $n^2 - 1$ to be 6 then then the value of n will not integer(n^2 will be 5 or 7)
So we can $2n = 6$

Therefore, $n = 3$

And, $n^2 + 1 = 3^2 + 1 = 9 + 1 = 10$

And, $n^2 - 1 = 3^2 - 1 = 9 - 1 = 8$

Test: $6^2 + 8^2 = 36 + 64 = 100 = 10^2$

Hence, the triplet is 6, 8, and 10 Answer

ii) If we take $n^2 + 1$ or $n^2 - 1$ to be 14 then then the value of n will not integer(n^2 will be 15 or 13)
So we can take $2n = 14$, therefore, $n = 7$

Now, $n^2 + 1 = 7^2 + 1 = 49 + 1 = 50$

And, $n^2 - 1 = 7^2 - 1 = 49 - 1 = 48$

Test: $14^2 + 48^2 = 196 + 1304 = 2500 = 50^2$

Hence, the triplet is 14, 48, and 50 Answer

iii) If we take $n^2 + 1$ or $n^2 - 1$ to be 16 then then the value of n will not integer(n^2 will be 17 or 15)
Let us assume $2n = 16$, then $n = 8$

Now, $n^2 + 1 = 8^2 + 1 = 64 + 1 = 65$

And, $n^2 - 1 = 8^2 - 1 = 64 - 1 = 63$

Test: $16^2 + 63^2 = 256 + 3969 = 4225 = 65^2$

Hence, the triplet is 16, 63, and 65 Answer

iv) If we take $n^2 + 1$ or $n^2 - 1$ to be 18 then then the value of n will not integer(n^2 will be 19 or 17)
Let us assume $2n = 18$, therefore, $n = 9$

Now, $n^2 + 1 = 9^2 + 1 = 81 + 1 = 82$

And, $n^2 - 1 = 9^2 - 1 = 81 - 1 = 80$

Test: $18^2 + 80^2 = 324 + 6400 = 6724 = 82^2$