NCERT SOLUTIONS CLASS-8 MATHS CHAPTER-6 EXERCISE-6.1

Question-1) Determine which digit will be at the unit's place in the squares of the numbers given below:

1. **36**
2. **273**
3. **798**
4. **3864**
5. **58637**
6. **63545**
7. **16542**
8. **45640**
9. **98231**
10. **89999**

Solution:

"Say x is at the unit's place in a number, then its square will have unit digit = x*x."

1)36

Digit at unit's place = 6

Unit digit in 36^2 = 6*6 = 36

So, the unit digit in 36^2 is **6**.

2) 273

Digit at unit's place = 3

Unit digit in 273^2 = 3*3 = 9

So, the unit digit in 273^2 is **9**.

3) 798

Digit at unit's place = 8

Unit digit in 798^2 = 8*8 = 64

So, the unit digit in 798^2 is **4**.

4) 3864

Digit at unit's place = 4

Unit digit in 3864^2 = 4*4 = 16

So, the unit digit in 3864^2 is **6**.

5) 58637

Digit at unit's place = 7

Unit digit in 58637^2 = 7*7 = 49

So, the unit digit in 58637^2 is **9**.

6) 63545

Digit at unit's place = 5

Unit digit in 63545^2 = 5*5 = 25

So, the unit digit in 63545^2 is **5**.

7) 16542

Digit at unit's place = 2

Unit digit in 16542^2 = 2*2 = 4

So, the unit digit in 16542^2 is **4**.

8) 45640

Digit at unit's place = 0

Unit digit in 45640^2 = 0*0 = 0

So, the unit digit in 45640^2 is **0**.

9) 98231

Digit at unit's place = 1

Unit digit in 98231^2 = 1*1 = 1

So, the unit digit in 98231^2 is **1**.

10) 89999

Digit at unit's place = 9

Unit digit in 89999^2 = 9*9 = 81

So, the unit digit in 89999^2 is **1**.

Question-2) Explain why following numbers are not perfect squares.

1. **1263**
2. **654657**
3. **25000**
4. **23438**
5. **888080**
6. **895352**
7. **35500000**
8. **798657**

Solution:

"The square of numbers generally ends with 0,1,5,6, or 9. Perfect square always ends with even numbers of zeros."

1) 1263

Digit at unit's place = 3

∴ this number is not a perfect square.

2) 654657

Digit at unit's place = 7

∴ this number is not a perfect square.

3) 25000

Digit at unit's place = 0

But the given number contains three 0's and that is odd number and as a perfect square cannot end with odd numbers of zeros.

∴ this number is not a perfect square.

4) 23438

Digit at unit's place = 8

∴ this number is not a perfect square.

5) 888080

Digit at unit's place = 0

But the given number contains one 0 and that is odd number and as a perfect square cannot end with odd numbers of zeros.

∴ this number is not a perfect square.

6) 895352

Digit at unit's place = 2

∴ this number is not a perfect square.

7) 35500000

Digit at unit's place = 0

But the given number contains five 0's and that is odd number and as a perfect square cannot end with odd numbers of zeros.

∴ this number is not a perfect square.

8) 798657

Digit at unit's place = 7

∴ this number is not a perfect square.

Question-3) From the numbers given below which number's square would be the odd number?

1. **541**
2. **667**
3. **2558**
4. **3250**

Solution:

We know that, "the square of any odd number will be odd and the square of any even number will be even."

From the numbers given in question 541 and 667 are odd numbers and 2558 and 3250 are even numbers.

So, the square of **541** and **667** will be an odd number.

Question-4) Find out the missing number by observing the pattern given below.

21^2 **= 441**

201^2 **= 40401**

2001^2 **= 4004001**

20001^2 **= 400040001**

2000000001^2 **= _____**

Solution:

It can be seen from the pattern that in a square of a given number there is equal number of 0's both the sides of the middle digit 4.

So, it can be said that

2000000001^2 **= 4000000004000000001**

This is the missing number.

Question-5) Find out the value of *x* by observing the pattern given below.

9^2 **= 81**

99^2 **= 9801**

999^2 **= 998001**

9999^2 **= 99980001**

x^2 **= 99999980000001**

Solution:

It can be seen from the pattern that if a number contain *n* number of nines than the square of that number is of the form,

(n – 1) numbers of nines then 8 then *(n – 1)* numbers of zeros then 1

i.e. *(n- 1)9's 8 (n – 1)0's 1*

In the question the x^2 = *99999980000001* is given.

This number contains six *9's* and six *0's.*

The number of nines in a square should be *(n – 1)*

So, here *(n – 1) = 6*

∴n = 6 + 1

∴n = 7

So, the required number is

x = 9999999

Question-6) Find out the missing number X, Y and Z by observing the pattern given below.

$6^2 + 42^2 + 7^2 = 43^2$

$9^2 + 90^2 + 10^2 = 91^2$

$13^2 + X^2 + 14^2 = 183^2$

$23^2 + 552^2 + 24^2 = 553^2$

$36^2 + 1332^2 + 37^2 = 1333^2$

$16^2 + Y^2 + 17^2 = Z^2$

Solution:

It can be seen from the pattern that,

The middle number in L.H.S is product of the first and third number.
The number in the R.H.S is equal to one plus the value of middle number in the L.H.S.

Hence the missing numbers are:

$13^2 + X^2 + 14^2 = 183^2$

Here, X = 13*14 or (183 – 1) = 182

$16^2 + Y^2 + 17^2 = Z^2$

Here, Y = 16*17 = 272

And Z = 272 + 1 = 273

Thus, the required numbers are

X = 182

Y = 272

Z = 273

Question-7) Without adding find the sum of the following series.

1. **1 + 3 + 5 + 7 + 9 + 11 + 12**
2. **25 + 27 + 29 + 31**
3. **43 + 45 + 47 + 49**

Solution:

Now the "sum of first n odd numbers is n^2".

1) 1 + 3 + 5 + 7 + 9 + 11 + 12

Here first six number are six consecutive odd numbers so there sum is

6^2 = 36

Thus, the sum of the given series = 36 +12 = **48**

2) 25 + 27 + 29 + 31

Here the numbers given are the 13th,14th,15th and 16th odd numbers

So, there sum is

= $16^2 - 12^2$

= 256 – 144 = **112**

3) 43 + 45 + 47 + 49

Here the numbers given are the 22th, 23rd, 24th and 25th odd numbers

So, there sum is

= $25^2 - 21^2$

= 625 – 441 = **184**

Question-8)

a) Show that 81 as a sum of 9 odd numbers.

b) Show 196 as sum of 14 odd numbers

Solution:

a) 81

Now, 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 = 81

i.e.

i.e. **81 =** 9^2

Thus 81 is the sum of first 9 odd numbers.

b) 196

Now, 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23 + 25 + 27 = 196

i.e. **196 =** 14^2

Thus 196 is the sum of first 14 odd numbers.

Question-9) How many numbers would be present between the squares of the numbers given below?

1. **14 and 15**
2. **27 and 28**
3. **43 and 44**
4. **101 and 102**

Solution:

As we know that "there will be 2x numbers in between the squares of the numbers x and (x + 1).

1) Count of numbers between $14^2 \; and \; 15^2$, there will be

= 2*14 = **28 numbers**.

2) Count of numbers between $27^2 \; and \; 28^2$, there will be

= 2*27 = **54 numbers**.

3) Count of numbers between 43^2 and 44^2, there will be

= 2*43 = **86 numbers**.

4) Count of numbers between 101^2 and 102^2 there will be

= 2*101 = **202 numbers**.

Question-10) Find out the square root of the numbers given below by division method:

1. **2209**
2. **4624**
3. **3721**
4. **576**
5. **2809**

Solution:

1) 2209

	47
4	$\overline{22}\ \overline{09}$ -16
87	609 609
	0

∴ $\sqrt{2209}$ = **47**

2) 4624

	68
6	$\overline{46}\ \overline{24}$ -36
128	1024 1024
	0

∴ $\sqrt{4624}$ = **68**

3) 3721

	61
6	$\overline{37}\ \overline{21}$ -36
121	121 121
	0

∴ $\sqrt{3721}$ = **61**

$\therefore \sqrt{3721}$ = **61**

4) 576

	64
2	$\overline{5}\ \overline{76}$ -4
44	176 176
	0

$\therefore \sqrt{576}$ = **24**

5) 2809

	53
5	$\overline{28}\ \overline{09}$ -25
103	309 309
	0

$\therefore \sqrt{2809}$ = **53**

Question-11) Find the number of digits in the square root of the numbers given below (without doing any calculation).

1. **81**
2. **121**
3. **6084**
4. **15129**
5. **328329**

Solution:

1) 81

On keeping bars on the given number, we get

81 = $\overline{81}$

Here, as there is only single bar,

Therefore, the square root of 81 contain only one digit.

2) 121

On keeping bars on the given number, we get

121 = $\overline{1}\ \overline{21}$

Here, as there are two bars available,

Therefore, the square root of 121 contains only two digits.

3) 6084

On keeping bars on the given number, we get

6084 = $\overline{60}\ \overline{84}$

Here, as there are two bars available,

Therefore, the square root of 6084 contains only two digits.

4) 15129

On keeping bars on the given number, we get

15129 = $\overline{1}\ \overline{51}\ \overline{29}$

Here, as there are three bars available,

Therefore, the square root of 15129 contains only three digits.

5) 328329

On keeping bars on the given number, we get

328329 = $\overline{32}\ \overline{83}\ \overline{29}$

Here, as there are three bars available,

Therefore, the square root of 328329 contains only three digits.

Question-12) Find the square root of the following numbers (decimal numbers):

2. **89**
3. **25**
4. **89**
5. **96**
6. **16**

Solution.

1) 89

	1.7
1	$\overline{2}\ .\ \overline{89}$—1
27	189 189
	0

$\therefore \sqrt{2.89}$ = **1.7**

2) 25

	2.5
	$\overline{6}\ \ \overline{25}$

2	-4
45	225 225
	0

∴ $\sqrt{6.25}$ = **2.5**

3) 89

	8.3
8	$\overline{68}$. $\overline{89}$—64
163	489 489
	0

∴ $\sqrt{68.89}$ = **8.3**

4) 96

	6.4
6	$\overline{40}$. $\overline{96}$—36
124	496 496
	0

∴ $\sqrt{40.96}$ = **6.4**

5) 16

	5.4
1	$\overline{29}$. $\overline{16}$—25
104	416 416
	0

∴ $\sqrt{29.16}$ = **5.4**

Question-13) Find the least number that can be subtracted from the numbers given below in order to get the perfect square. And also find the square root of that perfect square:

1. **124**
2. **2049**
3. **2213**
4. **630**
5. **2824**

Solution:

1) 124

	11
1	$\overline{1}\ \overline{24}$ -1
21	24 21
	03

Here, the remainder is **3**, which represents that the square of 11 is 3 less than 124.

Hence, we will get perfect square by subtracting 3 from the 124.

Thus, the required number is = 124 – 3 = 121

Now, $\sqrt{121}$ = **11**

2) 2049

	45
4	$\overline{20}\ \overline{49}$ -16
85	449 425
	24

Here, the remainder is **24**, which represents that the square of 45 is 24 less than 2049.

Hence, we will get perfect square by subtracting 24 from the 2049.

Thus, the required number is = 2049 -24 = 2045

Now, $\sqrt{2045}$ = **45**

3) 2213

	47
4	$\overline{22}\ \overline{13}$ -16
87	613 609
	04

Here, the remainder is **4**, which represents that the square of 47 is 4 less than 2213.

Hence, we will get perfect square by subtracting 4 from the 2213.

Thus, the required number is = 2213 – 4 =2209

Now, $\sqrt{2209}$ = **47**

4) 630

	25
2	$\overline{6}\ \overline{30}$ -4
45	230 225
	05

Here, the remainder is **5**, which represents that the square of 25 is 05 less than 630.

Hence, we will get perfect square by subtracting 5 from the 630.

Thus, the required number is = 630 – 5 = 625

Now, $\sqrt{625}$ = **25**

5) 2824

	53
5	$\overline{28}\ \overline{24}$ -25
103	324 309
	15

Here, the remainder is **15**, which represents that the square of 53 is 15 less than 2824.

Hence, we will get perfect square by subtracting 15 from the 2824.

Thus, the required number is = 2824 – 15 = 2809

Now, $\sqrt{2809}$ = **53**

Question-14) Find the least number that can be added to the numbers given below in order to get the perfect square. And also find the square root of that perfect square.

1. **670**
2. **1840**
3. **355**
4. **1518**
5. **6230**

Solution:

1) 670

	25
2	$\overline{6}\ \overline{70}$ -4
45	270 225

	45

Here, the remainder is 45.

This represents that the square of 25 is less than 670.

The next number is 26 and its square is i.e. 26^2 = 676.

Thus, the required number to be added to 670 = 26^2 – 670 = **6**.

Thus, the required perfect square is

$\sqrt{676}$ = **26**

2) 1840

	42
2	$\overline{18}\ \overline{40}$ -16
82	240 164
	76

Here, the remainder is 76.

This represents that the square of 42 is less than 1840.

The next number is 43 and its square is i.e. 43^2 = 1849.

Thus, the required number to be added to 1840 = 43^2 – 1840 = **9**.

Thus, the required perfect square is

$\sqrt{1849}$ = **43**

3) 355

	18
1	$\overline{3}\ \overline{55}$ -1
28	255 224
	31

Here, the remainder is 31.

This represents that the square of 18 is less than 670.

The next number is 19 and its square is i.e. 19^2 = 361.

Thus, the required number to be added to 355 = 19^2 – 355 = **6**.

Thus, the required perfect square is 6.

$\sqrt{361}$ = **19**

4) 1518

	38
3	$\overline{15}\ \overline{18}$ -9
68	618 544
	74

Here, the remainder is 74.

This represents that the square of 38 is less than 1518.

The next number is 39 and its square is i.e. 39^2 = 1521.

Thus, the required number to be added to 1518 = 39^2 – 1518 = **3**.

Thus, the required perfect square is

$\sqrt{1521}$ = **39**

5) 6230

	78
7	$\overline{62}\ \overline{30}$ -49
148	1330 1184
	146

Here, the remainder is 146.

This represents that the square of 78 is less than 6230.

The next number is 79 and its square is i.e. 79^2 = 6241.

Thus, the required number to be added to 6230 = 79^2 – 6230 = **11**.

Thus, the required perfect square is

$\sqrt{6241}$ = **79**

Question-15) If the area of a square is $841m^2$ is given find out the length of a side.

Solution:

Say, p *m* is the length of a side of a square.

Given that, area of a square = p^2 = $841m^2$

∴ p = $\sqrt{841}$

	29
2	$\overline{8}\ \overline{41}$ -4
49	441 441
	0

∴ $\sqrt{841}$ = 29

∴ p = 29 *m*

Thus, the length of a side of a square is 29 *m*.

Question -16) A right angled triangle XYZ, $\angle Y = 90^\circ$.

1. **Given that, XY = 3 *mm*, YZ = 4 *mm*then XZ = _____.**
2. **Given that, XZ= 13 *mm*, YZ = 5 *mm*then XY = _____.**

Solution:

1) In $\triangle XYZ$, $\angle Y = 90^\circ$ is given.

∴ By using "Pythagoras theorem", we get

$XZ^2 = XY^2 + YZ^2$ $XZ^2 = (3mm)^2 + (4mm)^2$ $XZ^2 = (9+16)mm = 25mm$ $XZ = \sqrt{(25mm^2)} = 5mm$

2) In $\triangle XYZ$, $\angle Y = 90^\circ$ is given.

∴ By using "Pythagoras theorem", we get

$XZ^2 = XY^2 + YZ^2$ $(13mm)^2 = XY^2 + (5mm)^2$ $(13mm)^2 - (5mm)^2 = XY^2$ Misplaced &
$XY = \sqrt{(144mm^2)} = 12mm$

Question-17) A school has 1400 books in the library. The librarian wants to arrange it in such a way that number of Horizontal lines of the books and number of vertical lines of the books are same. Find out the minimum number of books that a librarian will require to add, to make this Horizontal and vertical lines same.

Solution:

Here, it is given that there are 1400 books in the library and the numbers of horizontal and vertical lines of books are same.

For finding minimum number of books that a librarian will require to add, to make this Horizontal and vertical lines same,

We need to find the number of books that should be added to 1400 to get it done.

So, calculating the square root of 1400 and finding the perfect square out of it.

	37
3	$\overline{14}\ \overline{00}$ -9
67	500 469

	31

Here, the remainder is 31.

This represents that the square of 37 is less than 1400.

The next number is 38 and its square is i.e. 38^2 = 1444.

Thus, the required number to be added to 1400 = 38^2 – 1400 = 44.

Thus, the required perfect square is

$\sqrt{1444}$ = 38

Thus, the required number of books to be added is 44 and there will be 38 horizontal and 38 vertical lines made.

Question-18) There are 820 students in a ground. Teacher instructed students to stand in such an order that the number of rows and number of columns remain same. Calculate the number of students that would left out of this order or arrangement.

Solution:

Here, there are 820 students in a ground. Teacher instructed students to stand in such an order that the number of rows and number of columns remain same.

For finding number of students that would left out of this order or arrangement,

We need to find the square root of 820 by long division method.

	28
2	$\overline{8}\ \overline{20}$ -4
48	420 384
	36

Here, the remainder is 36, which represents that the square of 28 is 36 less than 1820.

Hence, we will get perfect square by subtracting 36 from the 820.

Thus, the required number is = 820 – 36 = 1784

Now, $\sqrt{1784}$ = 28

So, the students will form 28 rows and 28 columns.

The number of student that left out of the arrangement is 36.

Question-19) Find out the possible number at the unit's place in the square root of the number given below:

1. **99980001**
2. **106276**
3. **6241**
4. **625**

Solution.

1) Here, the 1 is at the units place in the given number.

From this possible number at the unit's place in the square root of may be 1 or 9.

∴ unit digit of the square root of 99980001 is either **1 or 9.**

2) 106276

From this possible number at the unit's place in the square root of may be 4 or 6.

∴ unit digit of the square root of 106276 is either **4 or 6**.

3) 6241

From this possible number at the unit's place in the square root of may be 1 or 9.

∴ unit digit of the square root of 6241 is either **1 or 9**.

4) 625

From this possible number at the unit's place in the square root will be 5.

∴unit digit of the square root is **5**.

Question-20) Find out which number is not perfect square from the numbers given below. (Without doing any calculations)

1. **163**
2. **267**
3. **418**
4. **625**

Solution:

"The square of numbers generally ends with 0,1,5,6, or 9. Perfect square always ends with even numbers of zeros."

1) 163

Digit at unit's place = 3

∴this number is **not a perfect square**.

2) 267

Digit at unit's place = 7

∴ this number is **not a perfect square**.

3) 418

Digit at unit's place = 8

∴this number is **not a perfect square**.

4) 625

Digit at unit's place = 5

∴ this number **is a perfect square**.

Question-21) Calculate the square roots of 225 and 289 by the method of repeated subtraction.

Solution:

Now the "sum of first n odd numbers is n^2".

For 225

$\sqrt{225}$
225 – 1 = 224
224 – 3 = 221
221 – 5 = 216
216 – 7 = 209
209 – 9 = 200
200 – 11 = 189
189 – 13 = 176
176 – 15 = 161
161 – 17 = 144
144 – 19 = 125
125 – 21 = 104
104 – 23 = 81
81 – 25 = 56
56 – 27 = 29
29 – 29 = 0

Here, as we get zero at 15th step

Thus, $\sqrt{225}$ = 15

For 289

$\sqrt{289}$
289 – 1 = 288
288 – 3 = 285
285 – 5 = 280
280 – 7 = 273
273 – 9 = 264
264 – 11 = 253
253 – 13 = 240
240 – 15 = 225

240 – 15 = 225
225 – 17 = 208
208 – 19 = 189
189 – 21 = 168
168 – 23 = 145
145 – 25 = 120
120 – 27 = 93
93 – 29 = 64
64 – 31 = 33
33 – 33 = 0

Here, as we get zero at 17th step

Thus, $\sqrt{289}$ = 17

Question-22) Using Prime Factorisation method find the square roots of the numbers given below.

1. **625**
2. **900**
3. **1521**
4. **3364**
5. **2304**
6. **9801**
7. **1089**
8. **7396**
9. **484**
10. **6400**

Solution:

1) 625

5	625
5	125
5	25
5	5
	1

625 = 5*5 * 5*5

$\sqrt{625} = 5 * 5 = 25$

2) 900

2	900
2	450
3	225
3	75
5	25
5	5
	1

900 = 2*2 * 3*3 * 5*5

$\sqrt{900} = 2 * 3 * 5 = 30$

3) 1521

3	1521
3	507
13	169
13	13
	1

1521 = 3*3 * 13*13

$\sqrt{1521} = 3 * 13 = 39$

-

4) 3364

2	3364
2	1682
29	841
29	29
	1

3364 = 2*2 * 29*29

$\sqrt{3364} = 2 * 29 = 58$

5) 2304

2	2304
2	1152
2	576
2	288
2	144
2	72
2	36
2	18
3	9
3	3
	1

2304 = 2*2 * 2*2 * 2*2 * 2*2 * 3*3

$\sqrt{2304} = 2 * 2 * 2 * 2 * 3 = 48$

6) 9801

3	9801
3	3267
3	1089
3	363
11	121
11	11

	1

9801 = 3*3 * 3*3 * 11*11

$\sqrt{9801} = 3 * 3 * 11 = 99$

7) 1089

3	1089
3	363
11	121
11	11
	1

1089 = 3*3 * 11*11

$\sqrt{1089} = 3 * 11 = 33$

8) 7396

2	7396
2	3698
43	1849
43	43
	1

7396 = 2*2 * 43*43

$\sqrt{7396} = 2 * 43 = 86$

9) 484

2	484
2	242
11	121
11	11
	1

484 = 2*2 * 11*11

$\sqrt{484} = 2 * 11 = 22$

10) 6400

2	6400
2	3200
2	1600
2	800
2	400
2	200
2	100

2	50
5	25
5	5
	1

6400 = 2*2 * 2*2 * 2*2 * 2*2 * 5*5

$\sqrt{6400} = 2 * 2 * 2 * 2 * 5 = 80$

Question-23) Find the smallest integer by which the numbers given below should be multiplied in order to get a perfect square. Also find the square root of that perfect square.

1. **1584**
2. **3825**
3. **720**
4. **3380**
5. **1872**
6. **6**

Solution:

1) 1584

2	1584
2	792
2	396
2	198
3	99
3	33
11	11
	1

1594 = 2*2 * 2*2 * 3*3 * 11

This prime factor 11 is not having a pair.

As 11 is not having pair the given number cannot be a perfect square. So, we need to multiply with 11 in order to make a pair.

1594*11 = 2*2 * 2*2 * 3*3 * 11*11

∴ 17534 = 2*2 * 2*2 * 3*3 * 11*11

$\sqrt{17534} = 2 * 2 * 3 * 11 = 132$

2) 3825

3	3825
3	1275
5	425
5	85
17	17
	1

3825 = 3*3 * 5*5 * 17

This prime factor 17 is not having a pair.

As 17 is not having pair the given number cannot be a perfect square. So, we need to multiply with 17 in order to make a pair.

3825*17 = 3*3 * 5*5 * 17*17

∴ 65025 = 3*3 * 5*5 * 17*17

$\sqrt{65025} = 3 * 5 * 17 = 255$

3) 720

2	720
2	360
2	180
2	90
3	45
3	15
5	5
	1

720 = 2*2 * 2*2 * 3*3 * 5

This prime factor 5 is not having a pair.

As 5 is not having pair the given number cannot be a perfect square. So, we need to multiply with 5 in order to make a pair.

720*5 = 2*2 * 2*2 * 3*3 * 5*5

∴ 3600 = 2*2 * 2*2 * 3*3 * 5*5

$\sqrt{3600} = 2 * 2 * 3 * 5 = 60$

4) 3380

2	3380
2	1690
5	845
13	169
13	13
	1

3380 = 2*2 * 5 * 13*13

This prime factor 5 is not having a pair.

As 5 is not having pair the given number cannot be a perfect square. So, we need to multiply with 5 in order to make a pair.

3380*5 = 2*2 * 13*13 * 5*5

∴ 16900 = 2*2 * 13*13 * 5*5

$\sqrt{16900} = 2 * 5 * 13 = 130$

5) 1872

2	1872
2	936
2	468
2	234
3	117
3	39
13	13
	1

1872 = 2*2 * 2*2 * 3*3 * 13

This prime factor 13 is not having a pair.

As 13 is not having pair the given number cannot be a perfect square. So, we need to multiply with 13 in order to make a pair.

1872*13 = 2*2 * 2*2 * 3*3 * 13*13

∴ 24336 = 2*2 * 2*2 * 3*3 * 13*13

$\sqrt{24336} = 2 * 2 * 3 * 13 = 156$

6) 2268

2	2268
2	1134
3	567
3	189
3	63
3	21
7	7
	1

2268 = 2*2 * 3*3 * 3*3 * 7

This prime factor 7 is not having a pair.

As 7 is not having pair the given number cannot be a perfect square. So, we need to multiply with 7 in order to make a pair.

2268*7 = 2*2 * 3*3 * 3*3 * 7*7

∴15876 = 2*2 * 3*3 * 3*3 * 7*7

$\sqrt{15876} = 2 * 3 * 3 * 7 = 126$

Question-24) The employees of "XYZ" company has done a charity of Rs. 4096 in all, for an orphanage. The amount donated by the single person is equal to the number of employees in the company. Find the number of

employees in the company.

Solution:

Here, it is given that the amount donated by the single person is equal to the number of employees in the company.

So, the number of employees in the company can be calculated by calculating the square root of the amount of charity.

∴Number of employees in the company = $\sqrt{4096}$

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

4096 = 2*2 * 2*2 * 2*2 * 2*2 * 2*2 * 2*2

∴ $\sqrt{4096}$ = 2*2*2*2*2*2

∴ $\sqrt{4096}$ = 64

Therefore, there are 64 employees in the Company.

Question-25) 7225 books are to be kept in a bookshelf of a library in such a way that each column contains as many books as the number of columns. Find out the number of column and number of books in each column.

Solution:

Here, it is given that each column contains as many books as the number of columns.

So, it can be said from the above statement that,

Number of books in each column = Number of Columns

∴ Total number of books = Number of columns * Number of books in each column

∴ Number of columns * Number of books in each column = 7225

$(Number\ of\ books\ in\ each\ column)^2$ = 7225

∴ Number of books in each column = $\sqrt{7225}$

5	7225
5	1445
17	289
17	17
	1

7225 = 5*5 * 17*17

$\therefore \sqrt{7225}$ = 5*17

$\therefore \sqrt{7225}$ = 85

∴ Number of books in each column = Number of Columns = 85

So, the number of columns and the number of books in each column is 85.

Question-26) For the numbers given below find out the smallest square number is divisible by each of them.

16, 27 and 40

Solution:

To, find the smallest square number is divisible by 16, 27 and 40 we need to find the L.C.M of these three numbers.

2	16	36	40
2	8	18	20
2	4	9	10
2	2	9	5
3	1	9	5
3	1	3	5
5	1	1	5
	1	1	1

Thus, L.C.M of 16, 27 and 40 = 2*2 * 2*2 * 3*3 * 5 = 720

This prime factor 5 is not having a pair.

As 5 is not having pair the given number cannot be a perfect square. So, we need to multiply with 5 in order to make a perfect square.

720*5 = 3600

Thus, the required number is 3600.

Question-27) For the numbers given below find out the smallest square number is divisible by each of them.

9, 14 and 24

Solution:

To, find the smallest square number is divisible by 16, 27 and 40 we need to find the L.C.M of these three numbers.

2	9	14	24
2	9	7	12
2	9	7	6
3	9	7	3
3	3	7	1
5	1	7	5
7	1	7	1
	1	1	1

Thus, L.C.M of 9, 14 and 24 = 2*2 * 2 * 3*3 * 5 * 7 = 2520

As 2, 5 and 7 are not having pair the given number cannot be a perfect square. So, we need to multiply with 2, 5 and 7 in order to make a perfect square.

order to make a perfect square.

2520*2*5*7 = 176400

Thus, the required number is 176400.

Question-28) Find out the square of the numbers given below;

1. **42**
2. **45**
3. **96**
4. **83**
5. **61**
6. **56**

Solution:

1) 42

$42^2 = (40 + 2)^2$

= 40(40 + 2) + 2(40 + 2)

= 40^2 + 40*2 + 2*40 + 2^2

= 1600 + 80 + 80 + 4

= 1764

2) 45

$45^2 = (40 + 5)^2$

= 40(40 + 5) + 5(40 + 5)

= 40^2 + 40*5 + 5*40 + 5^2

= 1600 + 200 + 200 + 25

= 2025

3) 96

$96^2 = (90 + 6)^2$

= 90(90 + 6) + 6(90 + 6)

= 90^2 + 90*6 + 6*90 + 6^2

= 8100 + 540 + 540 + 36

= 9216

4) 83

$83^2 = (80 + 3)^2$

= 80(80 + 3) + 3(80 + 3)

= 80^2 + 80*3 + 3*80 + 3^2

= 6400 + 240 + 240 + 9

= 6889

5) 61

$61^2 = (60+1)^2$

= 60(60 + 1) + 1(60 + 1)

= 60^2 + 60*1 + 1*60 + 1^2

= 3600 + 60 + 60 1

= 3721

6) 56

$56^2 = (50+6)^2$

= 50(50 + 6) + 6(50 + 6)

= 50^2 + 50*6 + 6*50 + 6^2

= 2500 + 300 + 300 + 36

= 3136

Question-29) Write a Pythagorean triplet whose one member is

1. **12**
2. **22**
3. **36**
4. **28**

Solution:

$x > 1, 2x, x^2 - 1, x^2 + 1$ **forms a Pythagorean Triplet**

Where, $x \in N$

1) 12

Let us assume $x^2 + 1 = 12, then\ x^2 = 11$

Thus, the value of x will be non-integer.

So, let us assume $x^2 - 1 = 12, then\ x^2 = 13$

Thus, the value of x will be non-integer.

So, let us assume 2x = 12

∴ x = 6

∴ the Pythagorean triplets are $2*6, 6^2 - 1, 6^2 + 1$ **i.e. 12,35,37.**

2) 22

Let us assume $x^2 + 1 = 22, then\ x^2 = 21$

Thus, the value of x will be non-integer.

So, let us assume $x^2 - 1 = 22, then\ x^2 = 23$

Thus, the value of x will be non-integer.

So, let us assume 2x = 22

∴ x = 11

∴ the Pythagorean triplets are $2*11, 11^2-1, 11^2+1$ i.e. 22,120,122.

3) 28

Let us assume $x^2+1=28, then\ x^2=27$

Thus, the value of x will be non-integer.

So, let us assume $x^2-1=28, then\ x^2=29$

Thus, the value of x will be non-integer.

So, let us assume 2x = 28

∴ x = 14

∴ the Pythagorean triplets are $2*14, 14^2-1, 14^2+1$ i.e. 28,195,197.

4) 36

Let us assume $x^2+1=36, then\ x^2=35$

Thus, the value of x will be non-integer.

So, let us assume $x^2-1=36, then\ x^2=37$

Thus, the value of x will be non-integer.

So, let us assume 2x = 36

∴ x = 18

∴ the Pythagorean triplets are $2*18, 18^2-1, 18^2+1$ i.e. 36,323,325.