



## Exercise 6.1

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1. What will be the unit digit of the squares of the following numbers?

i. 81 ii. 272 iii. 799 iv. 3853

v. 1234 vi.

26387 vii.

52698 viii.

99880 ix.

12796

x. 55555 Solution:

The unit digit of square of a number having 'a' at its unit place ends with  $axa$ .

i. The unit digit of the square of a number having digit 1 as unit's place is 1.

∴ Unit digit of the square of number 81 is equal to 1.

ii. The unit digit of the square of a number having digit 2 as unit's place is 4.

∴ Unit digit of the square of number 272 is equal to 4.

iii. The unit digit of the square of a number having digit 9 as unit's place is 1.

∴ Unit digit of the square of number 799 is equal to 1.

iv. The unit digit of the square of a number having digit 3 as unit's place is 9.

∴ Unit digit of the square of number 3853 is equal to 9.

v. The unit digit of the square of a number having digit 4 as unit's place is 6.

∴ Unit digit of the square of number 1234 is equal to 6.

vi. The unit digit of the square of a number having digit 7 as unit's place is 9.

∴ Unit digit of the square of number 26387 is equal to 9.

vii. The unit digit of the square of a number having digit 8 as unit's place is 4.

∴ Unit digit of the square of number 52698 is equal to 4.

viii. The unit digit of the square of a number having digit 0 as unit's place is 0.

∴ Unit digit of the square of number 99880 is equal to 0.

ix. The unit digit of the square of a number having digit 6 as unit's place is 6.

∴ Unit digit of the square of number 12796 is equal to 6.



- x. The unit digit of the square of a number having digit 5 as unit's place is 5.
- ∴ Unit digit of the square of number 55555 is equal to 5.

**2. The following numbers are obviously not perfect squares. Give reason. i.**

**1057 ii. 23453 iii. 7928 iv. 222222**

**v. 64000 vi.**

**89722 vii.**

**222000 viii.**

**505050**

Solution:

We know that natural numbers ending in the digits 0, 2, 3, 7 and 8 are not perfect squares. i.

1057 ⇒ Ends with 7 ii. 23453 ⇒ Ends with 3 iii. 7928 ⇒ Ends with 8

iv. 222222 ⇒ Ends with 2

v. 64000 ⇒ Ends with 0 vi. 89722 ⇒ Ends with 2

vii. 222000 ⇒ Ends with 0

viii. 505050 ⇒ Ends with 0

**3. The squares of which of the following would be odd numbers?**

**i. 431 ii. 2826 iii. 7779 iv. 82004**

Solution:

We know that the square of an odd number is odd and the square of an even number is even.

i. The square of 431 is an odd number. ii.

The square of 2826 is an even number. iii.

The square of 7779 is an odd number. iv.

The square of 82004 is an even number.

**4. Observe the following pattern and find the missing numbers.  $11^2 = 121$**

**$101^2 = 10201$**

**$1001^2 = 1002001$   $100001^2 = 1$**

**.....2.....1  $10000001^2 =$**

.....

Solution:



We observe that the square on the number on R.H.S of the equality has an odd number of digits such that the first and last digits both are 1 and middle digit is 2. And the number of zeros between left most digits 1

and the middle digit 2 and right most digit 1 and the middle digit 2 is same as the number of zeros in the given number.

$$\therefore 100001^2 = 10000200001$$

$$10000001^2 = 100000020000001$$

**5. Observe the following pattern and supply the missing numbers.  $11^2 = 121$**

$$101^2 = 10201$$

$$10101^2 = 102030201$$

$$1010101^2 = \dots\dots\dots 2$$

$$= 10203040504030201$$

Solution:

We observe that the square on the number on R.H.S of the equality has an odd number of digits such that the first and last digits both are 1. And, the square is symmetric about the middle digit. If the middle digit is 4, then the number to be squared is 10101 and its square is 102030201.

$$\text{So, } 1010101^2 = 1020304030201$$

$$101010101^2 = 10203040505030201$$

**6. Using the given pattern, find the missing numbers.  $1^2 + 2^2 + 2^2 = 3^2$**

$$2^2 + 3^2 + 6^2 = 7^2$$

$$3^2 + 4^2 + 12^2 = 13^2$$

$$4^2 + 5^2 + \underline{\quad} = 21^2$$

$$5 + \underline{\quad} + 30^2 = 31^2$$

$$6 + 7 + \underline{\quad} = \underline{\quad}^2$$

Given,  $1^2 + 2^2 + 2^2 = 3^2$

$$\text{i.e } 1^2 + 2^2 + (1 \times 2)^2 = (1^2 + 2^2 - 1 \times 2)^2$$

$$2^2 + 3^2 + 6^2 = 7^2$$

$$\therefore 2^2 + 3^2 + (2 \times 3)^2 = (2^2 + 3^2 - 2 \times 3)^2$$

$$3^2 + 4^2 + 12^2 = 13^2$$

$$\therefore 3^2 + 4^2 + (3 \times 4)^2 = (3^2 + 4^2 - 3 \times 4)^2$$

$$4^2 + 5^2 + (4 \times 5)^2 = (4^2 + 5^2 - 4 \times 5)^2$$



$$\therefore 4^2 + 5^2 + 20^2 = 21^2$$

$$5^2 + 6^2 + (5 \times 6)^2 = (5^2 + 6^2 - 5 \times 6)^2$$

$$\therefore 5^2 + 6^2 + 30^2 = 31^2$$

$$6^2 + 7^2 + (6 \times 7)^2 = (6^2 + 7^2 - 6 \times 7)^2$$

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

**7. Without adding, find the sum.**

**i.  $1 + 3 + 5 + 7 + 9$**

Solution:

Sum of first five odd number =  $(5)^2 = 25$  **ii. 1**

**$+ 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19$**

Solution:

Sum of first ten odd number =  $(10)^2 = 100$  **iii.  $1 + 3 + 5 +$**

**$7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23$**  Solution:

Sum of first thirteen odd number =  $(12)^2 = 144$  **8.**

**(i) Express 49 as the sum of 7 odd numbers.**

**Solution:**

We know, sum of first  $n$  odd natural numbers is  $n^2$ . Since,  $49 = 7^2 \therefore 49 =$

sum of first 7 odd natural numbers =  $1 + 3 + 5 + 7 + 9 + 11 + 13$  **(ii)**

**Express 121 as the sum of 11 odd numbers.**

**Solution:**

Since,  $121 = 11^2$

$\therefore 121 =$  sum of first 11 odd natural numbers =  $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21$

**9. How many numbers lie between squares of the following numbers?**

**i. 12 and 13 ii. 25 and 26 iii. 99 and 100**

Solution:

Between  $n^2$  and  $(n+1)^2$ , there are  $2n$  non-perfect square numbers.

i. 122 and 132 there are  $2 \times 12 = 24$  natural numbers. ii.

252 and 262 there are  $2 \times 25 = 50$  natural numbers. iii.

992 and 1002 there are  $2 \times 99 = 198$  natural numbers.



## Exercise 6.2

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1. Find the square of the following numbers.

i. 32

ii. 35

iii. 86

iv. 93

v. 71

vi. 46

Solution:

i.  $(32)^2$

$$= (30 + 2)^2$$

$$= (30)^2 + (2)^2 + 2 \times 30 \times 2 \text{ [Since, } (a+b)^2 = a^2 + b^2 + 2ab \text{]}$$

$$= 900 + 4 + 120 =$$

$$1024$$

ii.  $(35)^2$

$$= (30 + 5)^2$$

$$= (30)^2 + (5)^2 + 2 \times 30 \times 5 \text{ [Since, } (a+b)^2 = a^2 + b^2 + 2ab \text{]}$$

$$= 900 + 25 + 300$$

$$= 1225$$

iii.  $(86)^2$

$$= (90 - 4)^2$$

$$= (90)^2 + (4)^2 - 2 \times 90 \times 4 \text{ [Since, } (a-b)^2 = a^2 + b^2 - 2ab \text{]}$$

$$= 8100 + 16 - 720$$

$$= 8116 - 720 =$$

$$7396$$

iv.  $(93)^2$

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



$$= (90)^2 + (3)^2 + 2 \times 90 \times 3 \text{ [Since, } (a+b)^2 = a^2 + b^2 + 2ab \text{]}$$

$$= 8100 + 9 + 540$$

$$= 8649$$

v.  $(71)^2$

$$= (70+1)^2$$

$$= (70)^2 + (1)^2 + 2 \times 70 \times 1 \text{ [Since, } (a+b)^2 = a^2 + b^2 + 2ab \text{]}$$

$$= 4900 + 1 + 140 =$$

$$5041$$

vi.  $(46)^2$

$$= (50 - 4)^2$$

$$= (50)^2 + (4)^2 - 2 \times 50 \times 4 \text{ [Since, } (a+b)^2 = a^2 + b^2 + 2ab \text{]}$$

$$= 2500 + 16 - 400$$

$$= 2116$$

**2. Write a Pythagorean triplet whose one member is.**

**i. 6 ii. 14 iii. 16 iv. 18**

Solution:

For any natural number  $m$ , we know that  $2m, m^2-1, m^2+1$  is a Pythagorean triplet. i.

$$2m = 6 \Rightarrow m = 6/2 = 3 \quad m^2-1 = 3^2-1 = 9-1 = 8$$

$$m^2+1 = 3^2+1 = 9+1 = 10$$

$\therefore (6, 8, 10)$  is a Pythagorean triplet. ii.

$$2m = 14$$

$$\Rightarrow m = 14/2 = 7 \quad m^2-1 =$$

$$7^2-1 = 49-1 = 48 \quad m^2+1 =$$

$$7^2+1 = 49+1 = 50$$

$\therefore (14, 48, 50)$  is not a Pythagorean triplet. iii.

$$2m = 16$$

$$\Rightarrow m = 16/2 = 8 \quad m^2-1 =$$

$$8^2-1 = 64-1 = 63 \quad m^2+1 =$$

$$8^2+1 = 64+1 = 65$$



$\therefore (16, 63, 65)$  is a Pythagorean triplet.

iv.  $2m = 18$

$$\Rightarrow m = 18/2 = 9 \quad m^2 - 1 =$$

$$9^2 - 1 = 81 - 1 = 80 \quad m^2 + 1 =$$

$$9^2 + 1 = 81 + 1 = 82$$

$\therefore (18, 80, 82)$  is a Pythagorean triplet.

### Exercise 6.3

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**1. What could be the possible 'one's' digits of the square root of each of the following numbers? i.**

**9801 ii. 99856 iii. 998001 iv. 657666025** Solution:

i. We know that the unit's digit of the square of a number having digit as unit's place 1 is 1 and also 9 is 1 [ $9^2=81$  whose unit place is 1].

$\therefore$  Unit's digit of the square root of number 9801 is equal to 1 or 9.

ii. We know that the unit's digit of the square of a number having digit as unit's place 6 is 6 and also 4 is 6 [ $6^2=36$  and  $4^2=16$ , both the squares have unit digit 6].

$\therefore$  Unit's digit of the square root of number 99856 is equal to 6. iii. We know that the unit's digit of the square of a number having digit as unit's place 1 is 1 and also 9 is 1 [ $9^2=81$  whose unit place is 1].

$\therefore$  Unit's digit of the square root of number 998001 is equal to 1 or 9.

iv. We know that the unit's digit of the square of a number having digit as unit's place 5 is 5.

$\therefore$  Unit's digit of the square root of number 657666025 is equal to 5.

**2. Without doing any calculation, find the numbers which are surely not perfect squares. i. 153 ii.**

**257 iii. 408 iv. 441**

Solution:

We know that natural numbers ending with the digits 0, 2, 3, 7 and 8 are not perfect square. i.

153  $\Rightarrow$  Ends with 3.  $\therefore$ , 153 is not a perfect square ii. 257  $\Rightarrow$  Ends with 7  $\therefore$ , 257 is not a perfect

square iii. 408  $\Rightarrow$  Ends with 8



$\therefore$ , 408 is not a perfect square iv.

441  $\Rightarrow$  Ends with 1

$\therefore$ , 441 is a perfect square.

**3. Find the square roots of 100 and 169 by the method of repeated subtraction.**

Solution:

100

100 - 1 = 99

99 - 3 = 96

96 - 5 = 91

91 - 7 = 84

84 - 9 = 75

75 - 11 = 64

64 - 13 = 51

51 - 15 = 36

36 - 17 = 19

19 - 19 = 0

Here, we have performed subtraction ten times.

$\therefore \sqrt{100} = 10$

169

169 - 1 = 168

168 - 3 = 165

165 - 5 = 160

160 - 7 = 153

153 - 9 = 144

144 - 11 = 133

133 - 13 = 120

120 - 15 = 105

105 - 17 = 88

88 - 19 = 69

69 - 21 = 48





$$48 - 23 = 25$$

$$25 - 25 = 0$$

Here, we have performed subtraction thirteen times.

$$\therefore \sqrt{169} = 13$$

4. Find the square roots of the following numbers by the Prime Factorisation Method. i.

729 ii. 400 iii. 1764 iv. 4096

v. 7744 vi.

9604 vii.

5929 viii.

9216 ix.

529

x. 8100 Solution:

i.

$$\begin{array}{r} 3 \overline{) 729} \\ \underline{3} \phantom{24} 3 \\ 3 \phantom{2} 43 \\ \underline{3} \phantom{2} 81 \\ 3 \phantom{2} 27 \\ \underline{3} \phantom{2} 9 \\ 3 \phantom{2} 3 \\ \underline{3} \phantom{2} 1 \end{array}$$

$$729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 1$$

$$\Rightarrow 729 = (3 \times 3) \times (3 \times 3) \times (3 \times 3)$$

$$\Rightarrow 729 = (3 \times 3 \times 3) \times (3 \times 3 \times 3)$$

$$\Rightarrow 729 = (3 \times 3 \times 3)^2 \Rightarrow$$

$$\sqrt{729} = 3 \times 3 \times 3 = 27$$

ii.



2	400
2	200
2	100
2	50
5	25
5	5
	1

$$400 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 1$$

$$\Rightarrow 400 = (2 \times 2) \times (2 \times 2) \times (5 \times 5)$$

$$\Rightarrow 400 = (2 \times 2 \times 5) \times (2 \times 2 \times 5)$$

$$\Rightarrow 400 = (2 \times 2 \times 5)^2 \Rightarrow$$

$$\sqrt{400} = 2 \times 2 \times 5 = 20$$

iii.

2	1764
2	882
3	441
3	147
7	49
7	7
	1

$$1764 = 2 \times 2 \times 3 \times 3 \times 7 \times 7$$

$$\Rightarrow 1764 = (2 \times 2) \times (3 \times 3) \times (7 \times 7)$$

$$\Rightarrow 1764 = (2 \times 3 \times 7) \times (2 \times 3 \times 7)$$

$$\Rightarrow 1764 = (2 \times 3 \times 7)^2 \Rightarrow$$

$$\sqrt{1764} = 2 \times 3 \times 7 = 42$$

iv.



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

$$4096 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$\Rightarrow 4096 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2)$$

$$\Rightarrow 4096 = (2 \times 2 \times 2 \times 2 \times 2) \times (2 \times 2 \times 2 \times 2 \times 2)$$

$$\Rightarrow 4096 = (2 \times 2 \times 2 \times 2 \times 2)^2 \Rightarrow$$

$$\sqrt{4096} = 2 \times 2 \times 2 \times 2 \times 2 = 64$$

v.



$$\begin{array}{r} 2 \overline{) 7744} \\ \underline{2 \quad 3872} \\ 2 \quad 1936 \\ \underline{2 \quad 968} \\ 2 \quad 484 \\ \underline{2 \quad 242} \\ 11 \quad 121 \\ \underline{11 \quad 11} \\ 1 \end{array}$$

$$7744 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 11 \times 11 \times 1$$

$$\Rightarrow 7744 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (11 \times 11)$$

$$\Rightarrow 7744 = (2 \times 2 \times 2 \times 11) \times (2 \times 2 \times 2 \times 11)$$

$$\Rightarrow 7744 = (2 \times 2 \times 2 \times 11)^2 \Rightarrow$$

$$\sqrt{7744} = 2 \times 2 \times 2 \times 11 = 88$$

vi.

$$\begin{array}{r} 2 \overline{) 9604} \\ \underline{2 \quad 4802} \\ 7 \quad 2401 \\ \underline{7 \quad 343} \\ 7 \quad 49 \\ \underline{7 \quad 7} \\ 1 \end{array}$$

$$9604 = 62 \times 2 \times 7 \times 7 \times 7 \times 7$$

$$\Rightarrow 9604 = (2 \times 2) \times (7 \times 7) \times (7 \times 7)$$

$$\Rightarrow 9604 = (2 \times 7 \times 7) \times (2 \times 7 \times 7)$$

$$\Rightarrow 9604 = (2 \times 7 \times 7)^2$$



$$\Rightarrow \sqrt{9604} = 2 \times 7 \times 7 = 98$$

vii.

$$\begin{array}{r|l} 7 & 5929 \\ \hline 7 & 847 \\ \hline 11 & 121 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

$$5929 = 7 \times 7 \times 11 \times 11$$

$$\Rightarrow 5929 = (7 \times 7) \times (11 \times 11)$$

$$\Rightarrow 5929 = (7 \times 11) \times (7 \times 11)$$

$$\Rightarrow 5929 = (7 \times 11)^2 \Rightarrow$$

$$\sqrt{5929} = 7 \times 11 = 77$$

viii.



2	9216
2	4608
2	2304
2	1152
2	576
2	288
2	144
2	72
2	36
2	18
3	9
3	3
	1

$$9216 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 1 \Rightarrow 9216 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (3 \times 3)$$

$$\Rightarrow 9216 = (2 \times 2 \times 2 \times 2 \times 2 \times 3) \times (2 \times 2 \times 2 \times 2 \times 2 \times 3)$$

$$\Rightarrow 9216 = 96 \times 96$$

$$\Rightarrow 9216 = (96)^2$$

$$\Rightarrow \sqrt{9216} = 96$$

ix.

23	529
23	23
	1

$$529 = 23 \times 23$$

$$529 = (23)^2 \Rightarrow \sqrt{529}$$

$$= 23$$

x.



2	8100
2	4050
3	2025
3	675
3	225
3	75
5	25
5	5
	1

$$8100 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 1$$

$$\Rightarrow 8100 = (2 \times 2) \times (3 \times 3) \times (3 \times 3) \times (5 \times 5)$$

$$\Rightarrow 8100 = (2 \times 3 \times 3 \times 5) \times (2 \times 3 \times 3 \times 5)$$

$$\Rightarrow 8100 = 90 \times 90$$

$$\Rightarrow 8100 = (90)^2$$

$$\Rightarrow \sqrt{8100} = 90$$

5. For each of the following numbers, find the smallest whole number by which it should be multiplied so as to get a perfect square number. Also find the square root of the square number so obtained. i. 252 ii. 180  
iii. 1008 iv. 2028

v. 1458 vi.

768

Solution:

i.



2	252
2	126
3	63
3	21
7	7
	1

$$252 = 2 \times 2 \times 3 \times 3 \times 7$$

$$= (2 \times 2) \times (3 \times 3) \times 7$$

Here, 7 cannot be paired.

∴ We will multiply 252 by 7 to get perfect square.

$$\text{New number} = 252 \times 7 = 1764$$

2	1764
2	882
3	441
3	147
7	49
7	7
	1

$$1764 = 2 \times 2 \times 3 \times 3 \times 7 \times 7$$

$$\Rightarrow 1764 = (2 \times 2) \times (3 \times 3) \times (7 \times 7)$$

$$\Rightarrow 1764 = 2^2 \times 3^2 \times 7^2$$

$$\Rightarrow 1764 = (2 \times 3 \times 7)^2 \Rightarrow$$

$$\sqrt{1764} = 2 \times 3 \times 7 = 42$$

ii.





2	180
2	90
3	45
3	15
5	5
	1

$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

$$= (2 \times 2) \times (3 \times 3) \times 5$$

Here, 5 cannot be paired.

$\therefore$  We will multiply 180 by 5 to get perfect square.

$$\text{New number} = 180 \times 5 = 900$$

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

$$900 = 2 \times 2 \times 3 \times 3 \times 5 \times 5 \times 1$$

$$\Rightarrow 900 = (2 \times 2) \times (3 \times 3) \times (5 \times 5)$$

$$\Rightarrow 900 = 2^2 \times 3^2 \times 5^2$$

$$\Rightarrow 900 = (2 \times 3 \times 5)^2$$

$$\Rightarrow \sqrt{900} = 2 \times 3 \times 5 = 30$$

iii.



2	1008
2	504
2	252
2	126
3	63
3	21
7	7
	1

$$1008 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$$

$$= (2 \times 2) \times (2 \times 2) \times (3 \times 3) \times 7$$

Here, 7 cannot be paired.

$\therefore$  We will multiply 1008 by 7 to get perfect square.

$$\text{New number} = 1008 \times 7 = 7056$$

2	7056
2	3528
2	1764
2	882
3	441
3	147
7	49
7	7
	1

$$7056 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7 \times 7$$

$$\Rightarrow 7056 = (2 \times 2) \times (2 \times 2) \times (3 \times 3) \times (7 \times 7)$$

$$\Rightarrow 7056 = 2^2 \times 2^2 \times 3^2 \times 7^2$$



$$\Rightarrow 7056 = (2 \times 2 \times 3 \times 7)^2 \Rightarrow$$

$$\sqrt{7056} = 2 \times 2 \times 3 \times 7 = 84$$

iv.

2	2028
2	1014
3	507
13	169
13	13
	1

$$2028 = 2 \times 2 \times 3 \times 13 \times 13$$

$$= (2 \times 2) \times (13 \times 13) \times 3$$

Here, 3 cannot be paired.

$\therefore$  We will multiply 2028 by 3 to get perfect square. New number =  $2028 \times 3 = 6084$

2	6084
2	3042
3	1521
3	507
13	169
13	13
	1

$$6084 = 2 \times 2 \times 3 \times 3 \times 13 \times 13$$

$$\Rightarrow 6084 = (2 \times 2) \times (3 \times 3) \times (13 \times 13)$$

$$\Rightarrow 6084 = 2^2 \times 3^2 \times 13^2$$

$$\Rightarrow 6084 = (2 \times 3 \times 13)^2 \Rightarrow$$

$$\sqrt{6084} = 2 \times 3 \times 13 = 78$$

v.



2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

$$1458 = 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$= (3 \times 3) \times (3 \times 3) \times (3 \times 3) \times 2$$

Here, 2 cannot be paired.

$\therefore$  We will multiply 1458 by 2 to get perfect square. New number =  $1458 \times 2 = 2916$

2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

$$2916 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$\Rightarrow 2916 = (3 \times 3) \times (3 \times 3) \times (3 \times 3) \times (2 \times 2)$$

$$\Rightarrow 2916 = 3^2 \times 3^2 \times 3^2 \times 2^2$$

$$\Rightarrow 2916 = (3 \times 3 \times 3 \times 2)^2 \Rightarrow$$

$$\sqrt{2916} = 3 \times 3 \times 3 \times 2 = 54$$



vi.

2	768
2	384
2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

$$768 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$= (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times 3 \text{ Here,}$$

3 cannot be paired.

$\therefore$  We will multiply 768 by 3 to get perfect square.

$$\text{New number} = 768 \times 3 = 2304$$



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

$$2304 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$$

$$\Rightarrow 2304 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (3 \times 3)$$

$$\Rightarrow 2304 = 2^2 \times 2^2 \times 2^2 \times 2^2 \times 3^2$$

$$\Rightarrow 2304 = (2 \times 2 \times 2 \times 2 \times 3)^2$$

$$\Rightarrow \sqrt{2304} = 2 \times 2 \times 2 \times 2 \times 3 = 48$$

6. For each of the following numbers, find the smallest whole number by which it should be divided so as to get a perfect square. Also find the square root of the square number so obtained. i. 252 ii. 2925 iii. 396 iv.

2645

v. 2800 vi.

1620

Solution:

i.



2	252
2	126
3	63
3	21
7	7
	1

$$252 = 2 \times 2 \times 3 \times 3 \times 7$$
$$= (2 \times 2) \times (3 \times 3) \times 7$$

Here, 7 cannot be paired.

$\therefore$  We will divide 252 by 7 to get perfect square. New number =  $252 \div 7 = 36$

2	36
2	18
3	9
3	3
	1

$$36 = 2 \times 2 \times 3 \times 3$$
$$\Rightarrow 36 = (2 \times 2) \times (3 \times 3)$$
$$\Rightarrow 36 = 2^2 \times 3^2$$
$$\Rightarrow 36 = (2 \times 3)^2 \Rightarrow$$
$$\sqrt{36} = 2 \times 3 = 6$$

ii.



3	2925
3	975
5	325
5	65
13	13
	1

$$2925 = 3 \times 3 \times 5 \times 5 \times 13$$

$$= (3 \times 3) \times (5 \times 5) \times 13$$

Here, 13 cannot be paired.

$\therefore$  We will divide 2925 by 13 to get perfect square. New number =  $2925 \div 13 = 225$

3	225
3	75
5	25
5	5
	1

$$225 = 3 \times 3 \times 5 \times 5$$

$$\Rightarrow 225 = (3 \times 3) \times (5 \times 5)$$

$$\Rightarrow 225 = 3^2 \times 5^2$$

$$\Rightarrow 225 = (3 \times 5)^2 \Rightarrow$$

$$\sqrt{36} = 3 \times 5 = 15$$

iii.





2	396
2	198
3	99
3	33
11	11
	1

$$396 = 2 \times 2 \times 3 \times 3 \times 11$$

$$= (2 \times 2) \times (3 \times 3) \times 11$$

Here, 11 cannot be paired.

$\therefore$  We will divide 396 by 11 to get perfect square. New number =  $396 \div 11 = 36$

2	36
2	18
3	9
3	3
	1

$$36 = 2 \times 2 \times 3 \times 3$$

$$\Rightarrow 36 = (2 \times 2) \times (3 \times 3)$$

$$\Rightarrow 36 = 2^2 \times 3^2$$

$$\Rightarrow 36 = (2 \times 3)^2 \Rightarrow$$

$$\sqrt{36} = 2 \times 3 = 6$$

iv.

5	2645
23	529
23	23
	1

$$2645 = 5 \times 23 \times 23$$



$$\Rightarrow 2645 = (23 \times 23) \times 5$$

Here, 5 cannot be paired.

$\therefore$  We will divide 2645 by 5 to get perfect square.

$$\text{New number} = 2645 \div 5 = 529$$

$$\begin{array}{r|l} 23 & 529 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

$$529 = 23 \times 23$$

$$\Rightarrow 529 = (23)^2 \Rightarrow$$

$$\sqrt{529} = 23$$

v.

$$\begin{array}{r|l} 2 & 2800 \\ \hline 2 & 1400 \\ \hline 2 & 700 \\ \hline 2 & 350 \\ \hline 5 & 175 \\ \hline 5 & 35 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$2800 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 7$$

$$= (2 \times 2) \times (2 \times 2) \times (5 \times 5) \times 7$$

Here, 7 cannot be paired.

$\therefore$  We will divide 2800 by 7 to get perfect square. New number =  $2800 \div 7 = 400$



2	400
2	200
2	100
2	50
5	25
5	5
	1

$$400 = 2 \times 2 \times 2 \times 2 \times 5 \times 5$$

$$\Rightarrow 400 = (2 \times 2) \times (2 \times 2) \times (5 \times 5)$$

$$\Rightarrow 400 = (2 \times 2 \times 5)^2$$

$$\Rightarrow \sqrt{400} = 20$$

vi.

2	1620
2	810
3	405
3	135
3	45
3	15
5	5
	1

$$1620 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5$$

$$= (2 \times 2) \times (3 \times 3) \times (3 \times 3) \times 5$$

Here, 5 cannot be paired.

$\therefore$  We will divide 1620 by 5 to get perfect square. New number =  $1620 \div 5 = 324$



2	324
2	162
3	81
3	27
3	9
3	3
	1

$$324 = 2 \times 2 \times 3 \times 3 \times 3 \times 3$$

$$\Rightarrow 324 = (2 \times 2) \times (3 \times 3) \times (3 \times 3)$$

$$\Rightarrow 324 = (2 \times 3 \times 3)^2 \Rightarrow$$

$$\sqrt{324} = 18$$

7. The students of Class VIII of a school donated Rs 2401 in all, for Prime Minister's National Relief Fund. Each student donated as many rupees as the number of students in the class. Find the number of students in the class.

Solution:

Let the number of students in the school be,  $x$ .

$\therefore$  Each student donate Rs.  $x$ .

Total amount contributed by all the students =  $x \times x = x^2$  Given,  $x^2 = \text{Rs. } 2401$

7	2401
7	343
7	49
7	7
	1

$$x^2 = 7 \times 7 \times 7 \times 7$$

$$\Rightarrow x^2 = (7 \times 7) \times (7 \times 7)$$



$$\Rightarrow x^2 = 49 \times 49$$

$$\Rightarrow x = \sqrt{49 \times 49}$$

$$\Rightarrow x = 49$$

$\therefore$  The number of students = 49

8. **2025 plants are to be planted in a garden in such a way that each row contains as many plants as the number of rows. Find the number of rows and the number of plants in each row.**

Solution

Let the number of rows be,  $x$ .

$\therefore$  the number of plants in each rows =  $x$ .

Total plants to be planted in the garden =  $x \times x = x^2$

Given,  $x^2 =$

Rs.2025

3	2025
3	675
3	225
3	75
5	25
5	5
	1

$$x^2 = 3 \times 3 \times 3 \times 3 \times 5 \times 5$$

$$\Rightarrow x^2 = (3 \times 3) \times (3 \times 3) \times (5 \times 5)$$

$$\Rightarrow x^2 = (3 \times 3 \times 5) \times (3 \times 3 \times 5)$$

$$\Rightarrow x^2 = 45 \times 45$$

$$\Rightarrow x = \sqrt{45 \times 45}$$

$$\Rightarrow x = 45$$

$\therefore$  The number of rows = 45 and the number of plants in each rows = 45.

9. **Find the smallest square number that is divisible by each of the numbers 4, 9 and 10.**

Solution:



$$\begin{array}{r|l} 2 & 4, 9, 10 \\ \hline & 2, 9, 5 \end{array}$$

L.C.M of 4, 9 and 10 is  $(2 \times 2 \times 9 \times 5)$  180.

$$180 = 2 \times 2 \times 9 \times 5$$

$$= (2 \times 2) \times 3 \times 3 \times 5$$

$$= (2 \times 2) \times (3 \times 3) \times 5$$

Here, 5 cannot be paired.

$\therefore$  we will multiply 180 by 5 to get perfect square.

Hence, the smallest square number divisible by 4, 9 and 10 =  $180 \times 5 = 900$

**10. Find the smallest square number that is divisible by each of the numbers 8, 15 and 20.**

Solution:

$$\begin{array}{r|l} 2 & 8, 15, 20 \\ \hline 2 & 4, 15, 10 \\ \hline 5 & 2, 15, 5 \\ \hline & 2, 3, 1 \end{array}$$

L.C.M of 8, 15 and 20 is  $(2 \times 2 \times 5 \times 2 \times 3)$  120.

$$120 = 2 \times 2 \times 3 \times 5 \times 2$$

$$= (2 \times 2) \times 3 \times 5 \times 2$$

Here, 3, 5 and 2 cannot be paired.

$\therefore$  We will multiply 120 by  $(3 \times 5 \times 2)$  30 to get perfect square.

Hence, the smallest square number divisible by 8, 15 and 20 =  $120 \times 30 = 3600$



## Exercise 6.4

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1. Find the square root of each of the following numbers by Division method. i.

2304 ii. 4489 iii. 3481 iv. 529

v. 3249 vi.

1369 vii.

5776 viii.

7921 ix.

576

x. 1024 xi.

3136 xii.

900

Solution:

i.

	48	
4	2304	
+ 4	16	
88	704	
+ 8	704	
96	0	

 $\therefore \sqrt{2304} = 48$ 

ii.



$$\begin{array}{r|l} & 67 \\ 6 & \overline{4489} \\ +6 & 36 \\ \hline 127 & 889 \\ +7 & 889 \\ \hline 134 & 0 \end{array}$$

$\therefore \sqrt{4489} = 67$

iii.

$$\begin{array}{r|l} & 59 \\ 5 & \overline{3481} \\ +5 & 25 \\ \hline 109 & 981 \\ +9 & 981 \\ \hline 118 & 0 \end{array}$$

$\therefore \sqrt{3481} = 59$

iv.

$$\begin{array}{r|l} & 23 \\ 2 & \overline{529} \\ +2 & 4 \\ \hline 43 & 129 \\ +3 & 129 \\ \hline 46 & 0 \end{array}$$

$\therefore \sqrt{529} = 23$

v.





$$\begin{array}{r} 57 \\ 5 \overline{) 3249} \\ +5 \quad 25 \\ \hline 107 \quad 749 \\ +7 \quad 749 \\ \hline 114 \quad 0 \end{array}$$

$\therefore \sqrt{3249} = 57$

vi.

$$\begin{array}{r} 37 \\ 3 \overline{) 1369} \\ +3 \quad 9 \\ \hline 67 \quad 469 \\ +7 \quad 469 \\ \hline 74 \quad 0 \end{array}$$

$\therefore \sqrt{1369} = 37$

vii.

$$\begin{array}{r} 76 \\ 7 \overline{) 5776} \\ +7 \quad 49 \\ \hline 146 \quad 876 \\ +6 \quad 876 \\ \hline 152 \quad 0 \end{array}$$

$\therefore \sqrt{5776} = 76$  viii.



$$\begin{array}{r|l} & 89 \\ 8 & \overline{7921} \\ +8 & 64 \\ \hline 169 & 1521 \\ +9 & 1521 \\ \hline 178 & 0 \end{array}$$

$$\therefore \sqrt{7921} = 89$$

ix.

$$\begin{array}{r|l} & 24 \\ 2 & \overline{576} \\ +2 & 4 \\ \hline 44 & 176 \\ +4 & 176 \\ \hline 48 & 0 \end{array}$$

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

x.

$$\begin{array}{r|l} & 32 \\ 3 & \overline{1024} \\ +3 & 9 \\ \hline 62 & 124 \\ +2 & 124 \\ \hline 64 & 0 \end{array}$$

$$\therefore \sqrt{1024} = 32$$

xi.



$$\begin{array}{r|l} & 56 \\ 5 & \overline{3136} \\ +5 & 25 \\ \hline 106 & 636 \\ +6 & 636 \\ \hline 112 & 0 \end{array}$$

$$\therefore \sqrt{3136} = 56$$

xii.

$$\begin{array}{r|l} & 30 \\ 3 & \overline{900} \\ +3 & 9 \\ \hline 60 & 00 \end{array}$$

$$\therefore \sqrt{900} = 30$$

2. Find the number of digits in the square root of each of the following numbers (without any calculation).64

i. 144 ii.

4489 iii.

27225 iv.

390625

Solution:

i.



$$\begin{array}{r|l} & 12 \\ 1 & 144 \\ +1 & 1 \\ \hline 22 & 44 \\ +2 & 44 \\ \hline 24 & 0 \end{array}$$

$$\therefore \sqrt{144} = 12$$

Hence, the square root of the number 144 has 2 digits.

ii.

$$\begin{array}{r|l} & 67 \\ 6 & 4489 \\ +6 & 36 \\ \hline 127 & 889 \\ +7 & 889 \\ \hline 134 & 0 \end{array}$$

$$\therefore \sqrt{4489} = 67$$

Hence, the square root of the number 4489 has 2 digits. iii.



$$\begin{array}{r|l} & 165 \\ 1 & \overline{27225} \\ +1 & 1 \\ \hline 26 & 172 \\ +6 & 156 \\ \hline 325 & 1625 \\ +5 & 1625 \\ \hline 350 & 0 \end{array}$$

$$\sqrt{27225} = 165$$

Hence, the square root of the number 27225 has 3 digits.

iv.

$$\begin{array}{r|l} & 625 \\ 6 & \overline{390625} \\ +6 & 36 \\ \hline 122 & 306 \\ +2 & 244 \\ \hline 1245 & 6225 \\ +5 & 6225 \\ \hline 1250 & 0 \end{array}$$

$$\therefore \sqrt{390625} = 625$$

Hence, the square root of the number 390625 has 3 digits.

**3. Find the square root of the following decimal numbers.**



i. 2.56 ii.

7.29 iii.

51.84 iv.

42.25

v. 31.36 Solution:

i.

$$\begin{array}{r|l} & 1.6 \\ 1 & 2.56 \\ +1 & 1 \\ \hline 26 & 156 \\ +6 & 156 \\ \hline 32 & 0 \end{array}$$

$$\therefore \sqrt{2.56} = 1.6$$

ii.

$$\begin{array}{r|l} & 2.7 \\ 2 & 7.29 \\ +2 & 4 \\ \hline 47 & 329 \\ +7 & 329 \\ \hline 54 & 0 \end{array}$$

$$\therefore \sqrt{7.29} = 2.7$$

iii.



$$\begin{array}{r} 7.2 \\ 7 \overline{) 51.84} \\ +7 \quad 49 \\ \hline 142 \quad 284 \\ +2 \quad 284 \\ \hline 144 \quad 0 \end{array}$$

$$\therefore \sqrt{51.84} = 7.2$$

iv.

$$\begin{array}{r} 6.5 \\ 6 \overline{) 42.25} \\ +6 \quad 36 \\ \hline 125 \quad 625 \\ +5 \quad 625 \\ \hline 130 \quad 0 \end{array}$$

$$\therefore \sqrt{42.25} = 6.5$$

v.

$$\begin{array}{r} 5.6 \\ 5 \overline{) 31.36} \\ +5 \quad 25 \\ \hline 106 \quad 636 \\ +6 \quad 636 \\ \hline 112 \quad 0 \end{array}$$

$$\therefore \sqrt{31.36} = 5.6$$

4. Find the least number which must be subtracted from each of the following numbers so as to get a perfect square. Also find the square root of the perfect square so obtained. i. 402 ii. 1989



iii. 3250 iv.

825

v. 4000

Solution:

i.

$$\begin{array}{r|l} & 2 \\ 2 & \overline{402} \\ +2 & 4 \\ \hline 4 & 02 \end{array}$$

$$\therefore \sqrt{402} = 20$$

$\therefore$  We must subtract 2 from 402 to get a perfect square.

$$\text{New number} = 402 - 2 = 400$$

$$\begin{array}{r|l} & 20 \\ 2 & \overline{400} \\ +2 & 4 \\ \hline 40 & 00 \end{array}$$

$$\therefore \sqrt{400} = 20$$

ii.





$$\begin{array}{r} 44 \\ 4 \overline{) 1989} \\ +4 \quad 16 \\ \hline 84 \quad 389 \\ +4 \quad 336 \\ \hline 88 \quad 53 \end{array}$$

∴ We must subtract 53 from 1989 to get a perfect square. New number =  $1989 - 53 = 1936$

$$\begin{array}{r} 44 \\ 4 \overline{) 1936} \\ +4 \quad 16 \\ \hline 84 \quad 336 \\ +4 \quad 336 \\ \hline 88 \quad 0 \end{array}$$

∴  $\sqrt{1936} = 44$

iii.

$$\begin{array}{r} 57 \\ 5 \overline{) 3250} \\ +5 \quad 25 \\ \hline 107 \quad 750 \\ +7 \quad 749 \\ \hline 114 \quad 1 \end{array}$$

∴ We must subtract 1 from 3250 to get a perfect square.

New number =  $3250 - 1 = 3249$



$$\begin{array}{r|l} & 57 \\ 5 & \overline{3249} \\ +5 & 25 \\ \hline 107 & 749 \\ +7 & 749 \\ \hline 114 & 0 \end{array}$$

$$\therefore \sqrt{3249} = 57$$

iv.

$$\begin{array}{r|l} & 28 \\ 2 & \overline{825} \\ +2 & 4 \\ \hline 48 & 425 \\ +8 & 384 \\ \hline 56 & 41 \end{array}$$

$\therefore$  We must subtract 41 from 825 to get a perfect square.

$$\text{New number} = 825 - 41 = 784$$

$$\begin{array}{r|l} & 28 \\ 2 & \overline{784} \\ +2 & 4 \\ \hline 48 & 384 \\ +8 & 384 \\ \hline 56 & 0 \end{array}$$

$$\therefore \sqrt{784} = 28$$



$$\begin{array}{r} 63 \\ 6 \overline{) 4000} \\ \underline{+6} \quad 36 \\ 123 \overline{) 400} \\ \underline{+3} \quad 369 \\ 126 \overline{) 31} \end{array}$$

∴ We must subtract 31 from 4000 to get a perfect square. New number =  $4000 - 31 = 3969$

∴  $\sqrt{3969} = 63$

**5. Find the least number which must be added to each of the following numbers so as to get a perfect square. Also find the square root of the perfect square so obtained.**

- (i) 525
- (ii) 1750
- (iii) 252
- (iv) 1825
- (v) 6412

Solution:

- (i)



$$\begin{array}{r|l} & 22 \\ 2 & 525 \\ +2 & 4 \\ \hline 42 & 125 \\ +2 & 84 \\ \hline 44 & 41 \\ & 23 \\ 2 & 525 \\ +2 & 4 \\ \hline 43 & 125 \\ +3 & 129 \\ \hline & \end{array}$$

Here,  $(22)^2 < 525 < (23)^2$

We can say 525 is  $(129 - 125)^4$  less than  $(23)^2$ .

∴ If we add 4 to 525, it will be a perfect square. New number =  $525 + 4 = 529$

$$\begin{array}{r|l} & 23 \\ 2 & 529 \\ +2 & 4 \\ \hline 43 & 129 \\ +3 & 129 \\ \hline 46 & 0 \\ & \end{array}$$

∴  $\sqrt{529} = 23$

(ii)



$$\begin{array}{r}
 41 \\
 \hline
 4 \overline{) 1750} \\
 +4 \quad 16 \\
 \hline
 81 \quad 150 \\
 +1 \quad 81 \\
 \hline
 82 \quad 69
 \end{array}$$

$$\begin{array}{r}
 42 \\
 \hline
 4 \overline{) 1750} \\
 4 \quad 16 \\
 \hline
 82 \quad 150 \\
 +2 \quad 164
 \end{array}$$

Here,  $(41)^2 < 1750 < (42)^2$

We can say 1750 is  $(164 - 150) \cdot 14$  less than  $(42)^2$ .

$\therefore$  If we add 14 to 1750, it will be perfect square.

New number =  $1750 + 14 = 1764$

$$\begin{array}{r}
 42 \\
 \hline
 4 \overline{) 1764} \\
 4 \quad 16 \\
 \hline
 82 \quad 164 \\
 +2 \quad 164 \\
 \hline
 \end{array}$$

$\therefore \sqrt{1764} = 42$

(iii)



$$\begin{array}{r} 15 \\ 1 \overline{) 252} \\ +1 \quad 1 \\ \hline 25 \quad 152 \\ +5 \quad 125 \\ \hline 30 \quad 27 \end{array}$$

$$\begin{array}{r} 16 \\ 1 \overline{) 252} \\ +1 \quad 1 \\ \hline 26 \quad 152 \\ +6 \quad 156 \\ \hline \end{array}$$

Here,  $(15)^2 < 252 > (16)^2$

We can say 252 is  $(156 - 152)^4$  less than  $(16)^2$ .

∴ If we add 4 to 252, it will be perfect square.

New number =  $252 + 4 = 256$

$$\begin{array}{r} 16 \\ 1 \overline{) 256} \\ +1 \quad 1 \\ \hline 26 \quad 156 \\ +6 \quad 156 \\ \hline 32 \quad 0 \end{array}$$

∴  $\sqrt{256} = 16$

(iv)



$$\begin{array}{r} 42 \\ 4 \overline{) 1825} \\ +4 \quad 16 \\ \hline 82 \quad 225 \\ +2 \quad 162 \\ \hline 84 \quad 63 \end{array}$$

$$\begin{array}{r} 43 \\ 4 \overline{) 1825} \\ +4 \quad 16 \\ \hline 83 \quad 225 \\ +3 \quad 249 \\ \hline \end{array}$$

Here,  $(42)^2 < 1825 < (43)^2$

We can say 1825 is  $(249 - 225) = 24$  less than  $(43)^2$ .

∴ If we add 24 to 1825, it will be perfect square.

New number =  $1825 + 24 = 1849$

$$\begin{array}{r} 43 \\ 4 \overline{) 1849} \\ +4 \quad 16 \\ \hline 83 \quad 249 \\ +3 \quad 249 \\ \hline 86 \quad 0 \end{array}$$

∴  $\sqrt{1849} = 43$

(v)



$$\begin{array}{r|l}
 80 & \\
 8 & \overline{6412} \\
 +8 & 64 \\
 \hline
 160 & 120 \\
 0 & 0
 \end{array}$$

$$\begin{array}{r|l}
 81 & \\
 8 & \overline{6412} \\
 +8 & 64 \\
 \hline
 161 & 12 \\
 +1 & 161
 \end{array}$$

Here,  $(80)^2 < 6412 > (81)^2$

We can say 6412 is  $(161 - 12)^2$  less than  $(81)^2$ .

∴ If we add 149 to 6412, it will be perfect square.

New number =  $6412 + 149 = 6561$

$$\begin{array}{r|l}
 81 & \\
 8 & \overline{6561} \\
 +8 & 64 \\
 \hline
 161 & 161 \\
 +1 & 161 \\
 \hline
 162 & 0
 \end{array}$$

∴  $\sqrt{6561} = 81$

6. Find the length of the side of a square whose area is  $441 \text{ m}^2$ .

Solution:





Let the length of each side of the field = a Then, area of the field =  $441 \text{ m}^2 \Rightarrow a^2 = 441 \text{ m}^2$

$\Rightarrow a = \sqrt{441} \text{ m}$

	21
2	441
+ 2	4
41	41
+ 1	41
42	0

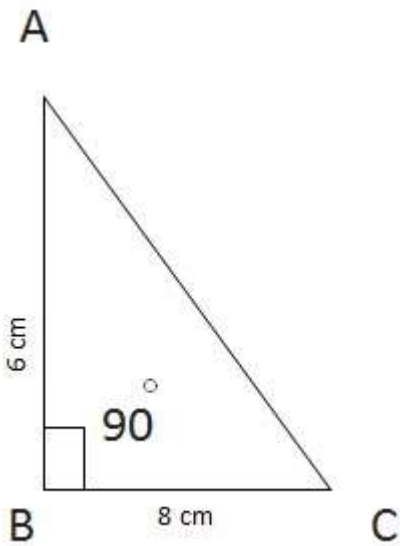
$\therefore$  The length of each side of the field = a m = 21 m.

7. In a right triangle ABC,  $\angle B = 90^\circ$ .

a. If AB = 6 cm, BC = 8 cm, find AC

b. If AC = 13 cm, BC = 5 cm, find AB Solution:

a.



Given, AB = 6 cm, BC = 8 cm Let

AC be x cm.

$\therefore AC^2 = AB^2 + BC^2$

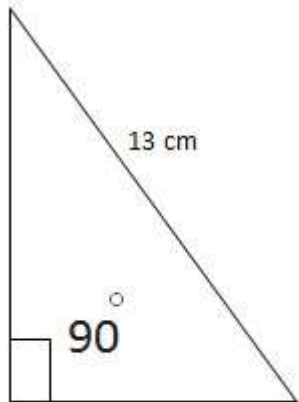


$$\begin{aligned}AC &= \sqrt{AB^2 + BC^2} \\ &= \sqrt{6^2 + 8^2} \\ &= \sqrt{36 + 64} \\ &= \sqrt{100} = 10\end{aligned}$$

Hence, AC = 10 cm.

b.

A



B

5 cm

C

Given, AC = 13 cm, BC = 5 cm Let

AB be x cm.

$$\therefore AC^2 = AB^2 + BC^2$$

$$\Rightarrow AC^2 - BC^2 = AB^2$$



$$\begin{aligned}AB &= \sqrt{AC^2 - BC^2} \\ &= \sqrt{13^2 - 5^2} \\ &= \sqrt{169 - 25} \\ &= \sqrt{144} = 12\end{aligned}$$

Hence,  $AB = 12$  cm

8. A gardener has 1000 plants. He wants to plant these in such a way that the number of rows and the number of columns remain same. Find the minimum number of plants he needs more for this.

Solution:

Let the number of rows and column be,  $x$ .

$\therefore$  Total number of row and column =  $x \times x = x^2$  As per question,  $x^2 = 1000$

$$\Rightarrow x = \sqrt{1000}$$

$$\begin{array}{r|l} & 31 \\ 3 & \overline{1000} \\ +3 & 9 \\ \hline 61 & 100 \\ +1 & 61 \end{array}$$

$$\begin{array}{r|l} & 32 \\ 3 & \overline{1000} \\ +3 & 9 \\ \hline 62 & 100 \\ +2 & 124 \end{array}$$

Here,  $(31)^2 < 1000 < (32)^2$

We can say 1000 is  $(124 - 100)^{24}$  less than  $(32)^2$ .

$\therefore$  24 more plants are needed.



9. There are 500 children in a school. For a P.T. drill they have to stand in such a manner that the number of rows is equal to number of columns. How many children would be left out in this arrangement.

Solution:

Let the number of rows and column be,  $x$ .

$\therefore$  Total number of row and column =  $x \times x = x^2$  As per question,  $x^2 = 500$   $x =$

$\sqrt{500}$

	22
2	500
+2	4
42	100
+2	84
44	16

Hence, 16 children would be left out in the arrangement