EXERCISE 3.5 PAGE NO: 3.43

1.Find the square root of each of the following by long division method:
(i) 12544 (ii) 97344
(iii) 286225 (iv) 390625
(v) 363609 (vi) 974169
(vii) 120409 (viii) 1471369
(ix) 291600 (x) 9653449
(xi) 1745041 (xii) 4008004
(xiii) 20657025 (xiv) 152547201
(xv) 20421361 (xvi)62504836
(xvii) 82264900 (xviii) 3226694416
(xix) 6407522209 (xx) 3915380329
Solution:
(i) 12544
By using long division method

```
      112
    ------
1 | 12544
    1
    ---
21  | 25
      21
    ---
222 | 444
      444
    ---
      0
```

∴ the square root of 12544
√12544 = 112

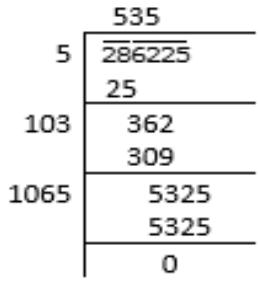
(ii) 97344
By using long division method

```
      312
    ------
3 | 97344
    9
    ---
61  | 73
      61
    ---
622 | 1244
      1244
    ---
      0
```

∴ the square root of 97344
√97344 = 312

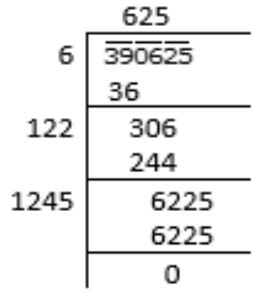
(iii) 286225

By using long division method



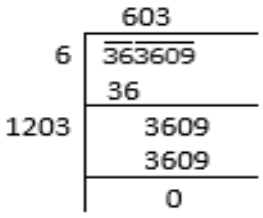
∴ the square root of 286225
√286225 = 535

(iv) 390625
By using long division method



∴ the square root of 390625
√390625 = 625

(v) 363609
By using long division method



∴ the square root of 363609
√36369 = 603

(vi) 974169
By using long division method

```
      987
   ---------
9  | 974169
     81
   ---------
188  1641
     1504
   ---------
1967   13769
       13769
   ---------
          0
```

∴ the square root of 974169
√974169 = 987

(vii) 120409
By using long division method

```
      347
   ---------
3  | 120409
     9
   ---------
64   304
     256
   ---------
687    4809
       4809
   ---------
          0
```

∴ the square root of 120409
√120409 = 347

(viii) 1471369
By using long division method

```
      1213
   ---------
1  | 1471369
     1
   ---------
22   47
     44
   ---------
241    313
       241
   ---------
2423     7269
         7269
   ---------
            0
```

∴ the square root of 1471369
√1471369 = 1213

(ix) 291600
By using long division method

```
      540
    ------
5  | 291600
     25
    ------
104  416
     416
    ------
1080   00
       00
      ----
       0
```

∴ the square root of 291600
√291600 = 540

(x) 9653449
By using long division method

```
       3107
     ------
3  | 9653449
     9
    ------
61   65
     61
    ------
6107   43449
       43449
      ------
       0
```

∴ the square root of 9653449
√9653449 = 3107

(xi) 1745041
By using long division method

```
       1321
     ------
1  | 1745041
     1
    ------
23   74
     69
    ------
262    550
       524
      ------
2641   2641
       2641
      ------
       0
```

∴ the square root of 1745041
√1745041 = 1321

(xii) 4008004
By using long division method

	2002
2	4008004
	4
40	000
	0
400	080
	0
4002	8004
	8004
	0

∴ the square root of 4008004
√4008004 = 2002

(xiii) 20657025
By using long division method

	4545
4	20657025
	16
85	465
	425
904	4070
	3616
9085	45425
	45425
	0

∴ the square root of 20657025
√20657025 = 4545

(xiv) 152547201
By using long division method

	12351
1	152547201
	1
22	52
	44
243	854
	729
2465	12572
	12325
27701	24701
	24701
	0

∴ the square root of 152547201
√152547201 = 12351

(xv) 20421361
By using long division method

```
      4519
   ---------
4 | 20421361
    16
   ---------
85 |  442
    425
   ---------
901 |  1713
      901
   ---------
9029 |  81261
      81261
   ---------
         0
```

∴ the square root of 20421361
√20421361 = 4519

(xvi) 62504836
By using long division method

```
      7906
   ---------
7 | 62504836
    49
   ---------
149 |  1350
     1341
   ---------
1580 |   948
   ---------
15806 |  94836
       94836
   ---------
          0
```

∴ the square root of 62504836
√62504836 = 7906

(xvii) 82264900
By using long division method

	9070
9	82264900
	81
180	126
1807	12649
	12649
14140	00
	0
	×

∴ the square root of 82264900
√82264900 = 9070

(xviii) 3226694416
By using long division method

	56804
5	3226694416
	25
106	726
	636
1128	9069
	9024
11360	4544
	0
113604	454416
	454416
	×

∴ the square root of 3226694416
√3226694416 = 56804

(xix) 6407522209
By using long division method

	80047
8	6407522209
	64
160	07
	0
1600	752
	00
16004	75222
	64016
160087	1120609
	1120609
	×

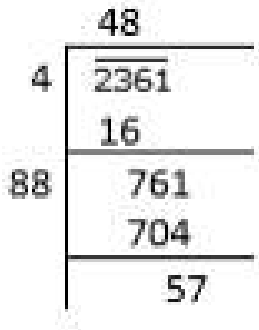
∴ the square root of 6407522209
√6407522209 = 80047

(xx) 3915380329
By using long division method

	62573
6	3915380329
	36
122	315
	244
1245	07138
	6225
12507	91303
	87549
125143	0375429
	375429
	×

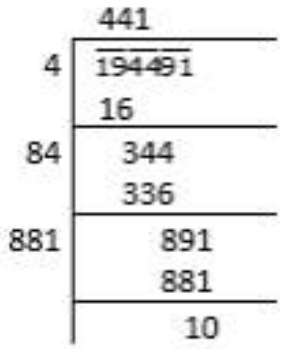
∴ the square root of 3915380329
√3915380329 = 62573

2. Find the least number which must be subtracted from the following numbers to make them a perfect square:
(i) 2361
(ii) 194491
(iii) 26535
(iv) 161605
(v) 4401624
Solution:
(i) 2361
By using long division method



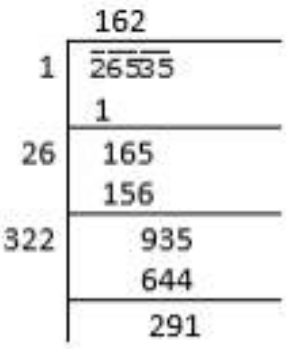
∴ 57 has to be subtracted from 2361 to get a perfect square.

(ii) 194491
By using long division method



∴ 10 has to be subtracted from 194491 to get a perfect square.

(iii) 26535
By using long division method



∴ 291 has to be subtracted from 26535 to get a perfect square.

(iv) 161605
By using long division method

```
      402
   ---------
 9 | 161605
     16
   ---------
802    1605
       1604
   ---------
          1
```

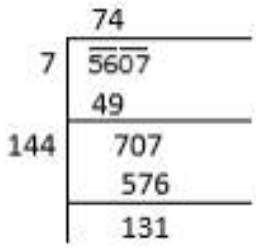
∴ 1 has to be subtracted from 161605 to get a perfect square.

(v) 4401624
By using long division method

```
      2098
   ---------
 2 | 4401624
     4
   ---------
40     40
        0
   ---------
409    4016
       3681
   ---------
4188   33524
       33504
   ---------
          20
```

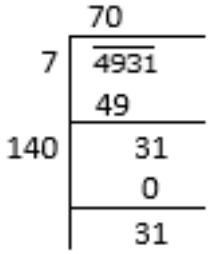
∴ 20 has to be subtracted from 4401624 to get a perfect square.

3. Find the least number which must be added to the following numbers to make them a perfect square:
(i) 5607
(ii)4931
(iii) 4515600
(iv) 37460
(v) 506900
Solution:
(i) 5607
By using long division method



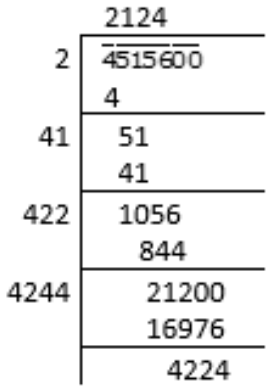
The remainder is 131
Since, $(74)^2 < 5607$
We take, the next perfect square number i.e., $(75)^2$
$(75)^2 = 5625 > 5607$
So, the number to be added = 5625 – 5607 = 18

(ii) 4931
By using long division method



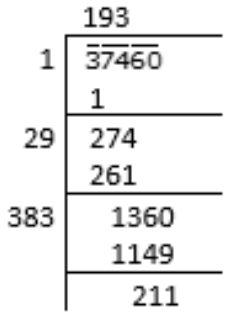
The remainder is 31
Since, $(70)^2 < 4931$
We take, the next perfect square number i.e., $(71)^2$
$(71)^2 = 5041 > 4931$
So, the number to be added = 5041 – 4931 = 110

(iii) 4515600
By using long division method



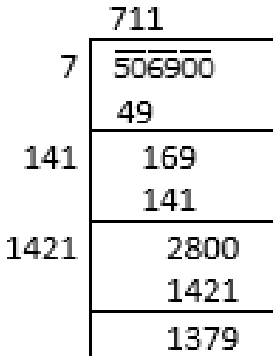
The remainder is 4224
Since, $(2124)^2 < 4515600$
We take, the next perfect square number i.e., $(2125)^2$
$(2125)^2 = 4515625 > 4515600$
So, the number to be added = 4515625 – 4515600 = 25

(iv) 37460
By using long division method



The remainder is 211
Since, $(193)^2 < 37460$
We take, the next perfect square number i.e., $(194)^2$
$(194)^2 = 37636 > 37460$
So, the number to be added = 37636 – 37460 = 176

(v) 506900
By using long division method



The remainder is 1379
Since, $(711)^2 < 506900$
We take, the next perfect square number i.e., $(712)^2$
$(712)^2 = 506944 > 506900$
So, the number to be added = 506944 – 506900 = 44

4. Find the greatest number of 5 digits which is a perfect square.

Solution:

We know that the greatest 5 digit number is 99999

By using long division method

```
      316
   ---------
3 | 99999
    9
   ---------
61 |  99
     61
   ---------
626|  3899
     3766
   ---------
       143
```

The remainder is 143

So, the greatest 5 digit perfect square number is:

99999 – 143 = 99856

∴ 99856 is the required greatest 5 digit perfect square number.

5. Find the least number of 4 digits which is a perfect square.

Solution:

We know that the least 4 digit number is 1000

By using long division method

```
     31
   -------
3 | 1000
    9
   -------
61 | 100
     61
   -------
     39
```

The remainder is 39

Since, $(31)^2 < 1000$

We take, the next perfect square number i.e., $(32)^2$

$(32)^2 = 1024 > 1000$

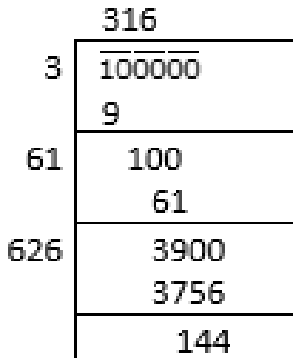
∴ 1024 is the required least number 4 digit number which is a perfect square.

6. Find the least number of six digits which is a perfect square.

Solution:

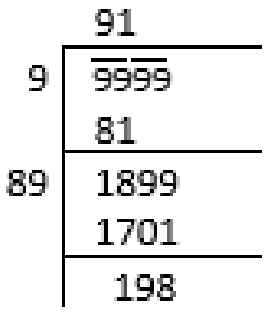
We know that the least 6 digit number is 100000

By using long division method



The remainder is 144
Since, $(316)^2 < 100000$
We take, the next perfect square number i.e., $(317)^2$
$(317)^2 = 100489 > 100000$
∴ 100489 is the required least number 6 digit number which is a perfect square.

7. Find the greatest number of 4 digits which is a perfect square.
Solution:
We know that the greatest 4 digit number is 9999
By using long division method



The remainder is 198
So, the greatest 4 digit perfect square number is:
9999 – 198 = 9801
∴ 9801 is the required greatest 4 digit perfect square number.

8. A General arranges his soldiers in rows to form a perfect square. He finds that in doing so, 60 soldiers are left out. If the total number of soldiers be 8160, find the number of soldiers in each row
Solution:
We know that the total number of soldiers = 8160
Number of soldiers left out = 60
Number of soldiers arranged in rows to form a perfect square = 8160 – 60 = 8100

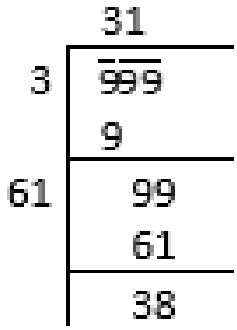
∴ number of soldiers in each row = $\sqrt{8100}$
= $\sqrt{(9\times9\times10\times10)}$
= 9×10
= 90

9. The area of a square field is 60025m^2. A man cycles along its boundary at 18 Km/hr. In how much time will he return at the starting point?
Solution:
We know that the area of square field = 60025 m^2
Speed of cyclist = 18 km/h
= 18 × (1000/60×60)
= 5 m/s^2
Area = 60025 m^2
Side^2 = 60025
Side = $\sqrt{60025}$
= 245
We know, Total length of boundary = 4 × Side
= 4 × 245
= 980 m
∴ Time taken to return to the starting point = 980/5
= 196 seconds
= 3 minutes 16 seconds

10. The cost of levelling and turning a square lawn at Rs 2.50 per m^2 is Rs13322.50 Find the cost of fencing it at Rs 5 per metre.
Solution:
We know that the cost of levelling and turning a square lawn = 2.50 per m^2
Total cost of levelling and turning = Rs. 13322.50
Total area of square lawn = 13322.50/2.50
= 5329 m^2
Side^2 = 5329
Side of square lawn = $\sqrt{5329}$
= 73 m
So, total length of lawn = 4 × 73
= 292 m
∴ Cost of fencing the lawn at Rs 5 per metre = 292 × 5
= Rs. 1460

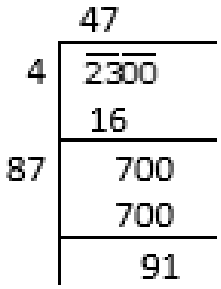
11. Find the greatest number of three digits which is a perfect square.

Solution:
We know that the greatest 3 digit number is 999
By using long division method



The remainder is 38
So, the greatest 3 digit perfect square number is:
999 – 38 = 961
∴ 961 is the required greatest 3 digit perfect square number.

12. Find the smallest number which must be added to 2300 so that it becomes a perfect square.
Solution:
By using long division method let's find the square root of 2300



The remainder is 91
Since, $(47)^2 < 2300$
We take, the next perfect square number i.e., $(48)^2$
$(48)^2 = 2304 > 2300$
∴ The smallest number required to be added to 2300 to get a perfect square is
2304 – 2300 = 4