

**RD SHARMA**

**Solutions**

**Class 8 Maths**

**Chapter 3**

**Ex 3.5**

Q-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)

$$\begin{array}{r} 112 \\ 1 \overline{) 12544} \\ \underline{1} \phantom{00} \\ 21 \phantom{00} \\ \underline{21} \phantom{00} \\ 025 \\ 1 \phantom{00} \\ \underline{1} \phantom{00} \\ 222 \phantom{00} \\ \underline{222} \phantom{00} \\ 444 \\ 2 \phantom{00} \\ \underline{444} \\ 0 \end{array}$$

Hence, the square root of 12544 is 112.

(ii)

$$\begin{array}{r}
 312 \\
 3 \overline{) 97344} \\
 \underline{9} \phantom{00} \\
 61 \phantom{00} \\
 \underline{61} \phantom{00} \\
 1 \phantom{00} \\
 \underline{1} \phantom{00} \\
 622 \phantom{00} \\
 \underline{622} \phantom{00} \\
 2 \phantom{00} \\
 \underline{2} \phantom{00} \\
 0
 \end{array}$$

Hence, the square root of 97344 is 312.

(iii)

$$\begin{array}{r}
 535 \\
 5 \overline{) 286225} \\
 \underline{25} \phantom{00} \\
 103 \phantom{00} \\
 \underline{103} \phantom{00} \\
 3 \phantom{00} \\
 \underline{3} \phantom{00} \\
 1065 \phantom{00} \\
 \underline{1065} \phantom{00} \\
 5 \phantom{00} \\
 \underline{5} \phantom{00} \\
 0
 \end{array}$$

Hence, the square root of 286225 is 535.

(iv)

$$\begin{array}{r}
 625 \\
 6 \overline{) 390625} \\
 \underline{36} \phantom{00} \\
 122 \phantom{00} \\
 \underline{122} \phantom{00} \\
 2 \phantom{00} \\
 \underline{2} \phantom{00} \\
 1245 \phantom{00} \\
 \underline{1245} \phantom{00} \\
 5 \phantom{00} \\
 \underline{5} \phantom{00} \\
 0
 \end{array}$$

Hence, the square root of 390625 is 625.

(v)

$$\begin{array}{r} 603 \\ 6 \overline{) 363609} \\ \underline{36} \phantom{09} \\ 1203 \phantom{09} \\ \underline{1203} \phantom{09} \\ 3 \phantom{09} \\ \underline{3609} \\ 0 \end{array}$$

Hence, the square root of 363609 is 603.

(vi)

$$\begin{array}{r} 987 \\ 9 \overline{) 974169} \\ \underline{81} \phantom{69} \\ 188 \phantom{69} \\ \underline{180} \phantom{69} \\ 8 \phantom{69} \\ \underline{81} \phantom{69} \\ 1967 \phantom{69} \\ \underline{1967} \phantom{69} \\ 7 \phantom{69} \\ \underline{769} \\ 0 \end{array}$$

Hence, the square root of 974169.

(vii)

	347	
3	120409	
3	9	
64	304	
4	256	
687	4809	
7	4809	
	0	

Hence, the square root of 120409 is 347.

(viii)

	1213	
1	1471369	
1	1	
22	47	
2	44	
241	313	
1	241	
2423	7269	
3	7269	
	0	

Hence, the square root of 1471369 is 1213.

(ix)

	540	
5	291600	
5	25	
104	416	
4	416	
1080	000	
0	000	
	0	

Hence, the square root of 291600 is 540

(x)

$$\begin{array}{r} 3107 \\ \hline 3 \quad | \quad 9653449 \\ \quad \quad 9 \\ \hline 61 \quad | \quad 65 \\ \quad \quad 61 \\ \hline 6207 \quad | \quad 43449 \\ \quad \quad 7 \quad \quad 43449 \\ \hline \quad \quad \quad \quad 0 \end{array}$$

Hence, the square root of 9653449 is 3107.

(xi)

$$\begin{array}{r} 1321 \\ \hline 1 \quad | \quad 1745041 \\ \quad \quad 1 \\ \hline 23 \quad | \quad 74 \\ \quad \quad 69 \\ \hline 262 \quad | \quad 550 \\ \quad \quad 524 \\ \hline 2641 \quad | \quad 2641 \\ \quad \quad 1 \quad \quad 2641 \\ \hline \quad \quad \quad \quad 0 \end{array}$$

Hence, the square root of 1745041 is 1321.

(xii)

2002	
2	4008004
2	4
40	00
0	00
400	080
0	00
4002	8004
2	8004
	0

Hence, the square root 4008004 is 2002

(xiii)

4545	
4	20657025
4	16
85	465
5	425
904	4070
4	3616
9085	45425
5	45425
	0

Hence, the square root of 20657025 is 4545

(xiv)

$$\begin{array}{r}
 12351 \\
 \hline
 1 \quad 152547201 \\
 \hline
 1 \quad 1 \\
 \hline
 22 \quad 52 \\
 \hline
 2 \quad 44 \\
 \hline
 243 \quad 854 \\
 \hline
 3 \quad 729 \\
 \hline
 2465 \quad 12572 \\
 \hline
 5 \quad 12325 \\
 \hline
 24701 \quad 24701 \\
 \hline
 1 \quad 24701 \\
 \hline
 \quad \quad 0
 \end{array}$$

Hence, the square root of 152547201 is 12351.

(xv)

$$\begin{array}{r}
 4519 \\
 \hline
 4 \quad 20421361 \\
 \hline
 4 \quad 16 \\
 \hline
 85 \quad 442 \\
 \hline
 5 \quad 425 \\
 \hline
 901 \quad 1713 \\
 \hline
 1 \quad 901 \\
 \hline
 9089 \quad 81261 \\
 \hline
 9 \quad 81261 \\
 \hline
 \quad \quad 0
 \end{array}$$

Hence, the square root of 20421361 is 4519.

(xvi)



7906	
7	62504836
7	49
149	1350
9	1341
1580	948
0	0
15806	94836
6	94836
	0

Hence, the square root of 6250486 is 7906.

(xvii)

9070	
9	82264900
9	81
180	126
0	0
1807	12649
7	12649
180140	000
0	0
	0

Hence, the square root of 82264900 is 9070.

(xviii)

56804	
5	3226694416
5	25
106	726
6	636
1128	9069
8	9024
11360	4544
0	0
113604	454416
4	454416
	0

Hence, the square root of 3226694416 is 56804.

(xix)

80047	
8	6407522209
8	64
160	007
0	0
1600	752
0	0
16004	75222
4	64016
160087	1120609
7	1120609
	0

Hence, the square root of 6407522209 is 80047

(xx)

	625763	
6	3915380329	
6	36	
122	315	
2	244	
1245	7138	
5	6225	
124507	91303	
7	87549	
125143	375429	
3	375429	
	0	

Hence, the square root of 3915380329 is 625763.

**Q-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) 16160            (v) 4401624

Solution.

(i) Using the long division method:

	48	
4	2361	
4	16	
88	761	
8	704	
	57	

We can see that 2361 is 57 more than  $47^2$ . Hence, 57 must be subtracted from 2361 to get a perfect square.

(ii) Using the long division method:

	441	
4	194491	
4	16	
84	344	
4	336	
881	891	
1	881	
	10	

We can see that 194491 is 10 more than  $441^2$ . Hence, 10 must be subtracted from 194491 to get a perfect square.

(iii) Using the long division method:

	162	
1	26535	
1	1	
26	165	
6	156	
322	935	
2	644	
	291	

We can see that 26535 is 291 more than  $162^2$ . Hence, 291 must be subtracted from 26535 to get a perfect square.

(iv) Using the long division method:

	127	
1	16160	
1	1	
22	061	
2	44	
247	1760	
7	1729	
	31	

We can see that 16160 is 31 more than  $127^2$ . Hence, 31 must be subtracted from 16160 to get a perfect square.

(v) Using the long division method;

	2098	
2	4401624	
2	4	
40	40	
0	4016	
409	3681	
9	33524	
4188	33524	
8	33504	
	20	

We can see that 4401624 is 20 more than  $2098^2$ . Hence, 20 must be subtracted from 4401624 to get a perfect square.

**Q-3. Find the least number which must be added from the following numbers to make them a perfect square:**

(i) 5607

(ii) 4931

(iii) 4515600

(iv) 37460

(v) 506900

Solution.

(i) Using the long division method:

	75	
7	5607	
7	49	
145	707	
5	725	
	-18	

We can see that 5607 is 18 more than  $75^2$ . Hence, we have to add 18 to 5607 to get a perfect square.

(ii) Using the long division method:

	71	
7	4931	
7	49	
141	031	
1	141	
	-110	

We can see that 4931 is 110 more than  $71^2$ . Hence, we have to add 110 to 4931 to get a perfect square.

(iii) Using the long division method:

	2125	
2	4515600	
2	4	
41	051	
1	41	
422	1056	
2	844	
4245	21200	
5	21225	
	-25	

We can see that 4515600 is 25 more than  $2125^2$ . Hence, we have to add 25 to 4515600 to get a perfect square.

(iv) Using the long division method:

$$\begin{array}{r}
 194 \\
 \hline
 1 \ 37460 \\
 1 \ 1 \\
 \hline
 29 \ 274 \\
 9 \ 261 \\
 \hline
 384 \ 1360 \\
 4 \ 1536 \\
 \hline
 \phantom{384} \ -176
 \end{array}$$

We can see that 37460 is 176 more than  $194^2$ . Hence, we have to 176 to 37460 to get a perfect square.

(v) Using the long division method:

$$\begin{array}{r}
 712 \\
 \hline
 7 \ 506900 \\
 7 \ 49 \\
 \hline
 141 \ 169 \\
 1 \ 141 \\
 \hline
 1422 \ 2800 \\
 2 \ 2844 \\
 \hline
 \phantom{1422} \ -44
 \end{array}$$

We can see that 506900 is 44 more than  $712^2$ . Hence, we have to add 44 to 506900 to get a perfect square.

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

Solution.

The greatest number with five digits is 99999.

To find the greatest square number with five digits, we must find the smallest number that must be subtracted from 99999 in order to make a perfect square.

For that, we have to find the square root of 99999 by the long division method as follows:

$$\begin{array}{r}
 316 \\
 \hline
 3 \ 99999 \\
 3 \ 9 \\
 \hline
 61 \ 099 \\
 1 \ 61 \\
 \hline
 626 \ 3899 \\
 6 \ 3756 \\
 \hline
 \phantom{626} \ 143
 \end{array}$$

Hence, we must subtract 143 from 99999 to get a perfect square.

$$99999 - 143 = 99856$$

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

Solution.

The least number with four digits is 1000. To find the square number with four digits, we must find the smallest number that must be added to 1000 in order to make a perfect square. For that, we have to find the square root of 1000 by the long division method as shown below:

	32	
3	1000	
3	9	
<hr/>		
62	100	
2	124	
<hr/>		
	-24	

1000 is 24 ( $124 - 100$ ) less than the nearest square number  $32^2$ . Thus, 24 must be added to 1000 to be a perfect square.

$$1000 + 24 = 1024$$

Hence, the smallest perfect square number with four digits is 1024.

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

Solution.

The least number with six digits is 100000. To find the least square number with six digits, we must find the smallest number that must be added to 100000 in order to make a perfect square. For that, we have to find the square root of 100000 by the long division method as follows:

	317	
3	100000	
3	9	
<hr/>		
61	100	
1	61	
<hr/>		
627	3900	
7	4389	
<hr/>		
	-489	

100000 is 489 ( $4389 - 3900$ ) less than  $317^2$ .

Hence, to be a perfect square, 489 should be added to 100000.

$$100000 + 489 = 100489$$

Hence, the least number of six digits that is a perfect square is 100489.

**Q-7. Find the greatest number of 4 digits which is a perfect square.**

Solution.

The greatest number with four digits is 9999.

To find the greatest perfect square with four digits, we must find the smallest number that must be subtracted from 9999 in order to make a perfect square. For that, we have to find the square root of 9999 by the long division method as shown below:

$$\begin{array}{r}
 99 \\
 9 \overline{) 1000} \\
 \underline{9} \phantom{00} \\
 9 \phantom{00} \\
 \underline{189} \phantom{0} \\
 9 \phantom{00} \\
 \underline{1701} \\
 198
 \end{array}$$

We must subtract 198 from 9999 to make a perfect square:

$$9999 - 198 = 9801$$

Hence, the greatest perfect square with four digits is 9801.

**Q-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.

60 soldiers are left out.

$$\text{So, Remaining soldiers} = 8160 - 60 = 8100$$

The number of soldiers in each row to form a perfect square would be the square root of 8100.

We have to find the square root of 8100 by the long division method as shown below:

$$\begin{array}{r}
 90 \\
 9 \overline{) 8100} \\
 \underline{81} \phantom{00} \\
 00 \phantom{0} \\
 \underline{000} \\
 000
 \end{array}$$

Hence, the number of soldiers in each row to form a perfect square is 90.

**Q-9. The area of a square field is 60025 m<sup>2</sup>. A man cycles along its boundary at 18 km/hr. In how much time will he return at the starting point?**

Solution.

$$\text{Area of the square field} = 60025 \text{ m}^2$$

The length of the square field would be the square root of 60025.

Using the long division method:

$$\begin{array}{r}
 245 \\
 2 \overline{) 60025} \\
 \underline{4} \phantom{00} \\
 20 \phantom{0} \\
 \underline{16} \phantom{0} \\
 40 \phantom{0} \\
 \underline{40} \phantom{0} \\
 025 \\
 24 \phantom{0} \\
 \underline{245} \\
 0
 \end{array}$$

Hence, the length of the square field is 245 m.



The square has four sides, so the number of boundaries of the field is 4.

The distance  $s$  covered by the man =  $245 \text{ m} \times 4 = 980 \text{ m} = 0.98 \text{ km}$

If the velocity  $v$  is  $18 \text{ km/hr}$ , the required time  $t$  can be calculated using the following formula:

$$t = \frac{s}{v}$$
$$t = \frac{0.98}{18} = 0.054 \text{ hr} = 3 \text{ minutes, } 16 \text{ seconds}$$

So, the man will return to the starting point after 3 minutes and 16 seconds.

**Q-10. The cost of leveling and turfing a square lawn at Rs. 2.50 per  $\text{m}^2$  is Rs. 13322.50. Find the cost of fencing it at Rs. 5 per metres.**

Solution.

First, we have to find the area of the square lawn, which the total cost divided by the cost of leveling and turfing per square metre:

$$\text{Area of a square} = \frac{13322.5}{2.5} = 5329 \text{ m}^2$$

The length of one side of the square is equal to the square root of the area. We will use the long division method to find it as shown below:

	73	
7	5329	
7	49	
143	429	
3	429	
	0	

Therefore, the length of one side of the square =  $73 \text{ m}$

The circumference of the square is  $73 \times 4 = 292 \text{ m}$

Hence, the cost of fencing the lawn at Rs. 5 per metre =  $292 \times 5 = \text{Rs. } 1460$ .

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

Solution.

The greatest number with three digits is 999.

To find the greatest perfect square with three digits, we must find the smallest number that must be subtracted from 999 in order to get a perfect square. For that, we have to find the square root by the long division method as shown below:

	31	
3	999	
3	9	
61	99	
1	61	
	38	

So, 38 must be subtracted from 999 to get a perfect square.

$$999 - 38 = 961$$

$$961 = 31^2$$

Hence, the greatest perfect square with three digits is 961.

**Q-12. Find the smallest number which must be added to 2300 so that it becomes a perfect square.**

Solution.

To find the square root of 2300, we use the long division method:

$$\begin{array}{r} 48 \\ 4 \overline{) 2300} \\ \underline{4} \phantom{00} \\ 16 \phantom{00} \\ \underline{16} \phantom{00} \\ 00 \phantom{00} \\ 88 \phantom{00} \\ \underline{88} \phantom{00} \\ 00 \phantom{00} \\ 8 \phantom{00} \\ \underline{8} \phantom{00} \\ 00 \phantom{00} \\ -4 \phantom{00} \end{array}$$

2300 is 4 (704 – 700 ) less than  $48^2$ .

Hence, 4 must be added to 2300 to get a perfect square.