

### EXERCISE 3.9

Square Root Table									
Number	Square Root( $\sqrt{\quad}$ )	Number	Square Root( $\sqrt{\quad}$ )	Number	Square Root( $\sqrt{\quad}$ )	Number	Square Root( $\sqrt{\quad}$ )	Number	Square Root( $\sqrt{\quad}$ )
1	1	21	4.583	41	6.403	61	7.81	81	9
2	1.414	22	4.69	42	6.481	62	7.874	82	9.055
3	1.732	23	4.796	43	6.557	63	7.937	83	9.11
4	2	24	4.899	44	6.633	64	8	84	9.165
5	2.236	25	5	45	6.708	65	8.062	85	9.22
6	2.449	26	5.099	46	6.782	66	8.124	86	9.274
7	2.646	27	5.196	47	6.856	67	8.185	87	9.327
8	2.828	28	5.292	48	6.928	68	8.246	88	9.381
9	3	29	5.385	49	7	69	8.307	89	9.434
10	3.162	30	5.477	50	7.071	70	8.367	90	9.487
11	3.317	31	5.568	51	7.141	71	8.426	91	9.539
12	3.464	32	5.657	52	7.211	72	8.485	92	9.592
13	3.606	33	5.745	53	7.28	73	8.544	93	9.644
14	3.742	34	5.831	54	7.348	74	8.602	94	9.695
15	3.873	35	5.916	55	7.416	75	8.66	95	9.747
16	4	36	6	56	7.483	76	8.718	96	9.798
17	4.123	37	6.083	57	7.55	77	8.775	97	9.849
18	4.243	38	6.164	58	7.616	78	8.832	98	9.899
19	4.359	39	6.245	59	7.681	79	8.888	99	9.95
20	4.472	40	6.325	60	7.746	80	8.944	100	10

**Using square root table, find the square roots of the following:**

**1. 7**

**Solution:**

From square root table we know,

Square root of 7 is:

$$\sqrt{7} = 2.645$$

∴ The square root of 7 is 2.645

### 2. 15

**Solution:**

We know that,

$$15 = 3 \times 5$$

$$\text{So, } \sqrt{15} = \sqrt{3} \times \sqrt{5}$$

From square root table we know,

Square root of 3 and 5 are:

$$\sqrt{3} = 1.732 \text{ and } \sqrt{5} = 2.236$$

$$\Rightarrow \sqrt{15} = 1.732 \times 2.236 = 3.873$$

∴ The square root of 15 is 3.873

### 3. 74

**Solution:**

We know that,

$$74 = 2 \times 37$$

$$\text{So, } \sqrt{74} = \sqrt{2} \times \sqrt{37}$$

From square root table we know,

Square root of 2 and 37 are:

$$\sqrt{2} = 1.414 \text{ and } \sqrt{37} = 6.083$$

$$\Rightarrow \sqrt{74} = 1.414 \times 6.083 = 8.602$$

∴ The square root of 74 is 8.602

### 4. 82

**Solution:**

We know that,

$$82 = 2 \times 41$$

$$\text{So, } \sqrt{82} = \sqrt{2} \times \sqrt{41}$$

From square root table we know,

Square root of 2 and 41 are:

$$\sqrt{2} = 1.414 \text{ and } \sqrt{41} = 6.403$$

$$\Rightarrow \sqrt{82} = 1.414 \times 6.403 = 9.055$$

∴ The square root of 82 is 9.055

### 5. 198

**Solution:**

We know that,

$$198 = 2 \times 9 \times 11$$

So,  $\sqrt{198} = \sqrt{2} \times \sqrt{9} \times \sqrt{11}$

From square root table we know,

Square root of 2, 9 and 11 are:

$$\sqrt{2} = 1.414, \sqrt{9} = 3 \text{ and } \sqrt{11} = 3.317$$

$$\Rightarrow \sqrt{198} = 1.414 \times 3 \times 3.317 = 14.071$$

$\therefore$  The square root of 198 is 14.071

### 6. 540

**Solution:**

We know that,

$$540 = 6 \times 9 \times 10$$

So,  $\sqrt{540} = \sqrt{6} \times \sqrt{9} \times \sqrt{10}$

From square root table we know,

Square root of 6, 9 and 10 are:

$$\sqrt{6} = 2.449, \sqrt{9} = 3 \text{ and } \sqrt{10} = 3.162$$

$$\Rightarrow \sqrt{540} = 2.449 \times 3 \times 3.162 = 23.24$$

$\therefore$  The square root of 540 is 23.24

### 7. 8700

**Solution:**

We know that,

$$8700 = 87 \times 100$$

So,  $\sqrt{8700} = \sqrt{87} \times \sqrt{100}$

From square root table we know,

Square root of 87 and 100 are:

$$\sqrt{8700} = 9.327 \text{ and } \sqrt{100} = 10$$

$$\Rightarrow \sqrt{8700} = 9.327 \times 10 = 93.27$$

$\therefore$  The square root of 8700 is 93.27

### 8. 3509

**Solution:**

We know that,

$$3509 = 121 \times 29$$

So,  $\sqrt{3509} = \sqrt{121} \times \sqrt{29}$

From square root table we know,

Square root of 121 and 29 are:

$$\sqrt{121} = 11 \text{ and } \sqrt{29} = 5.385$$

$$\Rightarrow \sqrt{3509} = 11 \times 5.385 = 59.235$$

$\therefore$  The square root of 3509 is 59.235

### 9. 6929

**Solution:**

We know that,

$$6929 = 169 \times 41$$

$$\text{So, } \sqrt{6929} = \sqrt{169} \times \sqrt{41}$$

From square root table we know,

Square root of 169 and 41 are:

$$\sqrt{169} = 13 \text{ and } \sqrt{41} = 6.403$$

$$\Rightarrow \sqrt{6929} = 13 \times 6.403 = 83.239$$

$\therefore$  The square root of 6929 is 83.239

### 10. 25725

**Solution:**

We know that,

$$25725 = 3 \times 7 \times 25 \times 49$$

$$\text{So, } \sqrt{25725} = \sqrt{3} \times \sqrt{7} \times \sqrt{25} \times \sqrt{49}$$

From square root table we know,

Square root of 3, 7, 25 and 49 are:

$$\sqrt{3} = 1.732, \sqrt{7} = 2.646, \sqrt{25} = 5 \text{ and } \sqrt{49} = 7$$

$$\Rightarrow \sqrt{25725} = 1.732 \times 2.646 \times 5 \times 7 = 160.41$$

$\therefore$  The square root of 25725 is 160.41

### 11. 1312.

**Solution:**

We know that,

$$1312 = 2 \times 16 \times 41$$

$$\text{So, } \sqrt{1312} = \sqrt{2} \times \sqrt{16} \times \sqrt{41}$$

From square root table we know,

Square root of 2, 16 and 41 are:

$$\sqrt{2} = 1.414, \sqrt{16} = 4 \text{ and } \sqrt{41} = 6.403$$

$$\Rightarrow \sqrt{1312} = 1.414 \times 4 \times 6.403 = 36.22$$

$\therefore$  The square root of 1312 is 36.22

### 12. 4192

**Solution:**

We know that,

$$4192 = 2 \times 16 \times 131$$

$$\text{So, } \sqrt{4192} = \sqrt{2} \times \sqrt{16} \times \sqrt{131}$$

From square root table we know,

Square root of 2 and 16 are:

$$\sqrt{2} = 1.414 \text{ and } \sqrt{16} = 4$$

The square root of 131 is not listed in the table

Thus, let's apply long division to find it

	1	1	.4	4	5
1	1	31	.00	00	00
	1	∴	∴	∴	∴
21	31	∴	∴	∴	∴
	21	∴	∴	∴	∴
224	10	00	∴	∴	∴
	8	96	∴	∴	∴
2284	1	04	00	∴	∴
		91	36	∴	∴
22885		12	64	00	∴
		11	44	25	∴
22890		1	19	75	∴

So, square root of 131 is 11.445

Now,

$$\Rightarrow \sqrt{4192} = 1.414 \times 4 \times 11.445 = 64.75$$

$\therefore$  The square root of 4192 is 64.75

### 13. 4955

**Solution:**

We know that,

$$4955 = 5 \times 991$$

$$\text{So, } \sqrt{4955} = \sqrt{5} \times \sqrt{991}$$

From square root table we know,

Square root of 5 is:

$$\sqrt{5} = 2.236$$

The square root of 991 is not listed in the table

Thus, let's apply long division to find it

		3	1	.4	8	0
	3	9	91	.00	00	00
		9	⋮	⋮	⋮	⋮
61		91				
		61				
624		30	00			
		24	96			
6288		5	04	00		
		5	03	04		
62960				96	00	
					0	
62960				96	00	

$$\sqrt{11} = 3.317$$

$$\Rightarrow \sqrt{(99/144)} = 3/12 \times 3.317 = 3.317/4 = 0.829$$

∴ The square root of 99/144 is 0.829

#### 15. 57/169

**Solution:**

We know that,

$$57/169 = (3 \times 19) / (13 \times 13)$$

$$\begin{aligned} \text{So, } \sqrt{(57/169)} &= \sqrt{[(3 \times 19) \times (13 \times 13)]} \\ &= \sqrt{3} \times \sqrt{19} \times 1/13 \end{aligned}$$

From square root table we know,

So, square root of 991 is 31.480

Now,

$$\Rightarrow \sqrt{4955} = 2.236 \times 31.480 = 70.39$$

∴ The square root of 4955 is 70.39

#### 14. 99/144

**Solution:**

We know that,

$$99/144 = (9 \times 11) / (12 \times 12)$$

$$\begin{aligned} \text{So, } \sqrt{(99/144)} &= \sqrt{[(9 \times 11) \times (12 \times 12)]} \\ &= 3/12 \times \sqrt{11} \end{aligned}$$

From square root table we know,

Square root of 11 is:



Square root of 3 and 19 is:

$$\sqrt{3} = 1.732 \text{ and } \sqrt{19} = 4.359$$

$$\Rightarrow \sqrt{(57/169)} = 1.732 \times 4.359 \times 1/13 = 0.581$$

$\therefore$  The square root of  $57/169$  is 0.581

### 16. 101/169

**Solution:**

We know that,

$$101/169 = 101 / (13 \times 13)$$

$$\text{So, } \sqrt{(101/169)} = \sqrt{[101 / (13 \times 13)]}$$
$$= \sqrt{101/13}$$

From square root table we don't have the square root of 101

Thus, we have to manipulate the number such that we get the square root of a number less than 100

$$\sqrt{101} = \sqrt{(1.01 \times 100)}$$
$$= \sqrt{1.01 \times 10}$$

Now, we have to find the square of 1.01

We know that,

$$\sqrt{1} = 1 \text{ and } \sqrt{2} = 1.414 \text{ (From the square root table)}$$

$$\text{Their difference} = 1.414 - 1 = 0.414$$

Hence, for a difference of 1 (2 - 1), the difference in the value of the square root is 0.414

So,

For the difference of 0.01, the difference in the value of the square roots will be

$$0.01 \times 1.414 = 0.00414$$

$$\therefore \sqrt{1.01} = 1 + 0.00414 = 1.00414$$

$$\text{Then, } \sqrt{101} = 1.00414 \times 10 = 10.0414$$

$$\Rightarrow \sqrt{(101/169)} = \sqrt{101/13} = 10.0414/13$$

$\therefore$  The square root of  $101/169$  is 0.773

### 17. 13.21

**Solution:**

We need to find  $\sqrt{13.21}$

From square root table we know,

Square root of 13 and 14 are:

$$\sqrt{13} = 3.606 \text{ and } \sqrt{14} = 3.742$$

$$\text{Their difference} = 3.742 - 3.606 = 0.136$$

Hence, for a difference of 1 (14 - 13), the difference in the value of the square root is 0.136

So,

For the difference of 0.21, the difference in the value of the square roots will be

$$0.136 \times 0.21 = 0.0286$$

$$\Rightarrow \sqrt{13.21} = 3.606 + 0.0286 = 3.635$$

$\therefore$  The square root of 13.21 is 3.635

### 18. 21.97

**Solution:**

We need to find  $\sqrt{21.97}$

From square root table we know,

Square root of 21 and 22 are:

$$\sqrt{21} = 4.583 \text{ and } \sqrt{22} = 4.690$$

$$\text{Their difference} = 4.690 - 4.583 = 0.107$$

Hence, for a difference of 1 (23 - 22), the difference in the value of the square root is 0.107

So,

For the difference of 0.97, the difference in the value of the square roots will be

$$0.107 \times 0.97 = 0.104$$

$$\Rightarrow \sqrt{21.97} = 4.583 + 0.104 = 4.687$$

$\therefore$  The square root of 21.97 is 4.687

**19. 110**

**Solution:**

We know that,

$$110 = 11 \times 10$$

$$\text{So, } \sqrt{110} = \sqrt{11 \times 10}$$

From square root table we know,

Square root of 11 and 10 are:

$$\sqrt{11} = 3.317 \text{ and } \sqrt{10} = 3.162$$

$$\Rightarrow \sqrt{110} = 3.317 \times 3.162 = 10.488$$

$\therefore$  The square root of 110 is 10.488

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**20. 1110**

**Solution:**

We know that,

$$1110 = 37 \times 30$$

$$\text{So, } \sqrt{1110} = \sqrt{37 \times 30}$$

From square root table we know,

Square root of 37 and 30 are:

$$\sqrt{37} = 6.083 \text{ and } \sqrt{30} = 5.477$$

$$\Rightarrow \sqrt{1110} = 6.083 \times 5.477 = 33.317$$

$\therefore$  The square root of 1110 is 33.317

**21. 11.11**

**Solution:**

We need to find  $\sqrt{11.11}$

From square root table we know,

Square root of 11 and 12 are:

$$\sqrt{11} = 3.317 \text{ and } \sqrt{12} = 3.464$$

Their difference =  $3.464 - 3.317 = 0.147$

Hence, for a difference of 1 (12 - 11), the difference in the value of the square root is 0.147

So,

For the difference of 0.11, the difference in the value of the square roots will be

$$0.11 \times 0.147 = 0.01617$$

$$\Rightarrow \sqrt{11.11} = 3.317 + 0.0162 = 3.333$$

$\therefore$  The square root of 11.11 is 3.333

**22. The area of a square field is  $325\text{m}^2$ . Find the approximate length of one side of the field.**

**Solution:**

We know that the given area of the field =  $325\text{ m}^2$

To find the approximate length of the side of the field we will have to calculate the square root of 325

$$\sqrt{325} = \sqrt{25} \times \sqrt{13}$$

From the square root table, we know

$$\sqrt{25} = 5 \text{ and } \sqrt{13} = 3.606$$

$$\Rightarrow \sqrt{325} = 5 \times 3.606 = 18.030$$

$\therefore$  The approximate length of one side of the field is 18.030 m

**23. Find the length of a side of a square, whose area is equal to the area of a rectangle with sides 240 m and 70 m.**

**Solution:**

We know that from the question,

Area of square = Area of rectangle

$$\text{Side}^2 = 240 \times 70$$

$$\text{Side} = \sqrt{(240 \times 70)}$$

$$= \sqrt{(10 \times 10 \times 2 \times 2 \times 2 \times 3 \times 7)}$$

$$= 20\sqrt{42}$$

Now, from the square root table, we know  $\sqrt{42} = 6.481$

$$= 20 \times 6.48$$

$$= 129.60 \text{ m}$$

$\therefore$  The length of side of the square is 129.60 m