

Question 1.

Find the square of:

(i) 59

(ii) 6.3

(iii) 15

Solution:

(i) Square of 59 = $59 \times 59 = 3481$

(ii) Square of 6.3 = $6.3 \times 6.3 = 39.69$

(iii) Square of 15 = $15 \times 15 = 225$

Question 2.

By splitting into prime factors, find the square root of:

(i) 11025

Solution:

$\sqrt{11025}$

$\sqrt{5 \times 5 \times 7 \times 7 \times 3 \times 3}$ (Splitting the terms)

$= 5 \times 7 \times 3 = 105$

Taking L.C.M.

5	11025
5	2205
7	441
7	63
3	9
	3

(ii) 396900

Solution:

$$\begin{aligned} & \sqrt{396900} \\ &= \sqrt{2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 7 \times 7} \quad (\text{Splitting the terms}) \\ &= 2 \times 3 \times 3 \times 5 \times 7 = 630 \end{aligned}$$

Taking L.C.M.

2	396900
2	198450
3	99225
3	33075
3	11025
3	3675
5	1225
5	245
7	49
	7

(iii) **194481****Solution:**

$$\begin{aligned} & \sqrt{194481} \\ &= \sqrt{3 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 \times 7} \quad (\text{Splitting the terms}) \\ &= 3 \times 3 \times 7 \times 7 = 441 \end{aligned}$$

Taking L.C.M.

3	194481
3	64827
3	21609
3	7203
7	2401
7	343
7	49
	7

Question 3.

(i) Find the smallest number by which 2592 be multiplied so that the product is a perfect square.

Solution:

$$(i) 2592 = \overset{-}{2} \times \overset{-}{2} \times \overset{-}{2} \times \overset{-}{2} \times \overset{-}{2} \times \overset{-}{3} \times \overset{-}{3} \times \overset{-}{3} \times \overset{-}{3}$$

On grouping the prime factors of 2592 as shown; one factor i.e. 2 is left which cannot be paired with equal factor.

Taking L.C.M.

2	2592
2	1296
2	648
2	324
2	162
3	81

The given number should be multiplied by 2 to make the given number a perfect square.

(ii) Find the smallest number by which 12748 be multiplied so that the product is a perfect square?

Solution:

$$12748 = \overset{-}{2} \times \overset{-}{2} \times 3187$$

On grouping the prime factors of 12748 as shown; one factor i.e. 3187 is left which cannot be paired with equal factor.

Taking L.C.M.

2	12748
2	6374
	3187

The given number should be multiplied by 3187.

Question 4.

Find the smallest number by which 10368 be divided, so that the result is a perfect square. Also, find the square root of the resulting numbers.

Solution:

$$10368 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$$

On grouping the prime factors of 10368 as shown; one factor i.e. 2 is left which cannot be paired with equal factor.

Taking L.C.M.

2	10368
2	5184
2	2592
2	1296
2	648
2	324
2	162
3	81
3	27
3	9
	3

∴ The given number should be divided by 2

$$\text{Now } \sqrt{\frac{10368}{2}} = \sqrt{\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3}{2}} \quad (\text{Splitting the terms})$$

$$= 2 \times 2 \times 2 \times 3 \times 3 = 72$$

Question 5

Find the square root of:

(i) 0.1764

(ii) $96 \frac{1}{25}$

(iii) 0.0169

Solution:

(i) $\sqrt{0.1764} = \sqrt{\frac{01764}{10000}} = 0.42$

(ii) $\sqrt{96 \frac{1}{25}} = \sqrt{96 + 0.04} = \sqrt{96.04} = 9.8$

$$(iii) 0.0169 = \sqrt{\frac{00169}{10000}} = 0.13$$

Question 6.**Evaluate**

$$(i) \sqrt{\frac{144}{225}}$$

$$(ii) \sqrt{\frac{0.225}{28.9}}$$

$$(iii) \sqrt{\frac{25}{32} \times 2 \frac{13}{18} \times 0.25}$$

$$(iv) \sqrt{1 \frac{4}{5} \times 14 \frac{21}{44} \times 2 \frac{7}{55}}$$

Solution:

$$\begin{aligned} \sqrt{\frac{144}{225}} &= \sqrt{\frac{144}{225}} \\ &= \sqrt{\frac{12 \times 12}{15 \times 15}} \quad (\text{Splitting the terms}) \\ &= \frac{12}{15} = 0.8 \end{aligned}$$

$$(ii) \sqrt{\frac{0.225}{28.9}}$$

Solution:

$$\sqrt{\frac{0.225}{28.9}} = \sqrt{\frac{0.225}{28.900}}$$

Taking L.C.M.

17	28900
17	1700
10	100
	10

$$= \sqrt{\frac{225}{28900}} = \sqrt{\frac{15 \times 15}{17 \times 17 \times 10 \times 10}} \quad (\text{Splitting the terms})$$

$$= \frac{15}{17 \times 10} = \frac{15}{170} = \frac{3 \times 5}{5 \times 34} = \frac{3}{34}$$

$$(iii) \sqrt{\frac{25}{32} \times 2 \frac{13}{18} \times 0.25}$$

Solution:

$$= \sqrt{\frac{25}{32} \times \frac{49}{18} \times 0.25} = \sqrt{\frac{25}{32} \times \frac{49}{18} \times \frac{25}{100}} \quad (\text{Simplifying})$$

$$= \sqrt{\frac{25 \times 49 \times 25^1}{32 \times 18 \times 100^4}} = \sqrt{\frac{25 \times 49}{32 \times 18 \times 4}}$$

$$= \sqrt{\frac{5 \times 5 \times 7 \times 7}{(2 \times 2 \times 2 \times 2 \times 2) \times (2 \times 3 \times 3) \times (2 \times 2)}} \quad (\text{Splitting the terms})$$

$$= \sqrt{\frac{5 \times 5 \times 7 \times 7}{2 \times 2 \times 2 \times 2} \times 2 \times 2 \times 3 \times 3 \times 2 \times 2}$$

$$= \frac{5 \times 7}{2 \times 2 \times 2 \times 3 \times 2} = \frac{35}{48}$$

$$(iv) \sqrt{1 \frac{4}{5} \times 14 \frac{21}{44} \times 2 \frac{7}{55}}$$

Solution:

$$= \sqrt{\frac{9}{5} \times \frac{637}{44} \times \frac{117}{55}} = \sqrt{\frac{9 \times 637 \times 117}{5 \times 44 \times 55}}$$

$$= \sqrt{\frac{9 \times 7 \times 7 \times 13 \times 13 \times 9}{5 \times 11 \times 2 \times 2 \times 11 \times 5}} \quad (\text{Splitting the terms})$$

Taking L.C.M.

7	637
7	91
	13

9	117
	13

$$= \frac{9 \times 7 \times 13}{5 \times 11 \times 2} = \frac{819}{110} = 7 \frac{49}{110} \quad (\text{Expressing the answer in mixed fraction})$$

Question 7**Evaluate:**

$$(i) \sqrt{3^2 \times 6^3 \times 24}$$

$$(ii) \sqrt{(0.5)^3 \times 6 \times 3^5}$$

$$(iii) \sqrt{\left(5 + 2\frac{21}{25}\right) \times \frac{0.69}{16}}$$

$$(iv) \sqrt{5\left(2\frac{3}{4} - \frac{3}{10}\right)}$$

$$(v) \sqrt{248 + \sqrt{52} + \sqrt{144}}$$

$$(i) \sqrt{3^2 \times 6^3 \times 24}$$

Solution:

$$= \sqrt{3^2 \times 6^3 \times 2 \times 2 \times 6} = \sqrt{3^2 \times 6^4 \times 2^2}$$

$$= 3 \times 6^2 \times 2 = 3 \times 36 \times 2 = 216$$

$$(ii) \sqrt{(0.5)^3 \times 6 \times 3^5}$$

Solution:

$$= \sqrt{(0.5)^2 \times 0.5 \times 3 \times 2 \times 3^5}$$

$$= \sqrt{(0.5)^2 \times 0.5 \times 2 \times 3 \times 3^5}$$

$$= \sqrt{(0.5)^2 \times 1.0 \times 3^6} \quad [0.5 \times 2 = 1.0]$$

$$= \sqrt{(0.5)^2 \times 1 \times 3^6} = 0.5 \times 3^3$$

$$= 0.5 \times 27 = 13.5$$

$$(iii) \sqrt{\left(5 + 2\frac{21}{25}\right) \times \frac{0.69}{16}}$$

Solution:

$$= \sqrt{\left(5 + \frac{71}{25}\right) \times \frac{0.69}{1600}} = \sqrt{\frac{196}{25} \times \frac{169}{1600}}$$

$$= \sqrt{\frac{14 \times 14}{5 \times 5} \times \frac{13 \times 13}{40 \times 40}} = \frac{14 \times 13}{5 \times 40}$$

$$= \frac{7 \times 13}{5 \times 20} = \frac{91}{100} = 0.91$$

$$(iv) \sqrt{5\left(2\frac{3}{4} - \frac{3}{10}\right)}$$

Solution :

$$\sqrt{5\left(2\frac{3}{4} - \frac{3}{10}\right)} = \sqrt{5\left(\frac{11}{4} - \frac{3}{10}\right)}$$

$$= \sqrt{5\left(\frac{55-6}{20}\right)} = \sqrt{5\left(\frac{49}{20}\right)}$$

$$= \sqrt{\frac{5 \times 49}{20}} = \sqrt{\frac{49}{4}} = \sqrt{\frac{7 \times 7}{2 \times 2}}$$

$$= \frac{7}{2} = 3\frac{1}{2}$$

$$(v) \sqrt{248 + \sqrt{52 + \sqrt{144}}}$$

Solution:

$$= \sqrt{248 + \sqrt{52 + 12}} \quad (\because \sqrt{144} = 12)$$

$$= \sqrt{248 + \sqrt{64}} = \sqrt{248 + 8} \quad (\because \sqrt{64} = 8)$$

$$= \sqrt{256} = 16 \quad (\because \sqrt{256} = \sqrt{16 \times 16} = 16)$$

Question 8.

A man, after a tour, finds that he had spent day as many rupees as the number of days he had been on tour. How long did his tour last, if he had spent in all 1,296?

Solution:

Let the number of days he had spent =x

Number of rupees spent in each day =x

Total money spent = $x \times x = x^2 = 1,296$ (given)

$$\therefore x = \sqrt{1296}$$

4	1296
4	324
9	81
	9

$$\Rightarrow x = \sqrt{4 \times 4 \times 9 \times 9}$$

$$x = 4 \times 9 = 36$$

Hence required number of days =36

Question 9.

Out of 745 students, maximum are to be arranged in the school field for a PT. display, such that the number of rows is equal to the number of columns. Find the number of rows if 16 students were left out after the arrangement.

Solution:

Total number of students =745

Students left after standing in arrangement =16

No. of students who were to be arranged = 745-16=729

The number of rows =No. of students in each row

$$\text{No. of rows} = \sqrt{729}$$

3	729
3	243
3	81
3	27
3	9
3	3
1	

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

Question 10

13 and 31 is a strange pair of numbers such that that squares 169 and 961 are also mirror images of each other. Find two more such pairs.

Solution:

$$(13)^2 = 169 \text{ and } (31)^2 = 961$$

Similarly, two such number can be 12 and 21

$$\therefore (12)^2 = 144 \text{ and } (21)^2 = 441$$

and 102,201

$$(102)^2 = 102 \times 102 = 10404$$

$$\text{And, } (201)^2 = 201 \times 201 = 40401$$

Question 11.

Find the smallest perfect square divisible by 3, 4, 5 and 6.

Solution:

$$\text{L.C.M. of } 3, 4, 5, 6 = 2 \times 2 \times 3 \times 5 = 60$$

2	3,4,5,6
3	3,2,5,3
	1,2,5,1

In which 3 and 5 are not in pairs L.C.M = $2 \times 3 \times 2 \times 5 = 60$

We should multiple it by 3×5 i.e. by 15

Required perfect square = $60 \times 15 = 900$

Question 12.

If $\sqrt{784} = 28$, find the value of:

(i) $\sqrt{7.84} + \sqrt{78400}$

(ii) $\sqrt{0.0784} + \sqrt{0.000784}$

Solution:

(i) $\sqrt{784} = 28$

$$\sqrt{7.84} = \sqrt{\frac{784}{100}} = \frac{28}{10} = 2.8$$

$$\sqrt{78400} = \sqrt{28 \times 28 \times 10 \times 10}$$

$$= 28 \times 10 = 280$$

$$\sqrt{7.84} + \sqrt{78400} = 2.8 + 280 = 282.8$$

(ii) $\sqrt{0.0784} = \sqrt{\frac{784}{10000}} = \frac{28}{100} = 0.28$

$$\sqrt{0.000784} = \sqrt{\frac{784}{1000000}}$$

$$= \sqrt{\frac{28 \times 28}{10 \times 10 \times 10 \times 10 \times 10 \times 10}}$$

$$= \frac{28}{10 \times 10 \times 10} = \frac{28}{1000} = 0.028$$

$$\sqrt{0.0784} + \sqrt{0.000784} = 0.28 + 0.028 = 0.308$$

Question 1

Find the square root of:

(i) 4761

(ii) 7744

(iii) 15129

(iv) 0.2916

(v) 0.001225

(vi) 0.023104

(vii) 0.023104

Solution: (i) 4761

	69
6	4761 36
129	1161 1161
	×

Required square root =69

Solution: (ii) 7744

	88
8	7744 64
168	1344 1344
	×

Required square root =88

Solution: (iii) 15129

	123
1	15129
	1
22	51
	44
243	729
	729
	x

Required square root =123

Solution: (iv) 0.2916

	0.54
0.5	0.291
	6
	0.25
0.104	416
	416
	x

Required square root =0.54

Solution: (v) 0.001225

	0.035
0.03	0.001
	225
	9
0.065	325
	325
	x

Required square root = 0.035

Solution: (vi) 0.023104

	0.152
0.1	0.023
	104
	0.01
.25	131
	125
.302	604
	604
	x

Required square root = 0.152

Solution: (vii) 0.023104

	5.23
--	------

5	27.35
	29
	25
102	2.35
	2.04
1043	3129
	3129

Required square root = 5.23

Question 2

Find the square root of:

- (i) 4.2025
- (ii) 531.7636
- (iii) 0.007225

Solution:

	2.05
2	4.202
	5
	4
405	.2025
	.2025
	x

Required square root = 2.05

Solution: (ii) 531.7636

	23.06
2	531.7 636 4
43	131 129
4606	2.763 6 2.763 6
	x

Required square root = 23.06

Solution: (iii) 0.007225

	0.085
.8	.0072 25 64
0.165	825 825
	x

Required square root = 0.085

Question 3

Find the square root of:

- (i) 245 correct to two places of decimal.

- (ii) 496 correct to three places of decimal.
- (iii) 82.6 correct to two places of decimal.
- (iv) 0.065 correct to two places of decimal.
- (v) 5.2005 correct to two places of decimal.
- (vi) 0.602 correct to two places of decimal

Solution:

	15.65
1	245
	1
25	145
	125
306	2000
	1836
3125	16400
	15625
	775

Required square root = 15.65 up to two places of decimal.

Solution: (ii) 496 correct to three places of decimal.

	22.27
	1
2	496
	4

42	96
	84
442	1200
	884
4447	31600
	31129
44541	47100
	44541

Required square root = 22.2708=22.271 up to two places of decimal.

Solution: (iii) 82.6 correct to two places of decimal.

	9.088
9	82.60
	81
1808	16000
	14464
18168	15360
	0
	14532
	4

Required square root =9.088=9.09 up to two places of decimal.

Solution: (iv) 0.065 correct to two places of decimal.

	.2549
--	-------

.2	0.065 0 .04
.45	250 225
.504	2500 2016
.5089	48400 45801

Required square root = .255 up to two places of decimal.

Solution: (v) 5.2005 correct to two places of decimal.

	2.28
2	5.200 5 4
42	120 84
448	3605 3584
456	2100

Required square root = 2.28 up to two places of decimal.

Solution: (vi) 0.602 correct to two places of decimal

	0.775
0.7	0.602 0.49
0.147	1120 1029
1545	9100 7725
	1375

Required square root = 0.78 up to two places of decimal.

