

Excercise 2.4 (Solution)

(i) $\frac{49}{64}$

Sol: After Factorization

$$\sqrt{\frac{49}{64}} = \sqrt{\frac{7 \times 7}{8 \times 8}} = \frac{7}{8}$$

(ii) $\frac{121}{625}$

Sol: After Factorization

$$\sqrt{\frac{121}{625}} = \sqrt{\frac{11 \times 11}{25 \times 25}} = \frac{11}{25}$$

(iii) $\frac{196}{441}$

Sol: After Factorization

$$\sqrt{\frac{196}{441}} = \sqrt{\frac{14 \times 14}{21 \times 21}} = \frac{14}{21}$$

(iv) $1 \frac{13}{36} = \frac{49}{36}$

Sol: After Factorization

$$\sqrt{\frac{49}{36}} = \sqrt{\frac{7 \times 7}{6 \times 6}} = \frac{7}{6}$$

(v) $\frac{676}{729}$

2	676
2	338
3	169
3	13
1	

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

(vi) $12 \frac{24}{25} = \frac{324}{25}$

$$\sqrt{\frac{324}{25}} = \sqrt{\frac{18 \times 18}{5 \times 5}} = \frac{18}{5}$$

$$\frac{676}{729} = \frac{2 \times 2 \times 13 \times 13}{3 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$= \frac{2^2 \times 13^2}{3^2 \times 3^2 \times 3^2}$$

$$= \frac{2 \times 13}{3 \times 3 \times 3} = \frac{26}{9}$$

$$\frac{\sqrt{729}}{\sqrt{100}} = \frac{\sqrt{3^2 \times 3^2 \times 3^2}}{\sqrt{10^2}} = \frac{3 \times 3 \times 3}{10} = \frac{27}{10}$$

$$(iv) 1.44 = \frac{144}{100}$$

$$\frac{\sqrt{144}}{\sqrt{100}} = \frac{\sqrt{12 \times 12}}{\sqrt{10 \times 10}} = \frac{\sqrt{12^2}}{\sqrt{10^2}} = \frac{12}{10} = \frac{6}{5} = 1.2$$

$$(v) 1.69 = \frac{169}{100}$$

$$\frac{\sqrt{169}}{\sqrt{100}} = \frac{\sqrt{13 \times 13}}{\sqrt{10 \times 10}} = \frac{\sqrt{13^2}}{\sqrt{10^2}} = \frac{13}{10} = 1.3$$

$$(vi) 12.25 = \frac{1225}{100}$$

$$\frac{\sqrt{1225}}{\sqrt{100}} = \frac{\sqrt{5 \times 5 \times 7 \times 7}}{\sqrt{10 \times 10}}$$

$$= \frac{\sqrt{5^2 \times 7^2}}{\sqrt{10^2}}$$

$$= \frac{5 \times 7}{10} = \frac{35}{10} = 3.5$$

5	1225	10	100
5	245	10	10
2	49		1
7	7		
	1		

(2) Find Square Root by Division Method?

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

$$= \frac{12}{15}$$

$$\begin{array}{r} 12 \\ 1 \overline{) 144} \\ \underline{111} \\ 33 \\ \underline{33} \\ 0 \end{array}$$

$$\begin{array}{r} 15 \\ 1 \overline{) 225} \\ \underline{-1} \\ 125 \\ \underline{125} \\ 0 \end{array}$$

$$(ii) - \sqrt{\frac{169}{256}} = \frac{\sqrt{169}}{\sqrt{256}}$$

$$\frac{13}{16}$$

$$\begin{array}{r} 13 \\ 1 \overline{) 169} \\ \underline{-111} \\ 58 \\ \underline{58} \\ 0 \end{array}$$

$$\begin{array}{r} 16 \\ 1 \overline{) 256} \\ \underline{-1} \\ 156 \\ \underline{156} \\ 0 \end{array}$$

$$(iii) \sqrt{\frac{784}{841}} = \frac{\sqrt{784}}{\sqrt{841}}$$

$$\frac{28}{29}$$

$$\begin{array}{r} 28 \\ 2 \overline{) 784} \\ \underline{-4} \\ 384 \\ \underline{-384} \\ 0 \end{array}$$

$$\begin{array}{r} 29 \\ 2 \overline{) 841} \\ \underline{-4} \\ 441 \\ \underline{-441} \\ 0 \end{array}$$

$$(iv) \sqrt{\frac{1024}{1225}} = \frac{\sqrt{1024}}{\sqrt{1225}}$$

$$\frac{32}{35}$$

$$\begin{array}{r} 32 \\ 3 \overline{) 1024} \\ \underline{-9} \\ 124 \\ \underline{-124} \\ 0 \end{array}$$

$$\begin{array}{r} 35 \\ 3 \overline{) 1225} \\ \underline{-9} \\ 425 \\ \underline{-425} \\ 0 \end{array}$$

(v) 20.5209
 4.53

4	20.5209
	-16 11
8.5	4.52
	-4.25
9.03	0.2709
	0.2709
	α

$\sqrt{20.5209} = 4.53$

(vi) 648.7209

25.27

2	648.7209
	4 1 1
45	248
	-225
504	23.72
	-20.16
50.87	3.5609
	3.5609
	α
	87.256

$\sqrt{648.7209} = 25.27$

(vii) 8 7613.609536

	64
167	1213
	-1169
174.2	44.60
	34.84
174.5	9.7695
	-8.7225
174.506	1.047036
	1.047036
	α

$\sqrt{7613.609536} = 87$

$$(v) \ 5 \frac{41}{64} = \frac{361}{64}$$

$$\sqrt{\frac{361}{64}} = \frac{\sqrt{361}}{\sqrt{64}} = \frac{19}{8}$$

$$\begin{array}{r} 19 \\ \hline 1 \overline{) 361} \\ \underline{1} \\ 26 \\ \underline{26} \\ 0 \\ \hline \end{array} \quad \begin{array}{r} 8 \\ \hline 8 \overline{) 64} \\ \underline{64} \\ \hline 0 \end{array}$$

Exercise # 2.5

(1). Solution

$$(i). \ 1.21 = \frac{121}{100}$$

$$\sqrt{\frac{121}{100}} = \frac{\sqrt{11 \times 11}}{\sqrt{10 \times 10}} = \frac{\sqrt{11 \times 11}}{\sqrt{10^2}} = \frac{\sqrt{11^2}}{\sqrt{10^2}} = \frac{11}{10}$$

$$\frac{11}{10} = 1.1$$

$$(ii). \ 0.64 = \frac{64}{100}$$

$$\sqrt{\frac{64}{100}} = \frac{\sqrt{8 \times 8}}{\sqrt{10 \times 10}} = \frac{\sqrt{8^2}}{\sqrt{10^2}} = \frac{\sqrt{8^2}}{10} = \frac{8}{10} = \frac{4}{5}$$

$$(iii). \ 7.29 = \frac{729}{100}$$

$$\sqrt{\frac{729}{100}} = \frac{\sqrt{729}}{\sqrt{100}}$$

$$= \frac{\sqrt{3 \times 3 \times 3 \times 3 \times 3 \times 3}}{\sqrt{10 \times 10}}$$

$$\begin{array}{r|l} 3 & 729 \\ \hline 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 10 & 100 \\ \hline 10 & 10 \\ \hline & 1 \end{array}$$

Exercise # 2.6

Solutions

Find Square Root by division method up to three decimal place

(i) 2

$$\begin{array}{r} 1.414 \\ 1 \overline{) 2.0000000} \\ \underline{-1} \\ 1.00 \\ \underline{-0.96} \\ 0.0400 \\ \underline{-0.0281} \\ 0.011900 \\ \underline{-0.011296} \\ .000604 \end{array}$$

(ii) 3

$$\begin{array}{r} 1.732 \\ 1 \overline{) 3.0000000} \\ \underline{-1} \\ 2.00 \\ \underline{-1.89} \\ 0.1100 \\ \underline{-0.1029} \\ 0.007100 \\ \underline{-0.006924} \\ .000176 \end{array}$$

(2) Find Square Root by division method

(i) 0.3249

0.57

$$\begin{array}{r} 0.5 \overline{) 0.3249} \\ \underline{-0.2511} \\ 1.07 \overline{) 0.0749} \\ \underline{-0.0749} \\ \times \end{array}$$

$$\sqrt{0.3249} = \sqrt{0.57}$$

(ii) 0.5184

0.72

$$\begin{array}{r} 0.7 \overline{) 0.5184} \\ \underline{-0.4911} \\ 1.07 \overline{) 0.0284} \\ \underline{-0.0284} \\ \times \end{array}$$

$$\sqrt{0.5184} = \sqrt{0.72}$$

(iii) 10.24

3.2

$$\begin{array}{r} 3 \overline{) 10.24} \\ \underline{9} \\ 6.2 \overline{) 1.24} \\ \underline{-1.24} \\ \alpha \end{array}$$

$$\sqrt{10.24} = 3.2$$

(viii) 0.00868624

$$\begin{array}{r} 0.0932 \\ 0 \overline{) 0.00868624} \\ \underline{-0.008} \\ 0.183 \quad 0.000586 \\ \underline{-0.000549} \\ 0.1862 \quad 0.00003724 \\ \underline{-0.00003724} \\ 0 \end{array}$$

$$\sqrt{0.00868624} = 0.0932$$

(ix) 2374.6129

$$\begin{array}{r} 48.73 \\ 4 \overline{) 2374.6129} \\ \underline{-16} \\ 88 \quad 774 \\ \underline{-704} \\ 96.7 \quad 70.61 \\ \underline{-67.69} \\ 97.43 \quad 2.9229 \\ \underline{-2.9229} \\ \alpha \end{array}$$

$$\sqrt{2374.6129} = 48.73$$

$$\begin{array}{r|l}
 6.626 & 0.043906 \\
 & -0.039756 \\
 \hline
 & 0.004144
 \end{array}$$

$$\sqrt{11} = 3.316$$

$$\begin{array}{r|l}
 & 3.872 \\
 (vi) \ 3 & 15.000000 \\
 & -9 \\
 \hline
 6.8 & 6.00 \\
 & -5.44 \\
 \hline
 7.67 & 0.5600 \\
 & -0.5369 \\
 \hline
 7.742 & 0.023100 \\
 & -0.015484 \\
 \hline
 & 0.007616
 \end{array}$$

2). Find Square Root up to two decimal places.

$$(i) \ 3.6$$

$$\begin{array}{r|l}
 & 1.89 \\
 1 & 3.6000 \\
 & -1.11 \\
 \hline
 2.8 & 2.60 \\
 & -2.24 \\
 \hline
 3.69 & 0.3600 \\
 & 0.3321 \\
 \hline
 & 0.0279
 \end{array}$$

(iii)

5

$$\begin{array}{r} 2 \overline{) 5.000000} \\ \underline{-4} \\ 1.00 \\ \underline{-0.84} \\ 0.1600 \\ \underline{-0.1329} \\ 0.027100 \\ \underline{-0.026796} \\ \hline .000304 \end{array}$$

(iv)

7

$$\begin{array}{r} 2 \overline{) 7.000000} \\ \underline{-4} \\ 3.00 \\ \underline{-2.76} \\ 0.2400 \\ \underline{-0.2096} \\ 0.030400 \\ \underline{-0.026425} \\ \hline 0.003975 \end{array}$$

(v)

11

$$\begin{array}{r} 3 \overline{) 11.000000} \\ \underline{-9} \\ 2.00 \\ \underline{-1.89} \\ 0.1100 \\ \underline{0.0661} \end{array}$$

(v) 816.081

$$\begin{array}{r} 28.56 \\ 2 \overline{) 816.081} \\ \underline{-4} \\ 416 \\ \underline{-384} \\ 32.08 \\ \underline{-28.25} \\ 3.8310 \\ \underline{-3.4236} \\ 0.4074 \end{array}$$

$$\sqrt{816.081} = 28.56$$

(vi) 36.008

$$\begin{array}{r} 6.00 \\ 6 \overline{) 36.0080} \\ \underline{-36} \\ 0.0080 \end{array}$$

$$\sqrt{36.008} = 6.00$$



6.4 2.52

(ii)

$$\begin{array}{r} 2 \quad | \quad 6.4000 \\ \quad \quad | \quad -4 \quad \quad \quad \quad \\ \hline 4.5 \quad | \quad 2.40 \\ \quad \quad | \quad -2.25 \\ \hline 5.02 \quad | \quad 0.1500 \\ \quad \quad | \quad -0.1004 \\ \hline \quad \quad | \quad 0.0496 \end{array}$$

$$\sqrt{6.4} = 2.52$$

(iii) 28.09

5.37

$$\begin{array}{r} 5 \quad | \quad 28.09 \\ \quad \quad | \quad -25 \quad \quad \quad \quad \\ \hline 10.3 \quad | \quad 3.90 \\ \quad \quad | \quad -3.09 \\ \hline 10.67 \quad | \quad 0.8100 \\ \quad \quad | \quad -0.7469 \\ \hline \quad \quad | \quad 0.0631 \end{array}$$

$$\sqrt{28.09} = 5.37$$

(iv) 63.34

7.95

$$\begin{array}{r} 7 \quad | \quad 63.3400 \\ \quad \quad | \quad -49 \quad \quad \quad \quad \\ \hline 14.9 \quad | \quad 14.34 \\ \quad \quad | \quad -13.41 \\ \hline 15.85 \quad | \quad 0.9300 \\ \quad \quad | \quad -0.7925 \\ \hline \quad \quad | \quad 0.1375 \end{array}$$

$$\sqrt{63.34} = 7.95$$

(v) 816.081

$$\begin{array}{r} 28.56 \\ 2 \overline{) 816.081} \\ \underline{-4} \\ 416 \\ \underline{-384} \\ 32.08 \\ \underline{-28.25} \\ 3.8310 \\ \underline{-3.4236} \\ 0.4074 \end{array}$$

$$\sqrt{816.081} = 28.56$$

(vi) 36.008

$$\begin{array}{r} 6.00 \\ 6 \overline{) 36.0080} \\ \underline{-36} \\ 0.0080 \end{array}$$

$$\sqrt{36.008} = 6.00$$

