

Ch-1 - Squares and Square Roots

Ex 1.1

1. a) $(5)^2 = 5 \times 5 = 25$

b) $(11)^2 = 11 \times 11 = 121$

c) $(20)^2 = 20 \times 20 = 400$

2. a) 5 - It is not a perfect square because 5 has no square root

b) 100 - It is a perfect square because it has 0 in its units place

c) 17 - It is not a perfect square because its square root is not possible and its unit digit has 7.

$$\begin{aligned}
 3. \rightarrow a) & \sqrt{36} \\
 &= \sqrt{2^2 \times 3^2} \\
 &= (2^2 \times 3^2)^{\frac{1}{2}} \\
 &= (2 \times 3)^{2 \times \frac{1}{2}} \\
 &= 6
 \end{aligned}$$

$$\begin{array}{r|l}
 2 & 36 \\
 2 & 18 \\
 3 & 9 \\
 3 & 3 \\
 & 1
 \end{array}$$

$$\begin{aligned}
 b) & \sqrt{64} \\
 &= \sqrt{2^2 \times 2^2 \times 2^2} \\
 &= \sqrt{(2 \times 2 \times 2)^2} \\
 &= 2 \times 2 \times 2 \\
 &= 8
 \end{aligned}$$

$$\begin{array}{r|l}
 2 & 64 \\
 2 & 32 \\
 2 & 16 \\
 2 & 8 \\
 2 & 4 \\
 2 & 2 \\
 & 1
 \end{array}$$

P.T.O

$$\begin{aligned}
 c.) \quad & \sqrt{81} \\
 &= \sqrt{3^2 \times 3^2} \\
 &= \sqrt{(3 \times 3)^2} \\
 &= 3 \times 3 \\
 &= 9
 \end{aligned}$$

$$\begin{array}{r|l}
 3 & 81 \\
 \hline
 3 & 27 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 d.) \quad & \sqrt{100} \\
 &= \sqrt{2^2 \times 5^2} \\
 &= \sqrt{(2 \times 5)^2} \\
 &= 2 \times 5 \\
 &= 10
 \end{aligned}$$

$$\begin{array}{r|l}
 2 & 100 \\
 \hline
 2 & 50 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 & 1
 \end{array}$$

$$e.) \quad \sqrt{0} = 0$$

$$f.) \quad \sqrt{1} = 1$$

Ex 1.2

1.) $\sqrt{144}$

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

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

$$= 12$$

(H.W.)

2.) $\sqrt{196}$

$$= \sqrt{2^2 \times 7^2}$$

$$= 2 \times 7$$

$$= 14$$

3.) $\sqrt{225}$

$$= \sqrt{3^2 \times 5^2}$$

$$= 3 \times 5$$

$$= 15$$

$$\begin{aligned}
 5) \sqrt{169} \\
 &= \sqrt{13 \times 13} \\
 &= 13
 \end{aligned}$$

$$\begin{aligned}
 7) \sqrt{576} \\
 &= \sqrt{2^2 \times 2^2 \times 2^2 \times 3^2} \\
 &= 2 \times 2 \times 2 \times 3 \\
 &= 24
 \end{aligned}$$

$$\begin{aligned}
 9) \sqrt{1764} \\
 &= \sqrt{2^2 \times 3^2 \times 7^2} \\
 &= 2 \times 3 \times 7 \\
 &= 42
 \end{aligned}$$

$$\begin{aligned}
 11) \sqrt{7056} \\
 &= \sqrt{2^2 \times 2^2 \times 3^2 \times 7^2} \\
 &= 2 \times 2 \times 3 \times 7 \\
 &= 84
 \end{aligned}$$

(Homework)

$$\begin{aligned} 2.) \sqrt{196} \\ &= \sqrt{2^2 \times 7^2} \\ &= 2 \times 7 \\ &= 14 \end{aligned}$$

$$\begin{aligned} 4.) \sqrt{121} \\ &= \sqrt{11^2} \\ &= 11 \end{aligned}$$

$$\begin{aligned} 6.) \sqrt{289} \\ &= \sqrt{17^2} \\ &= 17 \end{aligned}$$

$$\begin{aligned} 8.) \sqrt{1521} \\ &= \sqrt{3^2 \times 13^2} \\ &= 3 \times 13 \\ &= 39 \end{aligned}$$

$$\begin{aligned} 5) \sqrt{169} \\ &= \sqrt{13 \times 13} \\ &= 13 \end{aligned}$$

$$\begin{aligned} 7) \sqrt{576} \\ &= \sqrt{2^2 \times 2^2 \times 2^2 \times 3^2} \\ &= 2 \times 2 \times 2 \times 3 \\ &= 24 \end{aligned}$$

$$\begin{aligned} 9) \sqrt{1764} \\ &= \sqrt{2^2 \times 3^2 \times 7^2} \\ &= 2 \times 3 \times 7 \\ &= 42 \end{aligned}$$

$$\begin{aligned} 11) \sqrt{7056} \\ &= \sqrt{2^2 \times 2^2 \times 3^2 \times 7^2} \\ &= 2 \times 2 \times 3 \times 7 \\ &= 84 \end{aligned}$$

(homework)

$$\begin{aligned} 2.) & \sqrt{196} \\ &= \sqrt{2^2 \times 7^2} \\ &= 2 \times 7 \\ &= 14 \end{aligned}$$

$$\begin{aligned} 4.) & \sqrt{121} \\ &= \sqrt{11^2} \\ &= 11 \end{aligned}$$

$$\begin{aligned} 6.) & \sqrt{289} \\ &= \sqrt{17^2} \\ &= 17 \end{aligned}$$

$$\begin{aligned} 8.) & \sqrt{1521} \\ &= \sqrt{3^2 \times 13^2} \\ &= 3 \times 13 \\ &= 39 \end{aligned}$$

$$10) \sqrt{5625}$$

$$= \sqrt{3^2 \times 5^2 \times 5^2}$$

$$= \cancel{98} 3 \times 5 \times 5$$

$$= 75$$

$$12) \sqrt{53361}$$

$$= \sqrt{3^2 \times 7^2 \times 11^2}$$

$$= 3 \times 7 \times 11$$

$$= 231$$

Ex 1.3

$$1) 845 = 13^2 \times \underline{5}$$

We will multiply 5 to make it a perfect square

2) $3468 = 2^2 \times 17^2 \times 3$

We will multiply 3 to make it a perfect square

$$\begin{array}{r|l} 2 & 3468 \\ \hline 2 & 1734 \\ \hline 3 & 867 \\ \hline 17 & 289 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

3) $468 = 2^2 \times 3^2 \times 13$
13 is to be multiplied

$$\sqrt{468 \times 13} = \sqrt{2^2 \times 3^2 \times 13^2}$$

$$\sqrt{6084} = 2 \times 3 \times 13 = 78$$

$$\begin{array}{r|l} 2 & 468 \\ \hline 2 & 234 \\ \hline 3 & 117 \\ \hline 3 & 39 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

4) $2178 = 2 \times 3^2 \times 11^2$

We will divide by 2 to make it a perfect square

$$\begin{array}{r|l} 2 & 2178 \\ \hline 3 & 1089 \\ \hline 3 & 363 \\ \hline 11 & 129 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

$$6.) \quad \begin{array}{c} 4225 \\ 8450 \end{array} = \frac{2 \times 5^2 \times 13^2}{2}$$

$$\begin{aligned} \sqrt{4225} &= \sqrt{5^2 \times 13^2} \\ &= 5 \times 13 \\ &= 65 \end{aligned}$$

$$\begin{array}{r|l} 2 & 8450 \\ 5 & 4225 \\ 5 & 845 \\ 13 & 169 \\ 13 & 13 \\ & 1 \end{array}$$

Ex 1.4

$$1.) \quad \begin{array}{r} 2 \overline{) 784} 28 \\ \underline{2} \quad \underline{-4} \\ 48 \quad 384 \\ \underline{-384} \\ \hline X \end{array}$$

$$\sqrt{784} = 28$$

P.T.O

3.)

$$\begin{array}{r} 3 \overline{) 961} \overline{) 31} \\ \underline{3} \quad \underline{-9} \\ 61 \quad \times 61 \\ \underline{-61} \\ \times \end{array}$$

$$\sqrt{961} = 31$$

5.)

$$\begin{array}{r} 7 \overline{) 5329} \overline{) 73} \\ \underline{7} \quad \underline{-49} \\ 143 \quad \times 429 \\ \underline{-429} \\ \times \end{array}$$

$$\sqrt{5329} = 73$$

7.) P.O.T.O

7.)

$$\begin{array}{r}
 1 \overline{) 21609} \quad 147 \\
 \underline{1} \quad -1 \\
 24 \quad 116 \\
 \underline{4} \quad 96 \\
 287 \quad 2009 \\
 \underline{2009} \\
 \hline
 X
 \end{array}$$

$$\sqrt{21609} = 147$$

$$\begin{array}{r}
 0 \\
 24 \\
 \hline
 96
 \end{array}$$

9.)

$$\begin{array}{r}
 3 \overline{) 95481} \quad 309 \\
 \underline{3} \quad -9 \\
 60 \quad 054 \\
 \underline{0} \quad 0 \\
 609 \quad 5481 \\
 \underline{5481} \\
 \hline
 X
 \end{array}$$

$$\sqrt{95481} = 309$$

Ex 1.5

1. >

$$\begin{array}{r} 47 \\ 49 \overline{) 2275} \\ \underline{4 - 16} \\ 87 675 \\ \underline{- 609} \\ 66 \end{array}$$

We will subtract 66 from 2275 to make it a perfect square

$$2275 - 66 = 2209$$

3. >

$$\begin{array}{r} 75 \\ 7 \overline{) 5687} \\ \underline{7 49} \\ 145 787 \\ \underline{725} \\ 62 \end{array}$$

$$\begin{array}{r} 76 \\ 7 \overline{) 5687} \\ \underline{7 49} \\ 146 787 \\ \underline{876} \end{array}$$

$$876 - 787 = 89$$

We will add 89 with 5687 to make it a perfect square

(Homework) Ex 1.3

5.) $3920 = 2^2 \times 2^2 \times 7^2 \times 5$

We will divide by 2
to make it a perfect
square.

2	3920
2	1960
2	980
2	490
5	245
7	49
7	7
	1

Ex 1.4 (H.W)

2.)

	29	
2	841	1
2	4	
49	441	
	-441	
	0	

$\therefore \sqrt{841} = 29$

$$8) \quad \begin{array}{r} 193 \\ 1 \overline{) 37249} \end{array}$$

$$\begin{array}{r} 1 \\ -1 \end{array}$$

$$29 \quad 272$$

$$9 - 261$$

$$383 \quad 1149$$

$$\begin{array}{r} -1149 \\ \hline \end{array}$$

$$0$$

$$\therefore \sqrt{37249} = 193$$

10)

$$\begin{array}{r} 329 \\ 3 \overline{) 108241} \end{array}$$

$$\begin{array}{r} 3 \\ -3 \end{array}$$

$$62 \quad 182$$

$$\begin{array}{r} 2 \\ -2 \end{array}$$

$$649 \quad 5841$$

$$\begin{array}{r} -5841 \\ \hline \end{array}$$

$$0$$

$$\therefore \sqrt{108241} = 329$$

ex 1.5 (H.W)

17

2.)

$$\begin{array}{r} 125 \\ 1 \overline{) 15675} \\ \underline{1} \\ 22 56 \\ \underline{2} 44 \\ 245 1275 \\ \underline{1225} \\ 50 \end{array}$$

$$\begin{array}{r} 2 \\ 245 \\ \underline{5} \\ 1205 \end{array}$$

50 must be subtracted from 15675 to make it a perfect square

$$15675 - 50 = 15625$$

3.)

P.T.O

3)

$$\begin{array}{r} 75 \\ 7 \overline{) 5687} \\ \underline{7} \quad 49 \\ 145 \quad 787 \\ \underline{725} \\ 62 \end{array}$$

$$\begin{array}{r} 76 \\ 7 \overline{) 5687} \\ \underline{7} \quad 49 \\ 146 \quad 787 \\ \underline{876} \end{array}$$

$$876 - 787 = 89$$

We will add 89 with 5687 to make it a perfect square.

ex 1.5 (continued)

5)

$$\begin{array}{r} 31 \\ 3 \overline{) 1000} \\ \underline{3} \quad 9 \\ 61 \quad 100 \\ \underline{-61} \\ 39 \end{array}$$

$$\begin{array}{r} 32 \\ 3 \overline{) 1000} \\ \underline{3} \quad 9 \\ 62 \quad 100 \\ \underline{124} \end{array}$$

$$124 - 100 = 24$$

18

$$\begin{array}{r} 146 \\ 3 \overline{) 518} \\ \underline{42} \\ 76 \end{array} \quad \begin{array}{r} 145 \\ 3 \overline{) 513} \\ \underline{42} \\ 75 \end{array}$$

∴ The smallest 4 digit perfect square =
 $1000 + 24 = 1024$

6) Greatest 4 digit no. = 9999

$$\begin{array}{r} 99 \\ 9 \overline{) 9999} \\ \underline{9 \quad 81} \\ 189 \quad 1899 \\ \underline{1701} \\ 198 \end{array}$$

∴ The no. will be $(9999 - 198) = 9801$

7) a)

2	<u>8, 12, 42</u>	$L.C.M = 2^2 \times 2 \times 3 \times 7$ To make perfect square $= 2^2 \times 2^2 \times 3^2 \times 7^2$ $= 4 \times 4 \times 9 \times 49$ $= 7056$
2	<u>4, 6, 21</u>	
2	<u>2, 3, 21</u>	
3	<u>1, 3, 21</u>	
7	<u>1, 1, 7</u>	
	<u>1, 1, 1</u>	

8.) ^{let} No. of rows = No. of soldiers = x

$$\begin{aligned} x \times x &= 2500 \\ \Rightarrow x^2 &= 2500 \\ x &= \sqrt{2500} \\ &= \sqrt{2^2 \times 5^2 \times 5^2} \\ &= 2 \times 5 \times 5 \\ &= 50 \end{aligned}$$

9.) $(\text{side})^2 = 293764$
 $\text{side} = \sqrt{293764} = 542\text{m}$

$$\begin{array}{r} 542 \\ 5 \overline{) 293764} \\ \underline{5 \ 25} \\ 104 \ 437 \\ \underline{4 \ 416} \\ 1082 \ 2104 \\ \underline{2104} \\ 0 \end{array}$$

$$\begin{array}{r} 20 \\ 2 \overline{) 2500} \\ \underline{2 \ 10} \\ 5 \ 625 \\ \underline{5 \ 125} \\ 5 \ 25 \\ \underline{5 \ 5} \\ 1 \end{array}$$

$$\begin{aligned}
 P &= 4 \times \text{side} \\
 &= (4 \times 542) \text{ m} \\
 &= 2168 \text{ m}
 \end{aligned}$$

(H.W)

7b.)

$$2 \mid 6, 27, 14$$

$$3 \mid 3, 27, 7$$

$$3 \mid 1, 9, 7$$

$$3 \mid 1, 3, 7$$

$$7 \mid 1, 1, 7$$

$$1, 1, 1$$

$$L.C.M = 3^2 \times 3 \times 7 \times 2$$

To make perfect square

$$= 2^2 \times 3^3 \times 3^2 \times 7^2$$

$$= 15876$$

(H.W)

10e)

Let no. of trees = No. of rows = x

$$x \times x = 3025$$

$$x^2 = 3025$$

$$x = \sqrt{3025} = 55$$

Ans - No. of rows = 55

(H.W)

11.) let no. of students in each row = x
No. of rows = x

$$\begin{aligned}x \times x &= 3481 \\x^2 &= 3481 \\x &= \sqrt{3481} \\x &= 59\end{aligned}$$

$$\begin{array}{r}59 \\5 \overline{) 3481} \\ \underline{25} \\109 \\ \underline{981} \\0\end{array}$$

$\therefore$ No. of students in each row = x

(H.W)

4.)

$$\begin{array}{r}93 \\9 \overline{) 8743} \\ \underline{81} \\183 \\ \underline{180} \\3\end{array}$$

$$\begin{array}{r}94 \\9 \overline{) 8743} \\ \underline{81} \\184 \\ \underline{180} \\4\end{array}$$

$$736 - 643 = 93$$

93 must be added to 8743 to make it a perfect square.

12) 16, 25, 36, 49

$$\sqrt{16} = 4$$

$$\sqrt{25} = 5$$

$$\sqrt{36} = 6$$

$$\sqrt{49} = 7$$

Here 5 & 7 are prime nos.

13) $\sqrt{8}$

$$\begin{array}{r} 2.828 \\ 2 \overline{) 8.000000} \\ \underline{2 } 4 \\ 48 406 \\ \underline{8 } -384 \\ 562 1600 \\ \underline{2 } 1124 \\ 5648 47600 \\ -45184 \\ \hline 2416 \end{array}$$

Non terminating non
recurring decimal
 $\therefore \sqrt{8}$ is irrational

(H.W)

22

11.) let no. of students in each row = x
No. of rows = x

$$x \times x = 3481$$

$$x^2 = 3481$$

$$x = \sqrt{3481}$$

$$x = 59$$

$$\begin{array}{r} 59 \\ 5 \overline{) 3481} \\ \underline{25} \\ 109 \\ \underline{981} \\ 0 \end{array}$$

$\therefore$ No. of students in each row = x

(H.W)

4.)

$$\begin{array}{r} 93 \\ 9 \overline{) 8743} \\ \underline{9} 81 \\ 183 643 \\ \underline{- 549} \end{array}$$

$$\begin{array}{r} 94 \\ 9 \overline{) 8743} \\ \underline{9} 81 \\ 184 643 \\ \underline{- 736} \end{array}$$

$$\begin{array}{r} 94 \\ 9 \overline{) 8743} \\ \underline{9} 81 \\ 184 643 \\ \underline{- 736} \end{array}$$

$$736 - 643 = 93$$

93 must be added to 8743 to make it a perfect square.

$$15) (side)^2 = L \times B$$

$$(side)^2 = 64 \times 25$$

$$side = \sqrt{64 \times 25}$$

$$= \sqrt{2^2 \times 2^2 \times 2^2 \times 5^2}$$

$$= (2 \times 2 \times 2 \times 5) \text{ dm}$$

$$side = 40 \text{ dm}$$

$$16) 1 \text{ hectare} = 10,000 \text{ m}^2$$

$$62 \text{ hectares} = 6250000 \text{ m}^2$$

$$(side)^2 = 6250000 \text{ m}^2$$

$$side = \sqrt{6250000}$$

$$= 2500 \text{ m}$$

$$\begin{array}{r} 2 \\ 2 \overline{) 2500} \\ \underline{4} \\ 10 \\ \underline{10} \\ 00 \\ \underline{00} \\ 00 \\ \underline{00} \\ 00 \end{array}$$

$$\text{Perimeter} = 4 \times side = (4 \times 2500) \text{ m} = 10000 \text{ m}$$

$$\text{Cost of fencing} = \text{Rs } 1.50 \times 10000 = \text{Rs } 15000$$

$$1 \text{ Re} \rightarrow 1 \text{ m}^2$$

$$1 \text{ Re} \rightarrow 2 \text{ m}^2$$

$$\text{Rs } 220.5 = 220.5 \times 2 \\ = 441 \text{ m}^2$$

$$(\text{side})^2 = 441 \text{ m}^2$$

$$\text{side} = \sqrt{441} \\ = \sqrt{3^2 \times 7^2} = 3 \times 7 = 21 \text{ m}$$

Length of fence = Perimeter

$$= 4 \times \text{side}$$

$$= 4 \times 21$$

$$= 84 \text{ m}$$

The cost of fencing

$$= 84 \times 22.50$$

$$= \text{Rs } 1890$$

$$\begin{array}{r} 3 \overline{) 441} \\ 3 \overline{) 147} \\ 7 \overline{) 49} \\ 7 \overline{) 7} \\ 1 \end{array}$$

$$\begin{array}{r} 24 \\ 22 \overline{) 500} \\ \times 84 \\ \hline 1800 \\ 18900 \end{array}$$

19.10) No. of 50p coin = No. of touring days = x

$$\frac{x \times x}{2} = 924.5$$

$$x^2 = 2 \times 924.5$$

$$x^2 = 1849$$

$$x = \sqrt{1849}$$

$$x = 43 \text{ days}$$

$$\begin{array}{r} 43 \\ 4 \overline{) 1849} \\ \underline{16} \\ 249 \\ \underline{249} \\ 0 \end{array}$$

$$\begin{array}{r} 924.5 \\ \times 2 \\ \hline 1849.0 \end{array}$$

14.11) (i) 24

$$\sqrt{24} = 4.898$$

$$\sqrt{24} = 4.898 \text{ (nearly)}$$

$$\begin{array}{r} 4 \\ \underline{16} \end{array}$$

$$\begin{array}{r} 88 \\ 800 \end{array}$$

$$\begin{array}{r} 8 \\ \underline{704} \end{array}$$

$$\begin{array}{r} 969 \\ 9606 \end{array}$$

$$\begin{array}{r} 9 \\ \underline{-8721} \end{array}$$

$$\begin{array}{r} 9788 \\ 87900 \end{array}$$

$$\begin{array}{r} -78304 \end{array}$$

$$\begin{array}{r} 9696 \end{array}$$

$$\begin{array}{r} 788 \\ 9789 \\ \hline 88101 \\ 89 \\ 9 \\ 801 \\ 8721 \\ 688 \\ 304 \\ 969 \\ 8721 \\ 788 \\ 9789 \\ \hline 88101 \\ 704 \end{array}$$

(ii) 47

$$\begin{array}{r} 6.855 \\ 6 \overline{) 47.00000} \\ \underline{6} \quad 36 \\ 128 \quad 1100 \\ \underline{8} \quad 1024 \\ 1365 \quad 7600 \\ \underline{5} \quad 6825 \\ 13765 \quad 77500 \\ \underline{68525} \\ 8975 \end{array}$$

$$\sqrt{47} = 6.855 \text{ (nearly)}$$

(iii) P.T.O

27

$$\begin{array}{r} 2^8 2^6 \\ 2 \overline{) 29} \quad 2 \overline{) 28} \\ \underline{1161} \quad \underline{1024} \end{array}$$

$$\begin{array}{r} 2^4 2^3 \\ 2 \overline{) 1367} \quad 2 \overline{) 1366} \\ \underline{8202} \quad \underline{8196} \\ 1^3 2 \\ 1 \overline{) 365} \\ \underline{5} \\ 6825 \end{array}$$

$$\begin{array}{r} 3^4 \\ 1 \overline{) 3705} \quad 2^4 \\ \underline{5} \quad \underline{8222} \\ 68525 \end{array}$$

(ii) 59

$$\begin{array}{r}
 7.681 \\
 7 \overline{) 59.000000} - \\
 \underline{7 \quad 49} \\
 146 \quad 1000 \\
 \underline{6 \quad 876} \\
 1528 \quad 12400 \\
 \underline{8 \quad 12224} \\
 15361 \quad 17600 \\
 \underline{15361} \\
 1239
 \end{array}$$

$$\sqrt{59} = 7.681 \text{ (nearly)}$$

$$\begin{array}{r}
 8 \\
 4149 \\
 \underline{1341} \\
 347 \quad 346 \quad 21526 \\
 \underline{7} \quad \underline{6} \quad \underline{5} \\
 1029 \quad 876 \quad 7625 \\
 31527 \quad 41528 \\
 \underline{7} \quad \underline{8} \\
 16689 \quad 12224 \\
 71529 \quad 323 \\
 \underline{9} \quad \underline{6} \\
 1261 \quad 1536 \\
 9216
 \end{array}$$

$$\begin{array}{r}
 1153.6 \\
 15362 \\
 \underline{2} \\
 30724
 \end{array}$$

(iv) 77

$$\begin{array}{r} 8.774 \\ 8 \overline{) 77.00000} \\ \underline{8 64} \\ 167 1300 \\ \underline{7 1169} \\ 1747 13100 \\ \underline{7 12229} \\ 17549 87100 \\ 70176 \\ \underline{6924} \end{array}$$

$$\therefore \sqrt{77} = 8.774 \text{ (nearly)}$$

(v) P.T.O

29

$$\begin{array}{r} 5 168 167 \\ \underline{8 1344} 1169 \end{array}$$

$$\begin{array}{r} 9 749 1248 \\ \underline{9 15741} 1222 \end{array}$$

$$\begin{array}{r} 9 749 325 \\ \underline{9 15741} 7017 \\ 3222 \\ \underline{17545} \\ 87725 \end{array}$$

(v) 94

$$\begin{array}{r} 9 \overline{) 94.000000} \\ \underline{9 } 81 \\ 186 1300 \\ \underline{6 } 1116 \\ 1929 18400 \\ \underline{9 } 17361 \\ 19385 103900 \\ \underline{96925} \\ 6975 \end{array}$$

$$\sqrt{94} = 9.695$$

30

$$\begin{array}{r} 88 2 4 \\ 189 586 187 \\ \underline{9 } 1116 1309 \end{array}$$

$$\begin{array}{r} 7128 828 \\ 15424 1261 \end{array}$$

$$\begin{array}{r} 17361 6388 \\ \underline{1039} 174501 \end{array}$$

$$\begin{array}{r} 4142 \\ 19385 \\ \underline{96925} \end{array}$$

$$\begin{array}{r} 5263 \\ 19386 \\ \underline{6} \\ 112316 \end{array}$$

(H.W) 18) Total no. of soldiers = 16,160
 No. of soldiers over = 31
 No. of soldiers in the solid square = $(16160 - 31)$
 $= 16129$

31

Let no. of soldiers in the front be x
A.T.Q

$$x \times x = 16129$$

$$x^2 = 16129$$

$$x = \sqrt{16129}$$

$$x = 127$$

$$\begin{array}{r} 127 \\ 1 \overline{) 16129} \\ \underline{22} \\ 2 \\ \underline{247} \\ 1729 \\ \underline{-1729} \\ 0 \end{array}$$

$$\begin{array}{r} 23 \\ 22 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 3 \\ 247 \\ \hline 1729 \end{array}$$

Ans No. of soldiers in front
 $= 127$

(H.W)

20) Money collected = Rs 92.16
= 9216 P

Let no. of members = money contributed by each member (in P)

Ans

$$x \times x = 9216$$

$$x^2 = 9216$$

$$x = \sqrt{9216}$$

$$x = 96$$

$$\begin{array}{r} 96 \\ 9 \overline{) 9216} \\ \underline{9 } \\ 186 \\ \underline{180 } \\ 66 \\ \underline{63 } \\ 36 \\ \underline{36 } \\ 0 \end{array}$$

$$\begin{array}{r} 96 \\ 9 \overline{) 9216} \\ \underline{9 } \\ 186 \\ \underline{180 } \\ 66 \\ \underline{63 } \\ 36 \\ \underline{36 } \\ 0 \end{array}$$

Ans - No. of members = 96

Ex. 1.6

33

$$1.) \sqrt{\frac{81}{121}} = \frac{\sqrt{3^2 \times 3^2}}{\sqrt{11^2}} = \frac{3 \times 3}{11} = \frac{9}{11} \text{ (Ans)}$$

$$2.) \sqrt{\frac{225}{289}} = \frac{\sqrt{3^2 \times 5^2}}{\sqrt{17^2}} = \frac{3 \times 5}{17} = \frac{15}{17} \text{ (Ans)}$$

$$3.) \sqrt{\frac{841}{1521}} = \frac{\sqrt{(29)^2}}{\sqrt{(39)^2}}$$

$$= \frac{29}{39} \text{ (Ans)}$$

$$\begin{array}{r} 29 \\ 2 \overline{) 841} \\ \underline{4} \\ 49 \\ \underline{44} \\ 0 \end{array}$$

$$\begin{array}{r} 39 \\ 3 \overline{) 1521} \\ \underline{9} \\ 69 \\ \underline{62} \\ 0 \end{array}$$

3)

$$5) \sqrt[3]{\frac{1849}{3249}}$$

$$= \frac{\sqrt{(43)^2}}{\sqrt{(57)^2}}$$

$$= \frac{43}{57} \text{ (Ans)}$$

$$\begin{array}{r} 43 \\ 4 \overline{) 1849} \\ \underline{416} \\ 83249 \\ \underline{-249} \\ 0 \end{array}$$

$$\begin{array}{r} 57 \\ 5 \overline{) 3249} \\ \underline{525} \\ 107749 \\ \underline{749} \\ 0 \end{array}$$

$$\begin{array}{r} 83 \\ 8 \overline{) 249} \\ \underline{249} \\ 0 \end{array}$$

$$6) \sqrt[3]{\frac{4761}{7396}}$$

$$= \frac{\sqrt{(69)^2}}{\sqrt{(86)^2}}$$

$$= \frac{69}{86} \text{ (Ans)}$$

$$\begin{array}{r} 69 \\ 6 \overline{) 4761} \\ \underline{636} \\ 1291161 \\ \underline{-1161} \\ 0 \end{array}$$

$$\begin{array}{r} 86 \\ 8 \overline{) 7396} \\ \underline{864} \\ 166996 \\ \underline{-996} \\ 0 \end{array}$$

$$\begin{array}{r} 8 \\ 8 \overline{) 249} \\ \underline{1161} \\ 9266 \\ \underline{996} \\ 0 \end{array}$$

$$9. \rightarrow \sqrt{65536}$$

$$115600$$

$$= \sqrt{(256)^2}$$

$$\sqrt{(340)^2}$$

$$= \frac{64}{256} \text{ (Ans)}$$

$$34085$$

$$= \frac{64}{85} \text{ (Ans)}$$

$$2 \sqrt{65536}$$

$$2 \quad 4$$

$$45 \quad 255$$

$$5 \quad 225$$

$$506 \quad 3036$$

$$3036$$

$$0$$

$$3 \sqrt{115600}$$

$$3 \quad 9$$

$$64 \quad 256$$

$$4 \quad 256$$

$$680 \quad \bullet 80$$

$$35$$

$$\begin{array}{r} 1 \\ 44 \\ 4 \\ 176 \end{array} \quad \begin{array}{r} 6 \\ 48 \\ 8 \\ 384 \end{array} \quad \begin{array}{r} 3 \\ 46 \\ 6 \\ 276 \end{array}$$

$$\begin{array}{r} 506 \\ 6 \\ 3036 \end{array}$$

$$\begin{array}{r} 3 \\ 66 \\ 6 \\ 296 \end{array} \quad \begin{array}{r} 1 \\ 64 \\ 4 \\ 256 \end{array}$$

$$10) \sqrt{1 \frac{24}{25}} = \sqrt{\frac{49}{25}} = \sqrt{\left(\frac{7}{5}\right)^2} = \frac{7}{5} = 1 \frac{2}{5}$$

$$12) \sqrt{2 \frac{42}{75}} = \sqrt{\frac{192}{75}}$$

$$= \sqrt{\frac{2^2 \times 2^2 \times 2^2}{5^2}} = \frac{2 \times 2 \times 2}{5} = \frac{8}{5} = 1 \frac{3}{5}$$

$$13) \sqrt{2 \frac{433}{1296}} = \sqrt{\frac{3025}{1296}}$$

$$= \sqrt{\left(\frac{55}{36}\right)^2}$$

$$\begin{array}{r} 55 \\ 5 \overline{) 3025} \\ \underline{5 \ 25} \\ 105 \ 525 \\ \underline{525} \\ 0 \end{array}$$

$$\begin{array}{r} 1296 \\ \times \quad 2 \\ \hline 2592 \\ + 4332 \\ \hline 3025 \end{array}$$

37

$$= \frac{55}{36}$$

$$= 1 \frac{19}{36}$$

$$\begin{array}{r} 36 \\ 3 \overline{) 1296} \\ \underline{9} \\ 66 \\ \underline{396} \\ 396 \\ \underline{0} \end{array}$$

$$14.) \sqrt{1 \frac{424}{2601}} = \sqrt{\frac{3025}{2601}}$$

$$= \sqrt{\left(\frac{55}{51}\right)^2}$$

$$= \frac{55}{51}$$

$$= 1 \frac{4}{51}$$

$$\begin{array}{r} 51 \\ 5 \overline{) 2601} \\ \underline{25} \\ 101 \\ \underline{101} \\ 0 \end{array}$$

$$\begin{array}{r} 2601 \\ 424 \\ \hline 3025 \end{array}$$

$$\begin{array}{r} 55 \\ 5 \overline{) 3025} \\ \underline{25} \\ 105 \\ \underline{525} \\ 0 \end{array}$$

$$15 \Rightarrow \sqrt{3 \frac{334}{3025}} = \sqrt{\frac{9409}{3025}}$$

$$= \frac{\sqrt{(97)^2}}{\sqrt{(55)^2}}$$

$$= \frac{97}{55}$$

$$= 1 \frac{42}{55}$$

P.T.O

$$\begin{array}{r} 97 \\ 9 \overline{) 9409} \\ 81 \\ \underline{1309} \end{array}$$

$$\begin{array}{r} 1309 \\ \underline{1309} \\ 0 \end{array}$$

$$\begin{array}{r} 55 \\ 5 \overline{) 3025} \\ 25 \\ \underline{525} \end{array}$$

$$\begin{array}{r} 105 \\ 5 \overline{) 525} \\ 525 \\ \underline{0} \end{array}$$

$$\begin{array}{r} 187 \\ 1309 \overline{) 3025} \\ 25 \\ \underline{9075} \end{array}$$

$$\begin{array}{r} 9075 \\ \underline{9075} \\ 0 \end{array}$$

$$\begin{array}{r} 97 \\ 55 \overline{) 525} \\ 42 \\ \underline{105} \end{array}$$

Ex 1.7

39

1. $\rightarrow 44.89$

$\therefore \sqrt{44.89} = 6.7$

$$\begin{array}{r} 6.7 \\ 6 \overline{) 44.89} \\ \underline{6 36} \\ 127 889 \\ \underline{889} \\ 0 \end{array}$$

$$\begin{array}{r} 168 \\ \underline{1344} \end{array}$$

3. $\rightarrow$

$\therefore \sqrt{77.44} = 8.8$

$$\begin{array}{r} 8.8 \\ 8 \overline{) 77.44} \\ \underline{8 64} \\ 168 1344 \\ \underline{1344} \\ 0 \end{array}$$

~~Ex 1.7~~

S.P.T.O

$$\begin{array}{r}
 31.6 \\
 3 \overline{) 998.56} \\
 \underline{3 9} \\
 61 98 \\
 \underline{1 61} \\
 626 3756 \\
 \underline{3756} \\
 0
 \end{array}$$

$$\therefore \sqrt{998.56} = 31.6$$

$$\begin{array}{r}
 3 \\
 626 \\
 \underline{3756}
 \end{array}$$

$$\begin{array}{r}
 0.71 \\
 7 \overline{) 0.5041} \\
 \underline{7 49} \\
 141 \\
 \underline{141} \\
 0
 \end{array}$$

$$\therefore \sqrt{0.5041} = 0.71$$

$$9.) \sqrt{0.005329}$$

$$0 = 00$$

$$04 \quad 053$$

$$\begin{array}{r} 7 \quad 49 \\ 143 \quad 429 \end{array}$$

$$\begin{array}{r} -429 \\ \hline 0 \end{array}$$

$$\therefore \sqrt{0.005329} = 0.073$$

~~(Homework) Ex 1.6~~

$$4.) \frac{1089}{1681}$$

$$= \frac{\sqrt{(33)^2}}{\sqrt{(41)^2}}$$

$$= \frac{33}{41}$$

$$3 \overline{) 1089}$$

$$\begin{array}{r} 3 \quad 9 \\ 63 \quad 189 \end{array}$$

$$\begin{array}{r} 189 \\ \hline 0 \end{array}$$

$$4 \overline{) 1681}$$

$$\begin{array}{r} 4 \quad 16 \\ 81 \quad 081 \end{array}$$

$$\begin{array}{r} 81 \\ \hline 0 \end{array}$$

$$\frac{33}{41}$$

$$7 \rightarrow \sqrt{9409}$$

$$= \frac{\sqrt{(97)^2}}{\sqrt{(132)^2}}$$

$$= \frac{97}{132}$$

$$\begin{array}{r} 97 \\ 9 \overline{) 9409} \\ \underline{9 81} \\ 184 1309 \\ \underline{1309} \\ 0 \end{array}$$

$$\begin{array}{r} 132 \\ 1 \overline{) 17424} \\ \underline{1 1} \\ 23 074 \\ \underline{3 69} \\ 262 524 \\ \underline{524} \\ 0 \end{array}$$

$$\begin{array}{r} 187 \\ 1309 \end{array} \quad \begin{array}{r} 23 \\ 69 \end{array} \quad \begin{array}{r} 1 \\ 824 \end{array}$$

$$8 \rightarrow \sqrt{53824}$$

$$= \frac{\sqrt{(232)^2}}{\sqrt{(309)^2}}$$

$$= \frac{232}{309}$$

$$\begin{array}{r} 309 \\ 3 \overline{) 95481} \\ \underline{3 9} \\ 60 054 \\ \underline{0 0} \\ 609 5481 \\ \underline{9 5481} \\ 0 \end{array}$$

$$\begin{array}{r} 232 \\ 2 \overline{) 53824} \\ \underline{2 4} \\ 43 138 \\ \underline{3 129} \\ 462 924 \\ \underline{2 924} \\ 0 \end{array}$$

$$\begin{array}{r} 44 \\ 176 \end{array} \quad \begin{array}{r} 43 \\ 129 \end{array}$$

$$\begin{array}{r} 462 \\ 924 \end{array} \quad \begin{array}{r} 609 \\ 5481 \end{array}$$

$$11 \rightarrow \sqrt{4 \frac{29}{49}} = \sqrt{\frac{285}{49}}$$

$$= \sqrt{\frac{(15^2)}{(7)^2}}$$

$$= \frac{15}{7} = 2 \frac{1}{7}$$

~~ex 1.67 (continued)~~

(H.W)
2)

$$57.76$$

$$\therefore \sqrt{57.76} = 7.6$$

$$\begin{array}{r} 7.6 \\ 7 \overline{) 57.76} \\ \underline{7 } \\ 146 \\ \underline{146} \\ 876 \\ \underline{876} \\ 0 \end{array}$$

$$\begin{array}{r} 3 43 \\ 49 \\ \underline{146} \\ 196 \\ \underline{196} \\ 205 \end{array}$$

$$\begin{array}{r} 3 \\ 146 \\ \underline{876} \end{array}$$

44

4. $\rightarrow 12.5316$
 $\therefore \sqrt{12.5316}$
 $= 3.54$

$$\begin{array}{r} 3\overline{)12.5316} \\ \underline{9} \\ 353 \\ \underline{325} \\ 704 \\ \underline{2816} \\ -2816 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 66 \\ 396 \\ \hline \end{array} \quad \begin{array}{r} 25 \\ 325 \\ \hline \end{array}$$

$$\begin{array}{r} 704 \\ 2816 \\ \hline \end{array}$$

(HAW)
6. $\rightarrow 84.8241$
 $\therefore \sqrt{84.8241}$
 $= 9.21$

$$\begin{array}{r} 9-21 \\ 9 \overline{) 84.8241} \\ \underline{9} -81 \\ 182 \quad 382 \\ \underline{2} -364 \\ 1841 \quad 1841 \\ \underline{-1841} \\ 0 \end{array}$$

$$\begin{array}{r} 183 \\ 3 \\ \hline 549 \end{array} \quad \begin{array}{r} 182 \\ 2 \\ \hline 364 \end{array}$$

$$\begin{array}{r} 0.28 \\ 2 \overline{) 0.0784} \\ \underline{2} \quad \underline{-4} \\ 48 \quad 384 \\ \underline{-384} \\ 0 \end{array}$$

$$\begin{array}{r} 6 \\ 48 \\ \hline 288 \end{array}$$

45

10.

$$\begin{array}{r} 0.0241 \\ 0 \overline{) 0.00073441} \\ \underline{0} \\ 02 004 \\ \underline{2} \\ 47 334 \\ \underline{4} \\ 541 541 \\ \underline{541} \\ 0 \end{array}$$

$$\begin{array}{r} 45 \\ \times 5 \\ \hline 225 \end{array}$$

$$11) \quad 0 \overline{) 0.00008649} \overline{) 0.0093}$$

$$\begin{array}{r} 0 \quad 0 \\ 0 \quad 000 \\ 0 \quad 0 \\ 09 \quad 086 \\ \underline{9} \quad 81 \\ 183 \quad 549 \\ \quad \underline{549} \\ \quad 0 \end{array}$$

$$\therefore \sqrt{0.008649} = 0.0093$$

12) P.T.O

12.)

$$\begin{array}{r}
 8 \overline{) 7260.7441} \quad 85.21 \\
 \underline{8 \quad 64} \\
 165 860 \\
 \underline{5 825} \\
 1702 3574 \\
 \underline{2 3404} \\
 17041 17041 \\
 \underline{17041} \\
 0
 \end{array}$$

Ans - $\therefore \sqrt{7260.7441} = 85.21$

$$\begin{array}{r}
 47 \\
 164 3165 \\
 \underline{1169} 825 \\
 2703 170 \\
 \underline{3} 34 \\
 5109
 \end{array}$$

Ex 1.8

1) Let the no. be x

$$x \times x = 245.5489$$

$$x^2 = 245.5489$$

$$x = \sqrt{245.5489}$$

$$\therefore \sqrt{245.5489} = 15.67$$

Ans - $x = 15.67$

2) P.T.O

$$\begin{array}{r} 15.67 \\ 1 \overline{) 245.5489} \\ \underline{25} \\ 5 \\ \underline{306} \\ 6 \\ \underline{3127} \\ -21889 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 3127 \\ \underline{21889} \end{array}$$

48

$\frac{2}{158}$

$$\begin{array}{r} 30 \\ \underline{28} \\ 2 \\ \underline{303} \\ 2149 \end{array}$$

$$3) \sqrt{105.0625} = 10.25$$

$$\begin{array}{r}
 10.25 \\
 1 \overline{) 105.0625} \\
 \underline{1} \quad \underline{1} \\
 20 \quad 05 \\
 \underline{0} \quad \underline{0} \\
 202 \quad 506 \\
 \underline{2} \quad \underline{404} \\
 2045 \quad 10225 \\
 \quad \underline{10225} \\
 \quad \quad 0
 \end{array}$$

$$a) \sqrt{10506.25} = 102.5$$

$$b) \sqrt{1.050625} = 1.025$$

$$5) \frac{\sqrt{6561} - \sqrt{361}}{\sqrt{6561} + \sqrt{361}} = \frac{81 - 19}{81 + 19} = \frac{62}{100} = \frac{31}{50}$$

$$\begin{array}{r} 8 \overline{) 6561} \quad | 81 \\ \underline{8 \quad 64} \\ 161 \quad 161 \\ \underline{161} \\ 0 \end{array}$$

$$\begin{array}{r} 1 \overline{) 361} \quad | 19 \\ \underline{1 \quad 1} \\ 29 \quad 261 \\ \underline{261} \\ 0 \end{array}$$

$$\begin{array}{r} \sqrt{77.44} + \sqrt{43.56} \\ \sqrt{77.44} - \sqrt{44.89} \end{array}$$

$$= \frac{8.8 + 6.6}{8.8 - 6.7}$$

$$= \frac{15.4}{2.1} \text{ (like decimals)}$$

$$= \frac{15422}{213} = \frac{22}{3} \text{ or } 7\frac{1}{3} \text{ (Ans)}$$

(H.W)
2.)

Let the decimal be x

$$x \times x = 0.00006241$$

$$x^2 = 0.00006241$$

$$x = \sqrt{0.00006241}$$

$$x = 0.0079$$

Ans - Decimal
 $= 0.0079$

$$\begin{array}{r} 0.0079 \\ 0 \overline{) 0.00006241} \\ \underline{0} \quad \underline{-0} \\ 0 \quad 000 \\ \underline{0} \quad \underline{-0} \\ 07 \quad 062 \\ \underline{7} \quad \underline{49} \\ 149 \quad 1341 \\ \underline{-1341} \\ 0 \end{array}$$

(H.W)

4) $\sqrt{1383.0961}$

$$\begin{array}{r} 37.19 \\ 3 \overline{) 1383.0961} \\ \underline{3} \\ 67 483 \\ \underline{7} \\ 741 1409 \\ \underline{1} \\ 7429 66861 \\ \underline{66861} \\ 0 \end{array}$$

$\therefore \sqrt{1383.0961} = 37.19$

a) $\sqrt{138309.61} = 371.9$

b) $\sqrt{0.13830961} = 0.3719$

$$\begin{array}{r} 68 \\ 544 \\ \hline \end{array} \quad \begin{array}{r} 47 \\ 469 \\ \hline \end{array} \quad \begin{array}{r} 74 \\ 74 \\ \hline \end{array} \quad \begin{array}{r} 74 \\ 74 \\ \hline \end{array}$$

$$\begin{array}{r} 228 \\ 7429 \\ \hline 6861 \end{array}$$

(H.W)
6.)

$$\frac{\sqrt{13.69} + \sqrt{18.49}}{\sqrt{15129} - \sqrt{529}}$$

$$= \frac{3.7 + 4.3}{123 - 23}$$

$$= \frac{8}{100} = 0.08$$

$$= \frac{2}{25} \text{ or } 0.08$$

CAF

$$\begin{array}{r} 0.08 \\ 25 \overline{) 2} \\ \underline{0} \\ 20 \\ \underline{0} \\ 200 \\ \underline{200} \\ 0 \end{array}$$

11/4/19
Thursday

Chapter - 2 - Real Numbers and cubes and Cube Roots

Real Numbers

Rational
 $(\frac{p}{q}, q \neq 0)$

- a) Terminating ($\frac{1}{2}$)
- b) Non Terminating ($\frac{1}{3}$)
repeating

Irrational

Non terminating
non repeating
 $\sqrt{2}, \sqrt{3}, \sqrt{5}$

Ex 2.1

1. (i)

$$\frac{5}{8}$$

$$\begin{array}{r} 0.625 \\ 8 \overline{) 50} \\ \underline{-48} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Ans - $\frac{5}{8} = 0.625$

(ii)

$$\frac{29}{125}$$

$$\begin{array}{r} 0.232 \\ 125 \overline{) 290} \\ \underline{-250} \\ 400 \\ \underline{-375} \\ 250 \\ \underline{-250} \\ 0 \end{array}$$

Ans - $\frac{29}{125} = 0.232$

$$2) (i) \frac{2}{9}$$

$$= 0.222...$$

$$\underline{\text{Ans}} - \frac{2}{9} = 0.\overline{2}$$

$$\begin{array}{r} 0.\overline{22} \\ 9 \overline{) 20} \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

$$(iii) \frac{5}{27}$$

$$= 0.\overline{185}$$

$$\begin{array}{r} 0.\overline{185185} \\ 27 \overline{) 50} \\ \underline{27} \\ 230 \\ \underline{216} \\ 140 \\ \underline{135} \\ 5 \end{array}$$

P.T.O

$$4 \rightarrow (i) 0.\overline{08} \times 10 \\ = 0.\overline{8}$$

$$(ii) 0.\overline{67} \times 100 \\ = 0.\overline{67} \times 100 \\ = 67.\overline{67} \\ = 67.\overline{67}$$

$$5 \rightarrow (i) 0.\overline{2}$$

$$\text{Let } x = 0.222\ldots = 0.\overline{2}$$

$$10x = 2.222\ldots$$

$$10x = 2.\overline{2}$$

$$10x - x = 2.\overline{2} - 0.\overline{2}$$

$$9x = 2$$

$$x = \frac{2}{9}$$

(i)

$$0.\overline{13}$$

$$\text{Let } x = 0.\overline{13}$$

$$x = 0.1313 \dots$$

$$100x = 13.1312 \dots$$
$$= 13.\overline{13}$$

$$100x - x = 13.\overline{13} - 0.\overline{13}$$

$$99x = 13$$

$$x = \frac{13}{99}$$

(ii) $2.\overline{04}$

$$\text{Let } x = 2.\overline{04} = 2.0404 \dots$$

$$100x = 204.\overline{0404}$$

$$= 204.\overline{04}$$

$$100x - x = 204.\overline{04} - 2.\overline{04}$$

$$99x = 205$$

$$x = \frac{205}{99} \text{ or } \frac{7}{99}$$

Homework (Ex 2.1)

$$\rightarrow (ii) \frac{9}{16}$$

$$\begin{array}{r} 0.5625 \\ 16 \overline{) 90} \\ \underline{-80} \\ 100 \end{array}$$

$$= 0.5625 \text{ (Ans)}$$

$$\begin{array}{r} \underline{-96} \\ 40 \\ \underline{-32} \\ 80 \\ \underline{-80} \\ 0 \end{array}$$

$$\begin{array}{r} \text{(iv)} \quad 84 \\ 40 \end{array} \qquad \begin{array}{r} 2.35 \\ 40 \overline{) 84} \\ \underline{-80} \\ 40 \end{array}$$

$$= 2.35 \text{ (Ans)}$$

$$\begin{array}{r} \underline{-60} \\ 100 \\ \underline{-100} \\ 0 \end{array}$$

$$\text{Q. (ii)} \quad \begin{array}{r} 13 \\ 6 \end{array}$$

$$= 2.1\bar{6} \text{ (Ans)}$$

$$\begin{array}{r} 2.166 \\ 6 \overline{) 13} \\ \underline{12} \\ 10 \\ \underline{6} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 4 \end{array}$$

(iv)

$$\frac{118}{99}$$

$$= 1.\overline{19} \text{ (Ans)}$$

$$\begin{array}{r} 1.1919 \\ 99 \overline{) 118} \\ \underline{-99} \\ 190 \\ \underline{99} \\ 910 \\ \underline{891} \\ 19 \end{array}$$

4. (ii)

$$5.\overline{28} \times 1000$$

$$= 5.2828 \dots \times 1000$$

$$= 5282.82828 \dots$$

$$= 5282.\overline{828} \text{ (Ans)}$$

P.T.O

ex 2.1 (continued)

5)

$$(v) \quad 0.\overline{627}$$

$$\text{let } x = 0.\overline{627}$$

$$x = 0.6272727\ldots$$

$$10x = 6.272727\ldots$$

$$10x = 6.\overline{27}$$

$$1000x = 627.2727\ldots$$

$$1000x = 627.\overline{27}$$

$$1000x - 10x = 627.\overline{27} - 6.\overline{27}$$

$$990x = 621$$

$$x = \frac{621}{990}$$

$$990 \div 1010$$

$$x = \frac{69}{110}$$

$$(vi) \text{ let } x = 0.23\overline{41}$$

$$= 0.234141\ldots$$

$$100x = 23.414141\ldots$$

$$100x = 23.\overline{41}$$

$$10000x = 2341.4141\ldots$$

$$10000x = 2341.\overline{41}$$

$$10000x - 100x = 2341.\overline{41} - 23.\overline{41}$$

$$9900x = 2318$$

$$x = \frac{2318}{9900}$$

$$x = \frac{1159}{4950}$$

(vi) $0.\overline{513}$

Let $x = 0.\overline{513}$

$x = 0.513513\ldots$

$1000x = 513.513\ldots$

$1000x = 513.\overline{513}$

$1000x - x = 513.\overline{513} - 0.\overline{513}$

$999x = \frac{513\cancel{513}^{19}}{999\cancel{513}^{37}} = \frac{19}{37}$

(vii) $\frac{2}{9} = 0.\overline{2}$

$\frac{73}{99} = 0.\overline{73}$

The numerator is getting repeated.

(H.W)

5.) (iv)

$$\text{let } x = 0.\overline{45}$$

$$x = 0.4545\ldots$$

$$100x = 45.4545\ldots$$

$$100x = 45.\overline{45}$$

$$100x - x = 45.\overline{45} - 0.\overline{45}$$

$$99x = 45$$

$$x = \frac{45}{99} = \frac{5}{11}$$

$$x = \frac{5}{11}$$

(H.W)

(viii)

$$0.\overline{054}$$

$$\text{let } x = 0.\overline{054}$$

$$x = 0.054054\ldots$$

$$1000x = 54.054054\ldots$$

$$1000x = 54.\overline{054}$$

$$1000x - x = 54.\overline{054} - 0.\overline{054}$$

$$999x = 54$$

$$x = \frac{54}{999} = \frac{2}{37}$$

$$x = \frac{2}{37}$$

$$\text{ex } 2.2$$

$$3) (ii) \cdot \overline{4003}$$

$$\text{let } x = \cdot \overline{4003} = \cdot 40034003 \dots$$

$$10000x = 4003 \cdot 40034003 \dots$$

$$= 4003 \cdot \overline{4003}$$

$$10000x - x = \overline{4003} \cdot \overline{4003} - 0.\overline{4003}$$

$$9999x = \overline{4003}$$

$$x = \frac{4003}{9999}$$

(iv) $0.8787\ldots$

let $x = 0.8787\ldots$

$$x = 0.\overline{87}$$

$$100x = 87.8787\ldots$$

$$100x = 87.\overline{87}$$

$$100x - x = 87.\overline{87} - 0.\overline{87}$$

$$99x = 87$$

$$x = \frac{87}{99} = \frac{29}{33}$$

$$x = \frac{29}{33}$$

$$(v) \quad 9.\overline{15} = 9.155\ldots$$

$$\text{let } x = 9.155\ldots$$

$$x = 9.\overline{15}$$

$$10x = 91.555\ldots \\ = 91.\overline{5}$$

$$100x = 915.55\ldots \\ = 915.\overline{5}$$

$$100x - 10x = 915.\overline{5} - 91.\overline{5}$$

$$90x = 824$$

$$x = \frac{824}{90} = \frac{412}{45}$$

$$x = \frac{412}{45}$$

(How)

$$4. > (i) 0.666\ldots = 0.\overline{6}$$

$$\text{Let } x = 0.\overline{6} = 0.666\ldots$$

$$10x = 6.66\ldots = 6.\overline{6}$$

$$10x - x = 6.\overline{6} - 0.\overline{6}$$

$$9x = 6$$

$$x = \frac{6}{9} = \frac{2}{3}$$

$$x = \frac{2}{3} \text{ (Ans)}$$

(How)

$$(ii) 3.2 = \frac{32}{10} = \frac{16}{5} \text{ or } 3\frac{1}{5}$$

(iii) P.T.O

(now)

(iii) $2.\overline{405}$

$$\text{let } x = 2.405405\ldots = 2.\overline{405}$$

$$1000x = 2405.405405\ldots = 2405.\overline{405}$$

$$1000x - x = 2405.\overline{405} - 2.\overline{405}$$

$$999x = 2403$$

$$x = \frac{2403}{999}$$

$$x = \frac{89}{37}$$

(H.W)

$$(iv) \cdot 3\overline{3} = \cdot \overline{3}$$

$$\text{Let } x = 0.\overline{3} = 0.333\ldots$$

$$10x = 3.333\ldots = 3.\overline{3}$$

$$10x - x = 3.\overline{3} - 0.\overline{3}$$

$$9x = 3$$

$$x = \frac{3}{9}$$

$$x = \frac{1}{3} \text{ (Ans)}$$

$$(v) \cdot \overline{009}$$

$$\text{Let } x = \cdot 009009 = \cdot \overline{009}$$

$$1000x = 9.009009\ldots = 9.\overline{009}$$

$$1000x - x = 9.\overline{009} - 0.\overline{009}$$

$$999x = 9$$

$$x = \frac{9}{999}$$

$$x = \frac{1}{111} \text{ (Ans)}$$

(H.W)

(vi) $0.\overline{7}$

$$\text{Let } x = 0.\overline{7} = 0.777\ldots$$

$$10x = 7.777\ldots = 7.\overline{7}$$

$$10x - x = 7.\overline{7} - 0.\overline{7}$$

$$9x = 7$$

$$x = \frac{7}{9} \text{ (Ans)}$$

$$(vii) 0.000658$$

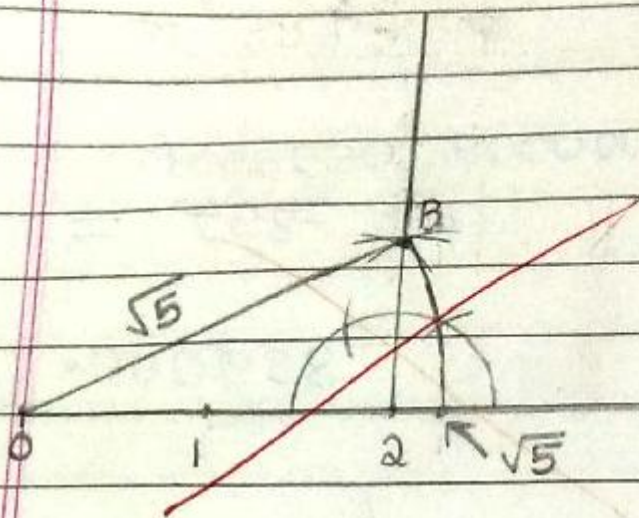
$$= \frac{658}{1000000}$$

$$= \frac{329}{500000}$$

$$= \frac{329}{500000}$$

$$5) \sqrt{5} = \sqrt{4+1} = \sqrt{2^2+1^2}$$

1 unit = 2cm

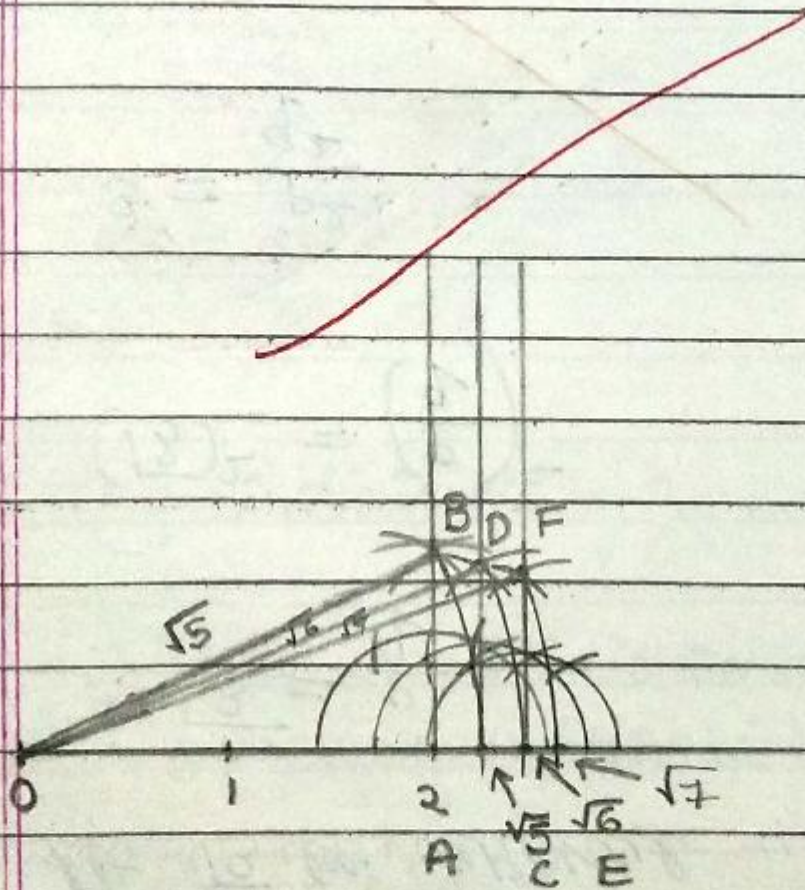


$$\sqrt{7} = \sqrt{\cancel{4} + \cancel{1} + \cancel{1} + \cancel{1}} = \sqrt{\cancel{2^2} + \cancel{1^2} + \cancel{1^2} + \cancel{1^2}}$$

$$= \sqrt{(\sqrt{6})^2 + (1)^2}$$

$$\sqrt{6} = \sqrt{5+1}$$

$$= \sqrt{(\sqrt{5})^2 + 1^2}$$



6.) let $\sqrt{3}$ be rational

$$\therefore \sqrt{3} = \frac{p}{q}$$

$$(\sqrt{3})^2 = \left(\frac{p}{q}\right)^2$$

$$3 = \frac{p^2}{q^2}$$

$$q^2 = \frac{p^2}{3}$$

Here p^2 is divisible by 3

$\therefore p$ is also divisible by 3

$\therefore$ Let $p = 3k$

k is any whole no.

$$q^2 = \frac{(3k)^2}{3}$$

$$q^2 = \frac{3k^2}{1}$$

$$k^2 = \frac{q^2}{3}$$

$\Rightarrow q$ is divisible by 3

- This is a contradiction as p & q are coprimes.
 $\therefore$ our assumption is wrong

$\Rightarrow \sqrt{3}$ is irrational

7.)

$$3.50\overline{0} = 3.5$$

$$3.499 = 3.5$$

Approximately they are equal

8.)

$$1 < 3 < 4$$

$$1 < \sqrt{3} < 4$$

$$1.7^2 < 3 < 1.8^2$$

$$1.7^4 < \sqrt{3} < 1.8^4$$

$$1.71^2 = 292.41$$

$$1.72^2 = 295.84$$

$$(1.73^2 = 299.29$$

$$(1.74^2 = 302.76$$

$$1.73^2 < 3 < 1.74^2$$

$$1.73 < \sqrt{3} < 1.74$$

$$1.1^2 = 1.21$$

$$1.2^2 = 1.44$$

$$1.3^2 = 1.69$$

$$1.4^2 = 1.96$$

$$1.5^2 = 2.25$$

$$1.6^2 = 2.56$$

$$1.7^2 = 2.89$$

$$1.8^2 = 3.24$$

2
1
9
2

9. (i) $\sqrt{5} =$

$$\begin{array}{r}
 2.23 \\
 2 \overline{) 5.0000} \\
 \underline{4} \\
 100 \\
 \underline{84} \\
 1600 \\
 \underline{1329} \\
 271
 \end{array}$$

$\sqrt{5} = 2.23$

(iii) $\sqrt{51}$

$$\begin{array}{r}
 7.14 \\
 7 \overline{) 51.0000} \\
 \underline{49} \\
 200 \\
 \underline{141} \\
 5900 \\
 \underline{5696} \\
 204
 \end{array}$$

$\sqrt{51} = 7.14$

10) $\frac{1}{2}(r+s)$ will lie at the middle of r & s on the no. line.

Ex 2.3

1) a) Yes $\sqrt{2}$ & $\sqrt{5}$ are irrational.

$$\sqrt{2} \times \sqrt{5} = \sqrt{10} \text{ (irrational)}$$

b) Yes $\sqrt{3}$ & $\sqrt{12}$ are irrational.

$$\sqrt{3} \times \sqrt{12} = \sqrt{36} = 6 \text{ (rational)}$$

2) ~~No~~ No, No, Yes

3) Yes all these nos. are irrational as they are non terminating non repeating decimal. Yes, the 3rd is the sum of the first 2
Yes sum of 2 irrational nos. is always irrational.

$$4 \rightarrow \frac{2 + \sqrt{2}}{3}$$

Let $\sqrt{2}$ be rational

$$\frac{2 + \sqrt{2}}{3} = \frac{p}{q}$$

$$\sqrt{2} = \frac{p}{q} - \frac{2}{3} \Rightarrow \frac{3p - 2q}{3q}$$

There $\sqrt{2}$ is irrational
 $\frac{3p - 2q}{3q}$ is irrational

rational $\neq$ irrational
 $\therefore$ our assumption is wrong

$\therefore \frac{2 + \sqrt{2}}{3}$ is irrational.

5) let the integer = 5
let the irrational no. = $\sqrt{2}$

To prove - $5 + \sqrt{2}$ is irrational

let $5 + \sqrt{2}$ be rational

$$\therefore 5 + \sqrt{2} = \frac{p}{q}$$

$$\Rightarrow \sqrt{2} = \frac{p-5}{q}$$

$$\Rightarrow \sqrt{2} = \frac{p-5q}{q}$$

This is a ~~contradiction~~ as $\frac{p-5q}{q}$ is rational

but $\sqrt{2}$ is irrational. but $\sqrt{2}$ is irrat

Hence, our assumption is wrong.

$\therefore 5 + \sqrt{2}$ is irrational.

6.) let $K = \sqrt{2}$
 $\therefore 3K = 3\sqrt{2}$

To prove - $3\sqrt{2}$ is irrational

let $3\sqrt{2}$ be rational

$$\therefore 3\sqrt{2} = \frac{p}{q}$$

$$\Rightarrow \sqrt{2} = \frac{p}{3q}$$

this is a contradiction as $\frac{p}{3q}$ is rational

but $\sqrt{2}$ is irrational. rational $\neq$ irr.
hence, our assumption is wrong.
 $\therefore 3\sqrt{2}$ is irrational.

$$\Rightarrow \text{let } K = \sqrt{2}$$

$$\text{let } \frac{P}{Q} = \frac{1}{2}$$

To prove $\Rightarrow K \times \frac{P}{Q}$ is irrational.

$$K \times \frac{P}{Q} = \sqrt{2} \times \frac{1}{2} = \frac{\sqrt{2}}{2}$$

let $\frac{\sqrt{2}}{2}$ be rational

$$\therefore \frac{\sqrt{2}}{2} = \frac{P}{Q}$$

$$\Rightarrow \sqrt{2} = \frac{2P}{Q}$$

This is a contradiction as $\sqrt{2}$ is irrational but $\frac{2P}{Q}$ is rational. rational $\neq$ irrational. Hence our assumption is wrong.

$\therefore K \times \frac{P}{Q} \Rightarrow (\frac{\sqrt{2}}{2})$ is irrational.

ex 2.4

$$\begin{array}{r} 1.414 \\ 1 \overline{) 2.00 \, 00 \, 00} \\ \underline{1 1} \\ 24 100 \\ \underline{4 96} \\ 281 400 \\ \underline{1 281} \\ 2824 1900 \\ \underline{4 1296} \\ 604 \end{array}$$

$$\sqrt{2} = 1.414 (\text{approx})$$

$$(iii) \sqrt{8} = \sqrt{2 \times 2} = 2\sqrt{2} = 2 \times 1.414 = 2.828$$

(V) P.T.O

$$\begin{array}{r}
 4.582 \\
 (V) \quad 4 \overline{) 21.000000} \\
 \underline{4 16} \\
 85 500 \\
 \underline{5 425} \\
 908 7500 \\
 \underline{8 7264} \\
 9162 23600 \\
 \underline{2 18324} \\
 5276
 \end{array}$$

$$\sqrt{21} = 4.582 \text{ (approx)}$$

$$\begin{array}{r}
 1.732 \\
 ii) \quad 1 \overline{) 3.000000} \\
 \underline{1 1} \\
 24 200 \\
 \underline{7 189} \\
 343 1100 \\
 \underline{3 1029} \\
 3462 7100 \\
 \underline{2 6924} \\
 176
 \end{array}$$

$$\sqrt{3} = 1.732 \text{ (approx)}$$

(v) 10

$$\begin{array}{r|l} & 3.162 \\ 3 & 10.000000 \\ \hline 3 & 9 \\ \hline 61 & 100 \\ \hline 1 & 61 \\ \hline 626 & 3900 \\ \hline 6 & 3756 \\ \hline 6322 & 14400 \\ \hline 2 & 12644 \\ \hline & 1456 \end{array}$$

$$\sqrt{10} = 3.162 \text{ (approx)}$$

(vi) 37

$$\sqrt{37} = 6.082 \text{ (approx)}$$

$$\begin{array}{r|l} & 6.082 \\ 6 & 37.000000 \\ \hline 6 & 36 \\ \hline 120 & 100 \\ \hline 0 & 0 \\ \hline 1208 & 10000 \\ \hline 8 & 9664 \\ \hline 12162 & 33600 \\ \hline 2 & 24324 \\ \hline & 9276 \end{array}$$

2. (i)

	1	1.673
	1	2.800000
26		180
6		156
327		2400
7		2289
3343		11100
3		10029
		1071

$$\sqrt{2.8} = 1.673 \text{ (approx)}$$

(iii) $\sqrt{3.005} = 1.733$
(approx)

	1	1.733
	1	3.005000
27		200
7		189
343		1150
3		1029
3463		12100
3		10389
		1711

$$(iv) \sqrt{\frac{102}{3}} = 10.666666$$

$$\begin{array}{r}
 3.265 \\
 3 \overline{) 10.666666} \\
 \underline{9} \\
 166 \\
 \underline{124} \\
 4266 \\
 \underline{3876} \\
 39066 \\
 \underline{32625} \\
 6441
 \end{array}$$

$$\therefore \sqrt{\frac{102}{3}} = 3.265 (\text{approx})$$

$$3.) (i) \sqrt{18} = \sqrt{3^2 \times 2} = 3\sqrt{2}$$

$$(ii) \sqrt{108} = \sqrt{2^2 \times 3^2 \times 3} \\ = 2 \times 3\sqrt{3} \\ = 6\sqrt{3} \text{ (Ans)}$$

$$(iii) \sqrt{125} = \sqrt{5^2 \times 5} \\ = 5\sqrt{5}$$

$$(iv) \sqrt{\frac{49}{64}} = \sqrt{\frac{7^2}{8^2}} = \frac{7}{8}$$

$$(v) \sqrt{\frac{121}{81}} = \sqrt{\frac{121}{8100}}$$

$$= \frac{(11)^2}{\sqrt{3^2 \times 3^2 \times 2^2 \times 5^2}}$$

$$= \frac{11}{3 \times 3 \times 2 \times 5} = \frac{11}{90}$$

$$\begin{array}{r} 3 \overline{) 8100} \\ 3 \overline{) 2700} \\ 3 \overline{) 900} \\ 3 \overline{) 300} \\ 2 \overline{) 100} \\ 2 \overline{) 50} \\ 5 \overline{) 25} \\ 5 \overline{) 5} \\ 1 \end{array}$$

$$\begin{aligned}
 \text{(vi)} \quad & \sqrt{21} \times \sqrt{6} \\
 &= \sqrt{3 \times 7} \times \sqrt{2 \times 3} \\
 &= \sqrt{3 \times 7 \times 2 \times 3} \\
 &= \sqrt{2 \times 7 \times 3 \times 3} \\
 &= 3\sqrt{14}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad & \sqrt{45} \times \sqrt{20} \\
 &= \sqrt{3^2 \times 5} \times \sqrt{2^2 \times 5} \\
 &= 3\sqrt{5} \times 2\sqrt{5} \\
 &= 3 \times 2 \times \sqrt{5} \times \sqrt{5} \\
 &= 6 \times 5 \\
 &= 30
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad & \frac{\sqrt{3}\sqrt{20}}{\sqrt{2}\sqrt{5}} = \frac{\sqrt{3 \times 20}}{\sqrt{2 \times 5}} = \frac{\sqrt{3 \times 2 \times 2 \times 5}}{\sqrt{2 \times 5}} = \sqrt{3 \times 2} = \sqrt{6}
 \end{aligned}$$

$$(X) \quad 21\sqrt{384} \div 8\sqrt{8}$$

$$= \frac{21}{8} \sqrt{\frac{384}{48} \cdot \frac{192}{49}}$$

$$= \frac{21}{8} \sqrt{\frac{2^2 \times 2^2 \times 2^2 \times 3}{7^2}}$$

$$= \frac{2^3 \times 2^1 \times 2^1 \times 2^1 \times \sqrt{3}}{8 \times 7}$$

$$= 3\sqrt{3} \text{ (Ans)}$$

$$(ix) \quad 3\sqrt{12} \div 6\sqrt{27}$$

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

$$= \frac{3 \times 2}{6} \sqrt{3} \div \frac{6 \times 3}{6} \sqrt{3}$$

$$= \frac{2\sqrt{3}}{3\sqrt{3}}$$

$$= \frac{1}{3} \text{ (Ans)}$$

$$4 \times (i) \quad \sqrt{\frac{10}{7}} = \frac{\sqrt{10}}{\sqrt{7}} = \frac{\sqrt{10} \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} = \frac{\sqrt{10 \times 7}}{(\sqrt{7})^2}$$

$$= \frac{\sqrt{70}}{7}$$

(ii) $\frac{\sqrt{15}}{\sqrt{10}} = \sqrt{\frac{15}{10}} = \frac{\sqrt{3} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{\sqrt{6}}{2} \text{ (Ans)}$

$$(iv) \frac{\sqrt{3}+1}{\sqrt{3}} = \frac{\sqrt{3}+1 \times \sqrt{3}}{\sqrt{3}}$$

$$= \frac{\sqrt{3}(\sqrt{3}+1)}{3}$$

$$= \frac{3 + \sqrt{3}}{3} \text{ (Ans)}$$

H CAMP

26/6/19

HOMEWORK

ex. 2.4

2. (i)

0.2

$$\sqrt{0.2} = 0.447 \text{ (approx)}$$

	0.447
4	0.200000
4	16
84	400
4	336
887	6400
7	6209
	191

(V)

	5.049
5	25.500000
5	25
100	050
0	0
1004	5000
4	4016
10089	98400
9	90801
	7599

$$\sqrt{25.5} = 5.049 \text{ (approx)}$$

(vi)

$$\begin{array}{r} 15.349 \\ \hline 1 \overline{) 235.600000} \\ \underline{1} \\ 25 \\ \underline{5} \\ 303 \\ \underline{3} \\ 3064 \\ \underline{4} \\ 30689 \\ \underline{9} \\ 8199 \end{array}$$

$$\sqrt{235.6} = 15.349 \text{ (approx)}$$

* * * * *

Continued

$$4) (i) \frac{1}{3+\sqrt{5}}$$

$$= \frac{1}{(3+\sqrt{5})} \times \frac{(3-\sqrt{5})}{(3-\sqrt{5})}$$

$$= \frac{3-\sqrt{5}}{3^2-(\sqrt{5})^2}$$

$$= \frac{3-\sqrt{5}}{9-5}$$

$$= \frac{3-\sqrt{5}}{4}$$

$$(vii) \frac{2\sqrt{3}}{3-\sqrt{6}} \times \frac{(3+\sqrt{6})}{(3+\sqrt{6})}$$

$$= \frac{(2\sqrt{3})(3+\sqrt{6})}{3^2 - (\sqrt{6})^2}$$

$$= \frac{2\sqrt{3} \times \sqrt{3}(\sqrt{3} + \sqrt{2})}{9-6}$$

$$= \frac{2 \times \cancel{3}(\sqrt{3} + \sqrt{2})}{\cancel{3}}$$

$$= 2\sqrt{3} + 2\sqrt{2} \text{ (Ans)}$$

(viii)

$$\frac{5+\sqrt{2}}{5-\sqrt{2}} \times \frac{5+\sqrt{2}}{5+\sqrt{2}}$$

$$= \frac{(5+\sqrt{2})^2}{(5)^2 - (\sqrt{2})^2} = \frac{5^2 + (\sqrt{2})^2 + 2 \times 5 \times \sqrt{2}}{25-2}$$

$$= \frac{25+2+10\sqrt{2}}{23} = \frac{27+10\sqrt{2}}{23}$$

$$5. \times (i) \begin{array}{r|l} 7 & 343 \\ 7 & 49 \\ 7 & 7 \\ \hline & 1 \end{array}$$

$$\sqrt[3]{343} = \sqrt[3]{7^3} = 7$$

$$(ii) \sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3} \\ = 2 \times 2 \times 3 \\ = 12$$

$$1) \sqrt[3]{9261} = \sqrt[3]{3^3 \times 7^3} \\ = 3 \times 7 \\ = 21$$

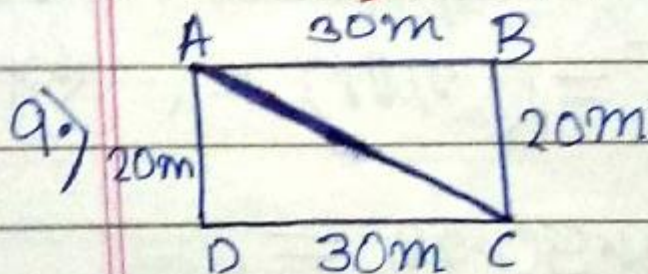
$$6. \begin{array}{r|l} 2 & 2662 \\ 11 & 1331 \\ 11 & 121 \\ 11 & 11 \end{array}$$

$$2662 = 11^3 \times 2$$

We will divided by 2 to get a perfect cube

8) $(\text{side})^2 = 67$
 $\text{side} = \sqrt{67} = 8.18 \text{m (approx)}$

$$\begin{array}{r}
 8.18 \\
 8 \overline{) 67.0000} \\
 \underline{8 } 64 \\
 161 300 \\
 \underline{1 } 161 \\
 1628 13900 \\
 \underline{8 } 13024 \\
 876
 \end{array}$$



$$\begin{aligned}
 AC^2 &= AD^2 + CD^2 \\
 &= 20^2 + 30^2 \\
 &= 400 + 900
 \end{aligned}$$

$$AC^2 = 1300$$

$$\begin{aligned}
 AC &= \sqrt{1300} \\
 &= \sqrt{13 \times 10^2} \\
 &= 10\sqrt{13} \\
 &= 10 \times 3.605 \\
 &= 36.05 \text{ m}
 \end{aligned}$$

10) $V = (\text{side})^3 = 2.197$

$$\text{side} = \sqrt[3]{2.197}$$

$$= \frac{\sqrt[3]{2197}}{\sqrt[3]{1000}}$$

$$= \frac{13^3}{10^3}$$

$$= \frac{13}{10} = 1.3 \text{ m}$$

13		2197
13		1869
13		13
		1

$$11 \rightarrow l = 6 \times 10 + 4 = 64 \text{ dm}$$

$$b = 2 \times 10 + 8 = 28 \text{ dm}$$

Area of square = Area of rectangle

$$(\text{side})^2 = l \times b$$

$$(\text{side})^2 = 64 \times 28$$

$$\text{side} = \sqrt{64 \times 28}$$

$$= \sqrt{2^2 \times 2^2 \times 2^2 \times 2^2 \times 7}$$

$$= 2 \times 2 \times 2 \times 2 \sqrt{7}$$

$$= 16\sqrt{7} \text{ dm}$$

$$= 16 \times 2.64 \text{ dm}$$

$$= 42.24 \text{ dm}$$

HOMEWORK

$$4 \rightarrow (iii) \sqrt{\frac{5}{18}} \times \sqrt{2\frac{2}{5}} = \sqrt{\frac{5}{18}} \times \sqrt{\frac{12}{5}}$$

$$= \frac{\sqrt{5x+22}}{\sqrt{183-5}}$$

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

$$= \frac{\sqrt{6}}{3}$$

$$(vi) \frac{2}{5-\sqrt{3}} \times \frac{5+\sqrt{3}}{5+\sqrt{3}}$$

$$= \frac{2(5+\sqrt{3})}{5^2 - (\sqrt{3})^2}$$

$$= \frac{2(5+\sqrt{3})}{25-3}$$

$$= \frac{10 + 2\sqrt{3}}{22} = \frac{2(5 + \sqrt{3})}{22}$$

$$= \frac{5 + \sqrt{3}}{11}$$

5) (ii)

11	1331
11	121
11	11
	1

$$\therefore \sqrt[3]{1331} = \sqrt[3]{11 \times 11 \times 11}$$

$$= 11 \text{ (Ans)}$$

(iv)

2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

$$\therefore \sqrt[3]{5832} = \sqrt[3]{2^3 \times 3^3 \times 3^3}$$

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

$$= 18$$

$$\begin{array}{r}
 \rightarrow 2 \overline{) 8232} \\
 \underline{2 4116} \\
 2 2058 \\
 \underline{3 1029} \\
 7 343 \\
 \underline{7 49} \\
 7 7 \\
 \underline{7 0} \\
 1
 \end{array}$$

$$8232 = 2 \times 2 \times 2 \times 3 \times 7 \times 7 \times 7$$

since prime 2, 3 & 7 are not in pairs $\therefore$ 8232 must be multiplied by $(2 \times 3 \times 7) = 42$ to make it a perfect square.

