Unit 3

DECIMALS

EXERCISE NO. 3.1

A. *Convert the following one place-decimals into rational numbers?*

(i) 0.2:

Solution:

$$0.2 = \frac{02}{10} = \frac{1}{5}$$

Ans: $= \frac{1}{5}$

(ii) 0.4:

Solution:

$$0.4 = \frac{\cancel{04}^{2}}{\cancel{10}_{5}} = \frac{2}{5}$$

Ans: $= \frac{2}{5}$

(iii) 0.6:

Solution:

$$0.6 = \frac{\cancel{06}^{3}}{\cancel{10}_{5}} = \frac{3}{5}$$

Ans: $= \frac{3}{5}$

(iv) 0.8:

Solution:

$$0.8 = \frac{\cancel{08}^{4}}{\cancel{10}_{5}} = \frac{4}{5}$$

Ans: $= \frac{4}{5}$

(v) 0.9:

Solution:

$$0.9 = \frac{09}{10} = \frac{9}{10}$$

Ans: $= \frac{9}{10}$

B. Convert the following two place-decimals into rational numbers.

(i) 0.15:

Solution:

0.15

$$0.15 = \frac{15}{100} = \frac{3}{20}$$

Ans: $= \frac{3}{20}$

(ii) 0.35:

Solution:

0.35

$$0.35 = \frac{\cancel{35}}{\cancel{100}} = \frac{7}{20}$$

Ans: $= \frac{7}{20}$

(iii) 0.48

Solution:

0.48

$$0.48 = \frac{\cancel{48}}{\cancel{100}} \frac{\cancel{24}}{\cancel{50}} \frac{12}{25}$$

Ans: $= \frac{12}{25}$

(iv) 0.75:

Solution:

0.75

$$0.75 = \frac{\cancel{75}}{\cancel{100}} \quad \frac{3}{4}$$

Ans: $= \frac{3}{4}$

(v) 0.95:

Solution:

0.95

$$0.95 = \frac{\cancel{95}}{100} \quad \frac{19}{20}$$

Ans: $= \frac{19}{20}$

(vi) −1.30:

Solution:

-1.30

$$-1.30 = \left[1 + \frac{3\cancel{0}}{10\cancel{0}}\right]$$

$$= -\left[1 + \frac{3}{8}\right] = 1\frac{3}{8}$$

Ans: $= 1\frac{3}{8}$

(vii) -2.50

Solution:

-2.50

$-2.50 = [2 + 50]$

$= -\left[2 + \frac{5\cancel{0}}{10\cancel{0}}\right] = -\left[2 + \frac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{10}}}\right]$

$= -2\frac{1}{2} = -2\frac{1}{2}$

Ans: $= -2\frac{1}{2}$

(viii) 5.05:

Solution:

5.05

$5.05 = [5 + 05] = \left[5 + \frac{50}{100}\right]$

$= \left[5 + \frac{\overset{1}{\cancel{5}}\cancel{0}}{\underset{2}{\cancel{10}}\cancel{0}}\right] = \left[5 + \frac{1}{2}\right] = 5\frac{1}{2}$

Ans: $= 5\frac{1}{2}$

(ix) 5.60:

Solution:

5.60

$5.60 = [5.60] = \left[5\frac{60}{100}\right]$

$= \left[5\frac{6\cancel{0}}{10\cancel{0}}\right] = \left[5\frac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{10}}}\right]$

$= \left[5\frac{3}{5}\right] = 5\frac{3}{5}$

Ans: $= 5\frac{3}{5}$

(x) 6.85:

Solution:

6.85

$$6.85 = \left[6\frac{85}{100}\right]$$

$$= \left[6\frac{\overset{17}{\cancel{85}}}{\cancel{100}}\right] = 6\frac{17}{20}$$

Ans: $= 6\frac{17}{20}$

C. Convert the following three place-decimals into rational numbers.

(i) 0.024:

Solution:

0.024

$$0.024 = \frac{024}{1000}\ \cancel{6}^{3}$$

$$\cancel{250}\ 125 = \frac{\cancel{24}^{12}}{\cancel{500}\ \cancel{1000}} = \frac{3}{125}$$

Ans: $= \frac{3}{125}$

(ii) 3.125:

Solution:

3.125

$$3.125 = \left[3 + \frac{125}{1000}\right]$$

$$= \left[3 + \frac{\overset{1}{\cancel{125}}}{\cancel{1000}\ \cancel{200}_{8}}\right] = \left[3 + \frac{1}{8}\right] = 3\frac{1}{8}$$

Ans: $= 3\frac{1}{8}$

(iii) 0.375:

Solution:

$$0.375$$

$$0.375 = \frac{\cancel{375}^{\,3}}{\cancel{1000}} = \frac{3}{8}$$

$$\textbf{Ans:} = \frac{3}{8}$$

(iv) 4.065:

Solution:

$$4.065$$

$$4.065 = \left[4 + \frac{\cancel{065}}{\cancel{1000}}\right] \frac{13}{200}$$

$$= \left[4 + \frac{13}{200}\right] = 4\frac{13}{200}$$

$$\textbf{Ans:} = 4\frac{13}{200}$$

(v) 5.625:

Solution:

$$5.625$$

$$5.625 = \left[5 + \frac{625}{1000}\right]$$

$$= \left[5 + \frac{\cancel{625}}{\cancel{1000}}\right] \frac{27}{40}$$

$$= 5\frac{27}{40}$$

$$\textbf{Ans:} = 5\frac{27}{40}$$

(vi) –0.001:

Solution:

$$-0.001$$

$$-0.001 = -\frac{1}{1000}$$

$$\textbf{Ans:} = \frac{1}{1000}$$

(vii) −0.0005:

Solution:

$$-0.0005$$

$$= -\frac{\cancel{0.0005}^{1}}{\cancel{10000}}$$

$$= -\frac{1}{2000}^{2000}$$

Ans: $= -\frac{1}{2000}$

(viii) −0.005:

Solution:

$$-0.005$$

$$= \frac{\cancel{-0.005}}{\cancel{1000}} = -\frac{5}{200}$$

Ans: $= -\frac{5}{200}$

(ix) −5.005:

Solution:

$$-5.005$$

$$= -\left[5 + \frac{\cancel{5}}{\cancel{1000}}\right]$$

$$= -5\frac{1}{200}$$

Ans: $= -5\frac{1}{200}$

(x) −11.375:

Solution:

$$= -11.375^{3}$$

$$= -\left[11 + \frac{\cancel{375}^{\cancel{75}}}{\cancel{1000}}\right]$$

$$= -11\frac{3}{8}^{\cancel{200}\ 8}$$

Ans: $= -11\frac{3}{8}$

(xi) −0.00125:

Solution:

$$= -0.00125$$

$$= -\frac{00125}{100000}$$

$$= -\frac{\cancel{125}^{\cancel{5}}}{\cancel{10000}}$$

$$= -\frac{1}{8}^{\cancel{4000}\ 800}$$

Ans: $= -\frac{1}{8}$

(xii) −15.00625:

Solution:

$$-15.00625$$

$$= -\frac{00125}{100000}$$

$$= -\frac{125}{10000}$$

$$= -\left[15\frac{00625}{10000}\right]$$

$$= -\left[\cancel{15}\frac{\cancel{625}}{\cancel{10000}}\right]\frac{87}{160}$$

$$= -\left[1\frac{87}{160}\right] = \cancel{666}\ -1\frac{87}{160}$$

Ans: $= -1\frac{87}{160}$

EXERCISE 3.2

I. *Convert into decimals and identify terminating or non-terminating decimals.*

(i) $\frac{7}{3}$:

Solution:

$$
\begin{array}{r|l}
3 & 7.333 \\
\hline
 & 6 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 1
\end{array}
$$

Non terminating

(ii) $\frac{11}{6}$:

Solution:

$$
\begin{array}{r|l}
6 & 1.833 \\
\hline
 & 6 \\
\hline
 & 50 \\
 & 48 \\
\hline
 & 20 \\
 & 18 \\
\hline
 & 20 \\
 & 18 \\
\hline
 & 2
\end{array}
$$

Terminating

(iii) $-\frac{13}{9}$:

Solution:

$$
\begin{array}{r|l}
9 & 1.444 \\
\hline
 & 9 \\
\hline
 & 40 \\
 & 36 \\
\hline
 & 40 \\
 & 36 \\
\hline
 & 40 \\
 & 36 \\
\hline
 & 4
\end{array}
$$

Non terminating

(iv) $\frac{15}{7}$:

Solution:

$$
\begin{array}{r|l}
7 & 2.144 \\
\hline
 & 14 \\
\hline
 & 10 \\
 & 7 \\
\hline
 & 30 \\
 & 28 \\
\hline
 & 20 \\
 & 14 \\
\hline
 & 6
\end{array}
$$

Non terminating

(v) $\frac{14}{9}$:

Solution:

$$
\begin{array}{r|l}
9 & 14 \\
 & 9 \\
\hline
 & 50 \\
 & 45 \\
\hline
 & 50 \\
 & 45 \\
\hline
 & 50 \\
 & 45 \\
\hline
 & 5
\end{array}
\qquad 1.555
$$

Non terminating

(vi) $\frac{17}{11}$:

Solution:

$$
\begin{array}{r|l}
11 & 17 \\
 & 11 \\
\hline
 & 60 \\
 & 55 \\
\hline
 & 50 \\
 & 44 \\
\hline
 & 60 \\
 & 55 \\
\hline
 & 5
\end{array}
\qquad 1.545
$$

Non terminating

(vii) $\frac{19}{20}$:

Solution:

$$
\begin{array}{r|l}
12 & 19 \\
 & 12 \\
\hline
 & 70 \\
 & 60 \\
\hline
 & 100 \\
 & 96 \\
\hline
 & 40 \\
 & 36 \\
\hline
 & 40 \\
 & 36 \\
\hline
 & 4
\end{array}
\qquad 1.58333
$$

Terminating

(viii) $\frac{21}{13}$:

Solution:

$$
\begin{array}{r|l}
13 & 21 \\
 & 13 \\
\hline
 & 80 \\
 & 78 \\
\hline
 & 20 \\
 & 13 \\
\hline
 & 70 \\
 & 65 \\
\hline
 & 5
\end{array}
\qquad 1.615
$$

Non terminating

(ix) $-\frac{23}{14}$:

Solution:

$$
\begin{array}{r}
1.64222 \\
14\overline{)\,23} \\
14 \\
\hline
90 \\
84 \\
\hline
60 \\
56 \\
\hline
40 \\
28 \\
\hline
12
\end{array}
$$

Terminating

(x) $\frac{20}{19}$:

Solution:

$$
\begin{array}{r}
1.05222 \\
19\overline{)\,20} \\
19 \\
\hline
100 \\
95 \\
\hline
50 \\
38 \\
\hline
12
\end{array}
$$

Terminating

(xi) $\frac{31}{17}$:

Solution:

$$
\begin{array}{r}
1.82 \\
17\overline{)\,31} \\
17 \\
\hline
140 \\
136 \\
\hline
40 \\
34 \\
\hline
80 \\
68 \\
\hline
12
\end{array}
$$

Non Terminating

(xii) $-\frac{35}{18}$:

Solution:

$$
\begin{array}{r}
1.4333 \\
18\overline{)\,35} \\
18 \\
\hline
170 \\
162 \\
\hline
80 \\
72 \\
\hline
60 \\
54 \\
\hline
60 \\
54 \\
\hline
60 \\
54 \\
\hline
60
\end{array}
$$

Terminating

(xiii) $\frac{47}{19}$:

Solution:

$$
\begin{array}{r|l}
19 & 47 \\
\hline
 & 2.431 \\
 & 38 \\
\hline
 & 90 \\
 & 76 \\
\hline
 & 60 \\
 & 57 \\
\hline
 & 30 \\
 & 19 \\
\hline
 & 11
\end{array}
$$

Terminating

(xiv) $\frac{35}{23}$:

Solution:

$$
\begin{array}{r|l}
23 & 35 \\
\hline
 & 1.52777 \\
 & 23 \\
\hline
 & 120 \\
 & 115 \\
\hline
 & 50 \\
 & 46 \\
\hline
 & 40 \\
 & 23 \\
\hline
 & 170 \\
 & 161 \\
\hline
 & 9
\end{array}
$$

Terminating

(xv) $-\frac{20}{21}$

Solution:

$$
\begin{array}{r|l}
21 & 200 \\
\hline
 & 0.9523 \\
 & 189 \\
\hline
 & 110 \\
 & 105 \\
\hline
 & 50 \\
 & 42 \\
\hline
 & 80 \\
 & 63 \\
\hline
 & 13
\end{array}
$$

Non Terminating

(xvi) $\frac{39}{22}$

Solution:

$$
\begin{array}{r|l}
22 & 39 \\
\hline
 & 1.765 \\
 & 22 \\
\hline
 & 170 \\
 & 154 \\
\hline
 & 160 \\
 & 132 \\
\hline
 & 18
\end{array}
$$

Non terminating

(xvii) $\frac{41}{29}$

$$
\begin{array}{r}
1.413 \\
29\overline{)\,41} \\
29 \\
\hline
120 \\
116 \\
\hline
40 \\
29 \\
\hline
110 \\
87 \\
\hline
23
\end{array}
$$

Non terminating

(xviii) $\frac{40}{31}$

Solution:

$$
\begin{array}{r}
1.2903 \\
31\overline{)\,40} \\
31 \\
\hline
90 \\
62 \\
\hline
280 \\
279 \\
\hline
100 \\
93 \\
\hline
7
\end{array}
$$

Non terminating

(xix) $\frac{50}{37}$

Solution:

$$
\begin{array}{r}
1.357 \\
37\overline{)\,50} \\
37 \\
\hline
130 \\
111 \\
\hline
190 \\
185 \\
\hline
50 \\
37 \\
\hline
13
\end{array}
$$

Ans: Non Terminating

(xx) $\frac{101}{41}$

Solution:

$$
\begin{array}{r}
2.463 \\
41\overline{)\,101} \\
82 \\
\hline
190 \\
164 \\
\hline
260 \\
246 \\
\hline
140 \\
123 \\
\hline
17
\end{array}
$$

Ans: Non Terminating

II. Convert into decimals and identify which is recurring and which is not.

(i) $\frac{19}{20}$

Solution:

$$20\overline{)190}\ 0.95$$

$$\begin{array}{r} 180 \\ \hline 100 \\ 100 \\ \hline 0 \end{array}$$

Ans: Non Recurring

(ii) $\frac{17}{6}$

Solution:

$$6\overline{)17}\ 2.83333$$

$$\begin{array}{r} 12 \\ \hline 50 \\ 48 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 2 \end{array}$$

Ans: Recurring

(iii) $\frac{15}{8}$:

Solution:

$$8\overline{)15}\ 1.875$$

$$\begin{array}{r} 8 \\ \hline 70 \\ 64 \\ \hline 60 \\ 56 \\ \hline 40 \\ 40 \\ \hline 0 \end{array}$$

Ans: Non Recurring

(iv) $\frac{15}{7}$:

Solution:

$$7\overline{)15}\ 2.14285$$

$$\begin{array}{r} 14 \\ \hline 10 \\ 7 \\ \hline 30 \\ 28 \\ \hline 20 \\ 14 \\ \hline 6 \end{array}$$

Ans: Non Recurring

(v) $\frac{2}{11}$:

Solution:

$$
\begin{array}{r|l}
11 & 0.18181 \\
\hline
 & 20 \\
 & 11 \\
\hline
 & 90 \\
 & 88 \\
\hline
 & 20 \\
 & 11 \\
\hline
 & 90 \\
 & 88 \\
\hline
 & 20 \\
 & 11 \\
\hline
 & 9
\end{array}
$$

Ans: Recurring

(vi) $\frac{10}{3}$:

Solution:

$$
\begin{array}{r|l}
3 & 3.3333 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 1
\end{array}
$$

Ans: Recurring

(vii) $\frac{11}{12}$:

Solution:

$$
\begin{array}{r|l}
12 & 0.9222 \\
\hline
 & 110 \\
 & 108 \\
\hline
 & 20 \\
 & 12 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 8
\end{array}
$$

Ans: Recurring

(viii) $\frac{16}{7}$:

Solution:

$$
\begin{array}{r|l}
7 & 2.28 \\
\hline
 & 16 \\
 & 14 \\
\hline
 & 20 \\
 & 14 \\
\hline
 & 60 \\
 & 56 \\
\hline
 & 40 \\
 & 35 \\
\hline
 & 5
\end{array}
$$

Ans: Non Recurring

(ix) $\frac{2}{13}$:

Solution:

$$13\overline{)20}\ 0.5308$$
$$\begin{array}{r} 13 \\ \hline 70 \\ 65 \\ \hline 50 \\ 39 \\ \hline 110 \\ 104 \\ \hline 6 \end{array}$$

Ans: Non Recurring

(x) $\frac{4}{25}$:

Solution:

$$25\overline{)40}\ 0.106$$
$$\begin{array}{r} 25 \\ \hline 150 \\ 150 \\ \hline 0 \end{array}$$

Ans: Non Recurring

EXERSICE 3.3

I. *Without actual division, separate the terminating and non-terminating decimals.*

(i) $\frac{12}{25}$ **(ii)** $\frac{43}{21}$ **(iii)** $\frac{5}{12}$ **(iv)** $\frac{17}{20}$

(v) $\frac{117}{125}$ **(vi)** $\frac{5}{7}$ **(vii)** $-\frac{9}{40}$ **(viii)** $\frac{10}{33}$

(ix) $\frac{23}{60}$ **(x)** $\frac{40}{35}$ **(xi)** $\frac{55}{75}$ **(xii)** $-\frac{96}{100}$

(xiii) $\frac{101}{125}$ **(xiv)** $\frac{111}{96}$ **(xv)** $\frac{125}{200}$ **(xvi)** $\frac{141}{144}$

(xvii) $\frac{200}{201}$ **(xviii)** $-\frac{210}{147}$ **(xix)** $\frac{372}{400}$ **(xx)** $-\frac{401}{333}$

Terminating	Non-terminating
$\frac{12}{25}, \frac{5}{12}, \frac{17}{20}, -\frac{9}{40}, \frac{23}{60}, -\frac{96}{100}, \frac{101}{125}, \frac{111}{96}, \frac{125}{200}, \frac{55}{75}, \frac{372}{400}$	$\frac{43}{21}, \frac{5}{7}, \frac{10}{33}, \frac{40}{35}, \frac{141}{144}, \frac{200}{201}, \frac{210}{147}, -\frac{401}{333}$

EXERCISE 3.4

I. ***Express the following ratinoal numbers as decimals. Also indicate whether each is terminating or recurring.***

(i) $\frac{5}{14}$:

Solution:

$$
\begin{array}{r}
0.358142 \\
14\overline{)\,50} \\
42 \\
\hline
80 \\
70 \\
\hline
100 \\
98 \\
\hline
20 \\
14 \\
\hline
60 \\
56 \\
\hline
50
\end{array}
$$

0.357142

Ans: Non Recurring

(ii) $\frac{13}{18}$:

Solution:

$$
\begin{array}{r}
0722222 \\
-18\overline{)\,130} \\
126 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
4
\end{array}
$$

0.722222

Ans: Recurring

(iii) $\frac{19}{20}$:

Solution:

$$
\begin{array}{r}
0.95 \\
20\overline{)\,190} \\
180 \\
\hline
100 \\
100 \\
\hline
0
\end{array}
$$

0.95

Ans: Recurring

(iv) $-3\frac{21}{22}$:

Solution:

$$
\begin{array}{r}
-3.954545 \\
22\overline{)\,87} \\
66 \\
\hline
210 \\
198 \\
\hline
120 \\
110 \\
\hline
100 \\
98 \\
\hline
200 \\
198 \\
\hline
2
\end{array}
$$

-3.95495

Ans: Recurring

(v) $-6\frac{17}{30}$:

Solution:

$$
\begin{array}{r}
6.566666 \\
30\overline{)\,197} \\
180 \\
\hline
170 \\
150 \\
\hline
200 \\
180 \\
\hline
200 \\
180 \\
\hline
200 \\
180 \\
\hline
200 \\
180 \\
\hline
20
\end{array}
$$

6.56666

Ans: Recurring

(vi) $\frac{23}{40}$:

Solution:

$$
\begin{array}{r}
0.575 \\
40\overline{)\,230} \\
200 \\
\hline
300 \\
280 \\
\hline
200 \\
200 \\
\hline
0
\end{array}
$$

0575

Ans: Recurring

(vii) $-\frac{25}{34}$

Solution:

$$
\begin{array}{r}
-0735294116 \\
-34\overline{)\,250} \\
238 \\
\hline
120 \\
102 \\
\hline
180 \\
170 \\
\hline
100 \\
68 \\
\hline
320 \\
306 \\
\hline
140 \\
136 \\
\hline
40 \\
34 \\
\hline
60 \\
34 \\
\hline
26 \\
260 \\
\hline
38 \\
22 \\
\hline
16
\end{array}
$$

-0735294117

Ans: Non Recurring

(viii) $2\frac{15}{26}$:

Solution:

$$
\begin{array}{r}
67 \\
\hline
26 \\
\\
2.576923 \\
26\overline{)\,67} \\
52 \\
\hline
150 \\
130 \\
\hline
200 \\
182 \\
\hline
180 \\
156 \\
\hline
240 \\
234 \\
\hline
60 \\
52 \\
\hline
80 \\
78 \\
\hline
2
\end{array}
$$

2.576923

Ans: Non Terminating

(ix) $3\frac{27}{32}$:

Solution:

$$\begin{array}{r} 123 \\ \hline 32 \\ \hline 3.84375 \\ 32\overline{)\ 123} \\ 96 \\ \hline 270 \\ 256 \\ \hline 140 \\ 128 \\ \hline 120 \\ 96 \\ \hline 240 \\ 224 \\ \hline 160 \\ 160 \\ \hline 0 \end{array}$$

3.84375

Ans: Non Terminating

(x) $-1\frac{29}{45}$:

Solution:

$$\begin{array}{r} 74 \\ \hline 45 \\ \hline 1.644444 \\ -45\overline{)\ 74} \\ 45 \\ \hline 290 \\ 270 \\ \hline 200 \\ 180 \\ \hline 200 \\ 180 \\ \hline 200 \\ 180 \\ \hline 20 \end{array}$$

1.6444444

Ans: Recurring

(xi) $2\frac{31}{38}$:

Solution:

$$\begin{array}{r} 107 \\ \hline 38 \\ \hline 2.815789473 \\ 38\overline{)\ 107} \\ 76 \\ \hline 310 \\ 304 \\ \hline 60 \\ 38 \\ \hline 220 \\ 190 \\ \hline 300 \\ 266 \\ \hline 340 \end{array} \qquad \begin{array}{r} 340 \\ 340 \\ \hline 360 \\ 342 \\ \hline 180 \\ 152 \\ \hline 280 \\ 266 \\ \hline 140 \\ 114 \\ \hline 36 \end{array}$$

2.815789473

Ans: Non Terminating

(xii) $\frac{39}{46}$:

Solution:

$$\begin{array}{r} 0.847826081 \\ 46\overline{)\ 390} \\ 368 \\ \hline 220 \\ 184 \\ \hline 360 \\ 322 \\ \hline 380 \\ 368 \\ \hline 120 \\ 92 \\ \hline 280 \\ 276 \\ \hline 400 \\ 384 \\ \hline 60 \\ 46 \\ \hline 4 \end{array}$$

0.847826081

Ans: Terminating

(xiii) $-3\frac{49}{50}$:

Solution:

$$-\frac{199}{50}$$

$$-50\overline{)199}\ 3.98$$

150

490

450

400

400

0

3.98

Ans: Terminating

(xiv) $2\frac{45}{48}$:

Solution:

$$\frac{141}{48}$$

$$48\overline{)141}\ 2.9375$$

96

450

432

180

144

360

336

240

240

0

2.9375

Ans: Terminating

(xv) $\frac{91}{65}$:

Solution;

$$65\overline{)91}\ 1.4$$

65

260

260

0

1.4

Ans: Terminating

(xvi) $-\frac{153}{85}$:

Solution:

$$85\overline{)153}\ 1.8$$

85

680

680

0

1.8

Ans: Terminating

(xvii) $\frac{266}{171}$:

Solution:

$$
\begin{array}{r|l}
171 & 1.5555555 \\
\hline
 & 266 \\
 & 171 \\
\hline
 & 950 \\
 & 855 \\
\hline
 & 950 \\
 & 855 \\
\hline
 & 950 \\
 & 855 \\
\hline
 & 50
\end{array}
$$

1.5555555

Ans: Recurring

(xviii) $\frac{102}{210}$:

Solution:

$$
\begin{array}{r|l}
-210 & 0.495714281 \\
\hline
 & 1020 \\
 & 840 \\
\hline
 & 1800 \\
 & 1680 \\
\hline
 & 1200 \\
 & 1050 \\
\hline
 & 1500 \\
 & 1470 \\
\hline
 & 300 \\
 & 210 \\
\hline
 & 900 \\
 & 840 \\
\hline
 & 600 \\
 & 420 \\
\hline
 & 1800 \\
 & 1680 \\
\hline
 & 120
\end{array}
$$

0.495714281

Ans: Not Recurring

(xix) $\frac{111}{228}$:

Solution:

$$
\begin{array}{r|l}
228 & 0.4868421 \\
\hline
 & 1110 \\
 & 912 \\
\hline
 & 1980 \\
 & 1024 \\
\hline
 & 1560 \\
 & 1368 \\
\hline
 & 920 \\
 & 912 \\
\hline
 & 800 \\
 & 456 \\
\hline
 & 344 \\
 & 156 \\
\hline
 & 188
\end{array}
$$

0.4868421

Ans: Non Terminating

(xx) $\frac{272}{288}$:

Solution:

$$
\begin{array}{r|l}
288 & 0.94444444 \\
\hline
 & 2720 \\
 & 2590 \\
\hline
 & 1280 \\
 & 1152 \\
\hline
 & 1280 \\
 & 1152 \\
\hline
 & 1280 \\
 & 1152 \\
\hline
 & 1280 \\
 & 1152 \\
\hline
 & 1280 \\
 & 1152 \\
\hline
 & 128
\end{array}
$$

0.94444444

Ans: Recurring

EXERCISE 3.5

I. *Convert the following rational numbers as terminating and non-terminating decimals and express up to three places of decimal.*

(i) $\frac{23}{400}$:

Solution:

$$
\begin{array}{r}
0.0575 \\
400\overline{)\,2300} \\
2000 \\
\hline
3000 \\
2800 \\
\hline
2000 \\
2000 \\
\hline
0
\end{array}
$$

Ans: 0.0515

(ii) $\frac{27}{64}$:

Solution:

$$
\begin{array}{r}
0.421875 \\
64\overline{)\,270} \\
256 \\
\hline
140 \\
128 \\
\hline
120 \\
64 \\
\hline
560 \\
512 \\
\hline
480 \\
448 \\
\hline
320 \\
320 \\
\hline
0
\end{array}
$$

Ans: 0.421875

(iii) $\frac{53}{60}$:

Solution:

$$
\begin{array}{r}
0.883333 \\
60\overline{)\,530} \\
480 \\
\hline
500 \\
480 \\
\hline
200 \\
180 \\
\hline
200 \\
180 \\
\hline
200 \\
180 \\
\hline
200 \\
180 \\
\hline
20
\end{array}
$$

Ans: 0.883333

(iv) $-\frac{46}{75}$:

Solution:

$$
\begin{array}{r}
0.613333 \\
-75\overline{)\,460} \\
450 \\
\hline
100 \\
75 \\
\hline
250 \\
225 \\
\hline
250 \\
225 \\
\hline
250 \\
225 \\
\hline
250 \\
225 \\
\hline
50
\end{array}
$$

Ans: −0.613333

(v) $\frac{69}{70}$:

Solution:

$$
\begin{array}{r|l}
70 & 690 \\
 & 630 \\
\hline
 & 600 \\
 & 560 \\
\hline
 & 400 \\
 & 350 \\
\hline
 & 500 \\
 & 490 \\
\hline
 & 100
\end{array}
\qquad
\begin{array}{r|l}
70 & 100 \\
 & 70 \\
\hline
 & 300 \\
 & 280 \\
\hline
 & 300 \\
 & 280 \\
\hline
 & 200 \\
 & 140 \\
\hline
 & 600 \\
 & 490 \\
\hline
 & 10
\end{array}
$$

Ans: 0.98571428

(vi) $\frac{77}{80}$:

Solution:

$$
\begin{array}{r|l}
80 & 770 \\
 & 720 \\
\hline
 & 500 \\
 & 480 \\
\hline
 & 200 \\
 & 160 \\
\hline
 & 400 \\
 & 400 \\
\hline
 & 0
\end{array}
$$

Ans: 0.9625

(vii) $\frac{43}{90}$:

Solution:

$$
\begin{array}{r|l}
90 & 430 \\
 & 360 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 700 \\
 & 630 \\
\hline
 & 70
\end{array}
$$

Ans: 0.47777777

(viii) $\frac{119}{120}$:

Solution:

$$
\begin{array}{r|l}
120 & 1190 \\
 & 1080 \\
\hline
 & 1100 \\
 & 1080 \\
\hline
 & 200 \\
 & 120 \\
\hline
 & 800 \\
 & 720 \\
\hline
 & 800 \\
 & 720 \\
\hline
 & 800 \\
 & 720 \\
\hline
 & 800 \\
 & 720 \\
\hline
 & 800 \\
 & 720 \\
\hline
 & 800 \\
 & 720 \\
\hline
 & 80
\end{array}
$$

Ans: 0.99166667

(ix) $\frac{246}{300}$:

Solution:

$$
\begin{array}{r}
0.82 \\
300\overline{)2460} \\
2400 \\
\hline
600 \\
600 \\
\hline
0
\end{array}
$$

Ans: 0.82

(x) $-\frac{81}{96}$:

Solution:

$$
\begin{array}{r}
0.84375 \\
96\overline{)810} \\
768 \\
\hline
420 \\
384 \\
\hline
360 \\
288 \\
\hline
720 \\
672 \\
\hline
480 \\
480 \\
\hline
0
\end{array}
$$

Ans: 0.84375

II. Identify terminating and non-terminating decimals by division and express them up to two places of decimal.

(i) $\frac{4}{5}$:

Solution:

$$
\begin{array}{r}
0.26666 \\
15\overline{)40} \\
30 \\
\hline
100 \\
90 \\
\hline
100 \\
90 \\
\hline
100 \\
90 \\
\hline
100 \\
90 \\
\hline
10
\end{array}
$$

Ans: 0.26666

(ii) $-\frac{11}{12}$:

Solution:

$$
\begin{array}{r}
0.916666 \\
12\overline{)110} \\
108 \\
\hline
20 \\
12 \\
\hline
80 \\
72 \\
\hline
80 \\
72 \\
\hline
80 \\
72 \\
\hline
80 \\
72 \\
\hline
8
\end{array}
$$

Ans: 0.916666

(iii) $\frac{8}{9}$:

Solution:

$$
\begin{array}{r|l}
9 & 80.888888 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 80 \\
 & 72 \\
\hline
 & 8
\end{array}
$$

Ans: 0.888888

(iv) $\frac{22}{7}$:

Solution:

$$
\begin{array}{r|l}
7 & 22.14288143 \\
 & 21 \\
\hline
 & 10 \\
 & 7 \\
\hline
 & 30 \\
 & 28 \\
\hline
 & 20 \\
 & 14 \\
\hline
 & 60 \\
 & 56 \\
\hline
 & 40 \\
 & 35 \\
\hline
 & 50 \\
 & 49 \\
\hline
 & 10 \\
 & 7 \\
\hline
 & 30 \\
 & 28 \\
\hline
 & 20 \\
 & 14 \\
\hline
 & 6
\end{array}
$$

Ans: 3.14288143

(v) $-\frac{21}{16}$:

Solution:

$$
\begin{array}{r|l}
16 & 21.3125 \\
 & 161 \\
\hline
 & 50 \\
 & 48 \\
\hline
 & 20 \\
 & 16 \\
\hline
 & 40 \\
 & 32 \\
\hline
 & 80 \\
 & 80 \\
\hline
 & 0
\end{array}
$$

Ans: 1.3125

(vi) $\frac{3}{40}$:

Solution:

$$
\begin{array}{r|l}
40 & 300.075 \\
 & 280 \\
\hline
 & 200 \\
 & 200 \\
\hline
 & 0
\end{array}
$$

Ans: 0.075

(vii) $-\frac{18}{45}$:

Solution:

$$-45\overline{)180}\ -0.4$$

$$\begin{array}{r} 180 \\ \hline 0 \end{array}$$

Ans: -0.4

(viii) $\frac{21}{66}$:

Solution:

$$66\overline{)210}\ 0.3181818$$

$$\begin{array}{r} 198 \\ \hline 120 \\ 66 \\ \hline 540 \\ 528 \\ \hline 120 \\ 66 \\ \hline 540 \\ 528 \\ \hline 120 \\ 66 \\ \hline 54 \end{array}$$

Ans: 0.3181818

(ix) $\frac{33}{90}$:

Solution:

$$90\overline{)330}\ 0.366666$$

$$\begin{array}{r} 270 \\ \hline 600 \\ 540 \\ \hline 600 \\ 540 \\ \hline 600 \\ 540 \\ \hline 600 \\ 540 \\ \hline 600 \\ 540 \\ \hline 60 \end{array}$$

Ans: 0.366666

(x) $-\frac{81}{101}$:

Solution:

$$-101\overline{)810}\ -0.801980198$$

$$\begin{array}{r} 808 \\ \hline 200 \\ 101 \\ \hline 990 \\ 909 \\ \hline 810 \\ 808 \\ \hline 200 \\ 101 \\ \hline 990 \\ 909 \\ \hline 810 \\ 808 \\ \hline 2 \end{array}$$

Ans: -0.801980198

III. Express the following rational numbers as non-terminating or recurring up to three places of decimal.

(i) $\frac{10}{11}$:

Solution:

$$
\begin{array}{r|l}
11 & 100 \\
 & 99 \\
\hline
 & 100 \\
 & 99 \\
\hline
 & 100 \\
 & 99 \\
\hline
 & 100 \\
 & 99 \\
\hline
 & 1
\end{array}
\qquad 0.90909090
$$

Ans: 0.90909090

(ii) $-\frac{410}{90}$:

Solution:

$$
\begin{array}{r|l}
-90 & 410 \\
 & 360 \\
\hline
 & 500 \\
 & 450 \\
\hline
 & 500 \\
 & 450 \\
\hline
 & 500 \\
 & 450 \\
\hline
 & 500 \\
 & 450 \\
\hline
 & 50
\end{array}
\qquad -0.455555
$$

Ans: −0.455555

(iii) $\frac{211}{13}$:

Solution:

$$
\begin{array}{r|l}
13 & 21 \\
 & 13 \\
\hline
 & 80 \\
 & 78 \\
\hline
 & 20 \\
 & 13 \\
\hline
 & 70 \\
 & 65 \\
\hline
 & 50 \\
 & 39 \\
\hline
 & 110 \\
 & 104 \\
\hline
 & 60 \\
 & 52 \\
\hline
 & 80 \\
 & 78 \\
\hline
 & 2
\end{array}
\qquad 1.6153846
$$

Ans: 1.6153846

(iv) $\frac{17}{19}$:

Solution:

$$
\begin{array}{r|l}
19 & 170 \\
 & 152 \\
\hline
 & 180 \\
 & 171 \\
\hline
 & 90 \\
 & 76 \\
\hline
 & 140 \\
 & 133 \\
\hline
 & 70 \\
 & 57 \\
\hline
 & 130 \\
 & 114 \\
\hline
 & 16
\end{array}
\qquad 0.894736
$$

Ans: 0.894736

(v) $\frac{9}{7}$:

Solution

$$7\overline{)9}\ 1.285714$$

7
20
14
60
56
40
35
50
49
10
7
30
28
2

Ans: 1.285714

(vi) $\frac{15}{23}$:

Solution:

$$23\overline{)150}\ 0.6521735$$

138
120
115
50
46
40
23
170
161
90
69
210
110
100

Ans: 0.6521735

(vii) $-\frac{111}{96}$:

Solution:

$$-96\overline{)111}\ -1.15625$$

96
150
96
540
480
600
576
240
192
480
480
0

Ans: −1.15625

(viii) $\frac{22}{29}$:

Solution:

$$29\overline{)220}\ 0.75620689$$

203
170
145
250
232
180
174
60
58
260
171
260
232
280
261
19

Ans: 0.75620689

IV. Round off the following decimals up to two places of decimal.

(i) 0.451689
Ans: 0.46

(ii) 0.3648
Ans: 0.36

(iii) 0.6666
Ans: 0.67

(iv) 0.1054
Ans: 0.11

(v) 1.9091
Ans: 1.91

(vi) 3.2479
Ans: 3.25

(vii) 2.0518
Ans: 2.05

(viii) 8.3381
Ans: 8.34

(ix) 10.1036
Ans: 10.10

(x) 3.9995
Ans: 4.00

(xi) 13.0967
Ans: 13.10

(xii) 15.8159
Ans: 12.82

V. Round off the following decimals up to three places of decimal.

(i) 4.51689:
Ans: 4.517

(ii) 6.7272:
Ans: 6.747

(iii) 0.0098:
Ans: 0.010

(iv) 0.986:
Ans: 0.986

(v) 206.4176:
Ans: 206.418

(vi) 3.4073:
Ans: 3.407

(vii) 102.99909:
Ans: 102.999

(viii) 11.1234:
Ans: 11.123

(ix) 55.12345:
Ans: 55.123

(x) 4.10539:
Ans: 4.105

(xi) 66.3957:
Ans: 66.396

(xii) 59.9196:
Ans: 59.920

REVIEW EXERCISE 3

1. Convert the following decimals into rational numbers.

(i) 0.325:

Solution:

$$0.325 = \frac{\cancel{325}^{13}}{\cancel{1000}} = \frac{13}{40}$$

Ans: $= \frac{13}{40}$

(ii) 0.75:

Solution:

$$0.75 = \frac{\cancel{75}}{\cancel{100}} \quad \frac{3}{4} = \frac{3}{4}$$

Ans: $= \frac{3}{4}$

(iii) 2.5:

Solution:

$$= \frac{\cancel{2.5}}{\cancel{10}}$$

$$10\overline{)25}\ \begin{matrix}2\\ \underline{20}\\ 5\end{matrix} \qquad 2\frac{\cancel{5}}{\cancel{10}} \quad \frac{1}{2}$$

Ans: $= 2\frac{1}{2}$

(iv) 7.75:

Solution:

$$7.75 = \frac{\cancel{75}^{3}}{\cancel{100}_{4}} = 7\frac{3}{4}$$

Ans: $= 7\frac{3}{4}$

(v) 0.78:

Solution:

$$0.78 = \frac{\cancel{78}^{39}}{\cancel{100}_{50}} = \frac{39}{50}$$

Ans: $= \frac{39}{50}$

(vi) 1.297:

Solution:

$$1.297 = 1\frac{297}{1000} = 1\frac{297}{100}$$

Ans: $= 1\frac{297}{100}$

(vii) 2.348:

Solution:

$$2.348 = 2\frac{\cancel{348}^{\cancel{174}^{87}}}{\cancel{1000}^{\cancel{500}_{250}}} = \frac{87}{250}$$

Ans: $= \frac{87}{250}$

2. Express following number's as decimal.

(i) $\frac{41}{5}$:

Solution:

$$5\overline{)41}\ 8.2$$

40

10

10

0

Ans: = 8.2

(ii) $\frac{111}{12}$:

Solution:

$$12\overline{)111}\ 9.25$$

108

30

24

60

60

0

Ans: = 9.25

(iii) $\frac{28}{9}$:

Solution:

$$9\overline{)28}\ 3.111$$

27

10

9

10

9

10

9

10

9

10

9

1

Ans: = 3.11111

(iv) $\frac{10}{7}$:

Solution:

$$7\overline{)10}\ 1.42857$$

7

30

28

20

14

60

56

40

35

50

49

10

7

3

Ans: = 1.42857

(v) $\frac{27}{7}$:

Solution:

$$
\begin{array}{r}
3.142857 \\
7\overline{)\,22} \\
21 \\
\hline
10 \\
7 \\
\hline
30 \\
28 \\
\hline
20 \\
14 \\
\hline
60 \\
56 \\
\hline
40 \\
35 \\
\hline
50 \\
49 \\
\hline
1
\end{array}
$$

Ans: = 3.142857

(vi) $\frac{21}{16}$:

Solution:

$$
\begin{array}{r}
1.3125 \\
16\overline{)\,21} \\
16 \\
\hline
50 \\
48 \\
\hline
20 \\
16 \\
\hline
40 \\
32 \\
\hline
80 \\
80 \\
\hline
0
\end{array}
$$

Ans: = 1.3125

(vii) $\frac{73}{10}$:

Solution:

$$
\begin{array}{r}
7.3 \\
10\overline{)\,73} \\
70 \\
\hline
30 \\
30 \\
\hline
0
\end{array}
$$

Ans: = 7.3

3. Round off the following decimal upto two place of decimal.

(i) 14.5828:

Ans: 14.58

(ii) 10.78287:

Ans: 10.78

(iii) 5.7895:

Ans: 5.79

(iv) 6.7989:

Ans: 6.80

(v) 25.4897:

Ans: 25.49

4. With out actual division, sepante the terminating and non-terminating decimals.

(i) $\frac{13}{4}$:

Ans: Terminating

(ii) $\frac{17}{25}$:

Ans: Not Terminating

(iii) $\frac{80}{3}$:

Ans: Not Terminating

(iv) $\frac{15}{11}$:

Ans: Not Terminating

(v) $\frac{19}{6}$:

Ans: Not Terminating

(vi) $\frac{25}{15}$:

Ans: Not Terminating

(vii) $\frac{22}{7}$:

Ans: Not Terminating

(viii) $\frac{14}{9}$:

Ans: Not Terminating

5. Express the following rational numbers in terminating decimal.

(i) $\frac{21}{100}$:

Solution:

$$100\overline{)210}\ 0.21$$

$$\begin{array}{r} 200 \\ \hline 100 \\ 100 \\ \hline 0 \end{array}$$

Ans: $= 0.21$

(ii) $\frac{127}{20}$:

Solution:

$$20\overline{)127}\ 6.35$$

$$\begin{array}{r} 120 \\ \hline 70 \\ 60 \\ \hline 100 \\ 100 \\ \hline 0 \end{array}$$

Ans: $= 6.35$

(iii) $\frac{13}{25}$:

Solution:

$$25\overline{)130}\ 0.52$$
$$125$$
$$50$$
$$50$$
$$0$$

Ans: = 0.52

(iv) $\frac{31}{50}$:

Solution:

$$50\overline{)310}\ 0.62$$
$$300$$
$$100$$
$$100$$
$$0$$

Ans: = 0.62

(v) $\frac{145}{1000}$:

Solution:

$$1000\overline{)1450}\ 0.145$$
$$1000$$
$$4500$$
$$4000$$
$$5000$$
$$5000$$
$$0$$

Ans: = 0.145

(vi) $\frac{25}{8}$:

Solution:

$$8\overline{)25}\ 3.125$$
$$24$$
$$10$$
$$8$$
$$20$$
$$16$$
$$40$$
$$40$$
$$0$$

Ans: = 3.125

(vii) $\frac{23}{16}$:

Solution:

$$16\overline{)23}\ 1.4385$$
$$16$$
$$70$$
$$64$$
$$60$$
$$48$$
$$120$$
$$112$$
$$80$$
$$80$$
$$0$$

Ans: = 1.4385

(viii) $\frac{88}{64}$:

Solution:

$$64\overline{)88}\ 1.375$$
$$64$$
$$240$$
$$192$$
$$480$$
$$448$$
$$320$$
$$320$$
$$0$$

Ans: = 1.375

(ix) $\frac{48}{32}$:

Solution:

$$32\overline{)48}\ 1.5$$
$$32$$
$$160$$
$$160$$
$$0$$

Ans: = 1.5

6. Convert the following rational numbers in non-terminating decimals and express up to three place of decimal.

(i) $\frac{40}{3}$:

Solution:

$$
\begin{array}{r|l}
3 & 40 \quad (13.333 \\
 & 3 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 10 \\
 & 9 \\
\hline
 & 1
\end{array}
$$

Ans: = 13.333

(ii) $\frac{20}{7}$:

Solution:

$$
\begin{array}{r|l}
7 & 20 \quad (2.857 \\
 & 14 \\
\hline
 & 60 \\
 & 56 \\
\hline
 & 40 \\
 & 35 \\
\hline
 & 50 \\
 & 49 \\
\hline
 & 1
\end{array}
$$

Ans: = 2.857

(iii) $\frac{50}{11}$:

Solution:

$$
\begin{array}{r|l}
11 & 50 \quad (4.545 \\
 & 44 \\
\hline
 & 60 \\
 & 55 \\
\hline
 & 50 \\
 & 44 \\
\hline
 & 60 \\
 & 55 \\
\hline
 & 5
\end{array}
$$

Ans: = 4.545

(iv) $\frac{80}{13}$:

Solution:

$$
\begin{array}{r|l}
13 & 80 \quad (6.1538 \\
 & 78 \\
\hline
 & 20 \\
 & 13 \\
\hline
 & 70 \\
 & 65 \\
\hline
 & 50 \\
 & 39 \\
\hline
 & 110 \\
 & 104 \\
\hline
 & 6
\end{array}
$$

Ans: = 6.1538

(v) $\frac{100}{6}$:

Solution:

$$
\begin{array}{r}
16.666 \\
6\overline{)\,100} \\
6 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
4
\end{array}
$$

Ans: = 16.666

(vi) $\frac{240}{22}$:

Solution:

$$
\begin{array}{r}
10.9090 \\
22\overline{)\,240} \\
220 \\
\hline
200 \\
198 \\
\hline
200 \\
198 \\
\hline
2
\end{array}
$$

Ans: = 10.9090

(vii) $\frac{70}{12}$:

Solution:

$$
\begin{array}{r}
5.8333 \\
12\overline{)\,70} \\
60 \\
\hline
100 \\
96 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
40 \\
36 \\
\hline
4
\end{array}
$$

Ans: = 5.8333

(viii) $\frac{52}{91}$:

Solution:

$$
\begin{array}{r}
0.57142 \\
91\overline{)\,520} \\
455 \\
\hline
650 \\
637 \\
\hline
130 \\
91 \\
\hline
390 \\
364 \\
\hline
260 \\
182 \\
\hline
88
\end{array}
$$

Ans: = 0.57142

7. Round off the following decimals upto three place of decimal.

(i) 5.71679:

Ans: 5.717

(ii) 71.60365:

Ans: 71.604

(iii) 0.92598:

Ans: 0.926

(iv) 3.40855:

Ans: 3.409

(v) 0.74396:

Ans: 0.744

(vi) 23.15847:

Ans: 23.158

8. Answer the following questions.

(i) What are the terminating and non-terminating decimals?

Ans: Terminating Decimals:

A decimal which contains finite number of dicits after decimal point, is called a terminating decimal.

Hence *0.5, 0.25, 0.75, 0.345, 1.7227, 5.023748* etc are all terminating decimals.

Non-Terminating Decimals:

A decimal which contain infinite number of digits after decimal point is called non-terminating decimal.

(ii) Write the method for converting a decimal into a rational number. Give example.

Ans: The method for converting a decimal into a rational number as follows:

(i) Write 1 below the decimal and remove decimal point.

(ii) Put as many zero after as the number of digits after decimal point.

(iii) Simplify the numbers

Example 1:

Convert a decimal 0.5 to rational number.

Solution:

$$0.5 = \frac{05}{10} = \frac{5}{2 \times 5} = \frac{\cancel{5}^{1}}{2 \times \cancel{5}_{2}} = \frac{1}{2}$$

or $$0.5 = \frac{\cancel{5}^{1}}{\cancel{10}_{2}} = \frac{1}{2}$$

Example 2:

Convert decimal *2.40* into rational number.

Solution:

Given decimal *2.40* comprises of two parts '2' a whole part and '.40' a decimal part.

So, we first convert decimal part '.40' into rational number.

$$40 = \frac{40}{100}$$ (As .40 has two places of decimal, so we put two zeros after '1')

So, $$240 = 2 + .40 = 2\frac{40}{100} = 2\frac{4}{10} = 2\frac{\cancel{4}^{2}}{\cancel{10}_{5}} = 2\frac{2}{5} = \frac{12}{5}$$

Thus decimal $2.40 = \frac{12}{5}$ which is common fraction or a rational number.

(iii) Which of the non-terminating decimals are called reurring decimals? Give two examples.

Ans: A non-terminating decimal in which a 'single

digit' or a 'block of digits' is repeated infinite number of times after decimal point, is called recurring decimal.

Examples:

Convert the given rational numbers as decimals and find whether the decimals so obtained are recurring.

(i) $\frac{2}{3}$ (ii) $\frac{7}{6}$

Solution:

We can observe the long division that:

(i) $\frac{2}{3} = 0.666\ldots$ and (ii) $\frac{7}{6} = 1.1666\ldots$

Here in both the numbers, digit '6' repeats infinite number of times after decimal, so both are non-terminating and recurring.

(iv) What is the rule to find whether a given rational number is terminating or not? Give two example.

Ans: The following rule to find whether a given rational number is terminating or not.

Rule:

If the denominator of a rational number in standard from has prime factors 2 and 5 or 2,5 only then that rational number is derminating decimal.

Examples:

Rational No.	Division method	Use of Rule	Terminating or Not
$\frac{9}{20}$	$\frac{9}{20} = 9 \div 20 = 0.45$	$\frac{9}{20} = \frac{9}{2 \times 2 \times 5}$ Denominator has 2 and 5 as primer factors	Terminating
$\frac{4}{7}$	$\frac{4}{7} = 0.57142857$	$\frac{4}{7} = \frac{4}{7 \times 1}$ Denominator has not 2 and 5 as prime factor	Non Terinating

(v) What is meant by the term 'rounding off is decimals> Give two examples.

Ans: Get an appropriate value of a number called rounding off, to a desired number of decimal places.

In calculations we may come across rational numbers which are non-terminating decimals. So, we round off the decimals to some decimal places and then solve our calculations.

Rule:

(i) Check the remaining digits.
If the next digit is less than 5, drop it.

(ii) If the next digit is 5 or more than 5, then add 1 to the last digit of the number.

Example:

Consider the decimal 0.555... Round off 0.555... to two decimal places.

Solution:

We have to round off up to two decimal places.

Step 1:

So, we keep two digits of the given decimal same i.e. 0.55.

Step 2:

As the next digit to be removed after two decimal places is 5.

So, we add '1' to last digit of 0.55 i.e. t which will become 6.

Hence the given decimal 0.555... will be rounded off to two decimal places as 0.56.

Example 2:

Round off 2.333333 to two decimal places, we get: 2.33

Example 3:

Round off 4.8888 to two decimal places, we get: 4.89.

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9. Fill in the blanks.

(i) $\frac{1}{2} = 0.5$ which is a Terminating decimal .

(ii) $\frac{1}{3} = 0.333...$ which is a non-terminating decimal.

(iii) Two parts of adecimal number seperated by a dot, are called the whose numbers and decimal part .

(iv) In terminating decimals, division stops after a finite number of steps.

(v) A fraction will be terminating decimal if the fraction has 2 or 5 or both as factors of denominator.

(vi) In recurring decimals, single digit or block of digits repeat themselves.

10. Chose the correct answer:

(i) To separate a whole number from fractional part in a decimal, we use the symbol.

(a) - (b) . (c) : (d) /

Ans: (b) .

(ii) If we round off the decimal 3.8461 up to two decimal palces, we get:

(a) 3.84 (b) 3.81 (c) 3.86 (d) 3.85

Ans: (d) 3.85

(iii) A rational number is terminating decimal, if its denominator has no prime factor other than:

(a) 2 and 5 (b) 3 and 6

(c) 4 and 5 (d) 5 and 7

Ans: (a) 2 and 5

(iv) When we convert 0.75 into the rational number, we get:

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{7}$

Ans: (c) $\frac{3}{4}$