Exercise 1.3

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

On dividing 2 by 11, we get

$$
\begin{array}{r}
0.1818.... \\
11\overline{)\ 2} \\
\underline{-0} \\
\ \ 20 \\
\underline{-11} \\
\ \ 90 \\
\underline{-88} \\
\ \ 20 \\
\underline{-11} \\
\ \ 90 \\
\underline{-88} \\
\ \ 2
\end{array}
$$

We can observe that while dividing 2 by 11, first we got the remainder as 2 and then 9, which will continue to be 2 and 9 alternately.

Therefore, we conclude that

$\frac{2}{11} = 0.1818.....$ or $\frac{2}{11} = 0.\overline{18}$, which is a non-terminating decimal and recurring decimal.

(vi) $\frac{329}{400}$

On dividing 329 by 400, we get

$$
\begin{array}{r}
0.8225 \\
400\overline{)\ 329} \\
\underline{-0} \\
3290 \\
\underline{-3200} \\
900 \\
\underline{-800} \\
1000 \\
\underline{-800} \\
2000 \\
\underline{-2000} \\
0
\end{array}
$$

We can observe that while dividing 329 by 400, we got the remainder as 0.

Therefore, we conclude that $\frac{329}{400} = 0.8225$, which is a terminating decimal.

Q2. You know that $\frac{1}{7} = 0.142857.....$. Can you

predict what the decimal expansions of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$ are, without actually doing the long division? If so, how?

[Hint: Study the remainders while finding the value of $\frac{1}{7}$ carefully.]

Ans: We are given that

$\frac{1}{7} = 0.\overline{142857}$ or $\frac{1}{7} = 0.142857.....$

We need to find the values of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}$ and $\frac{6}{7}$, without performing long division.

We know that, $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}$ and $\frac{6}{7}$ can be rewritten

as $2\times\frac{1}{7}, 3\times\frac{1}{7}, 4\times\frac{1}{7}, 5\times\frac{1}{7}$ and $6\times\frac{1}{7}$.

On substituting value of $\frac{1}{7}$ as $0.142857.....$, we get

$2\times\frac{1}{7} = 2\times 0.142857..... = 0.285714.....$

$3\times\frac{1}{7}=3\times 0.142857....=0.428571$

$4\times\frac{1}{7}=4\times 0.142857...=0.571428$

$5\times\frac{1}{7}=5\times 0.142857.....=0.714285$

$6\times\frac{1}{7}=6\times 0.142857.....=0.857142$

Therefore, we conclude that, we can predict the values of $\frac{2}{7},\frac{3}{7},\frac{4}{7},\frac{5}{7}$ and $\frac{6}{7}$, without performing long division, to get

$\frac{2}{7}=0.\overline{285714},\frac{3}{7}=0.\overline{428571},\frac{4}{7}=0.\overline{571428},\frac{5}{7}$

$=0.\overline{714285},$ and $\frac{6}{7}=0.\overline{857142}$

Q3. Express the following in the form $\frac{p}{q}$, where p and q are integers and $q\neq 0$.

(i) $0.\bar{6}$

(ii) $0.4\bar{7}$

(iii) $0.\overline{001}$

Ans: (i) Let $x=0.\bar{6}$

$\Rightarrow x = 0.6666.....(a)$

We need to multiply both sides by 10 to get

$10x = 6.6666.....$ $....(b)$

We need to subtract $(a)$from (b), to get

$$\begin{array}{l} 10x = 6.6666..... \\ \underline{-x = 0.6666.....} \\ 9x = 6 \end{array}$$

We can also write $9x = 6$ as $x = \frac{6}{9}$ or $x = \frac{2}{3}$.

Therefore, on converting $0.\bar{6}$ in the $\frac{p}{q}$ form, we get the answer as $\frac{2}{3}$.

(ii) Let $x = 0.4\bar{7} \Rightarrow x = 0.47777.....(a)$

We need to multiply both sides by 10 to get

$10x = 4.7777.....(b)$

We need to subtract $(a)$from (b), to get

********** END **********