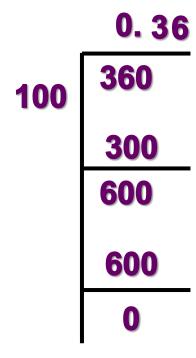# STD – 9   MATHS

CHAPTER - 1

NUMBER SYSTEM

EXERCISE - 1.3

1. Write the following in decimal form and say what kind of decimal expansion each has :

(i) 36 / 100

Solution :

```
        0. 36
     ┌──────────
100  │ 360
     │
     │ 300
     ├──────────
     │ 600
     │
     │ 600
     ├──────────
     │   0
```

= 0.36 (Terminating)

(ii) 1 / 11

Solution:

$$
\begin{array}{r}
0.\,0\,9\,0\,9 \\
11\,\overline{\big)\,1} \\
0 \\
\overline{10} \\
0 \\
\overline{100} \\
99 \\
\overline{10} \\
0 \\
\overline{100} \\
99 \\
\overline{1}
\end{array}
$$

= 0.0909...

= 0.09 (Non terminating and repeating)

(iii) $4\frac{1}{8}$

Solution :

$= 4\frac{1}{8}$

$= \dfrac{33}{8}$

```
            4. 1 2 5
        8 | 33
           32
           ‾‾‾‾
           10
            8
           ‾‾‾‾
           20
           16
           ‾‾‾‾
           40
           40
           ‾‾‾‾
            0
```

= 4.125 (Terminating)

(iv) 3 / 13

Solution:

```
        0.2 3 0 7 6 9
   13 | 30
        26
        40
        39
        10
         0
        100
         91
         90
         78
        120
        117
          3
```

= 0.230769...

= $0.\overline{230769}$ (Non terminating and repeating)

(v) 2 / 11

Solution:

```
        0. 18
     ┌──────
  11 │ 2
     │
     │ 0
     ├──────
     │ 20
     │
     │ 11
     ├──────
     │  90
     │
     │  88
     ├──────
     │   2
```

= 0.181818181818...

= 0.18 (Non teminating and repeating)

(vi) 329 / 400

Solution:

```
             0.8 2 2 5
      400 ) 329
             0
             ____
             3290

             3200
             ____
              900

              800
              ____
             1000

              800
              ____
             2000

             2000
             ____
                0
```

= 0.8225 (Terminating)

2. You know that 1/7 = 0. $\overline{142857}$. Can you predict what the decimal expansions of 2/7, 3/7, 4/7, 5/7, 6/7 are, without actually doing the long division? If so, how?

[Hint: Study the remainders while finding the value of 1/7 carefully.]

Solution:

$1/7 = 0.\overline{142857}$

$\therefore 2 \times 1/7$

$= 2 \times 0.\overline{142857}$

$= 0.\overline{285714}$

$\therefore 3 \times 1/7$

$= 3 \times 0.\overline{142857}$

$= 0.4\overline{28571}$

$\therefore 4 \times 1/7$

$= 4 \times 0.1\overline{42857}$

$= 0.5\overline{71428}$

$\therefore 5 \times 1/7$

$= 5 \times 0.1\overline{42857}$

$= 0.7\overline{14285}$

$\therefore 6 \times 1/7$

$= 6 \times 0.1\overline{42857}$

$= 0.8\overline{57142}$

3. Express the following in the form p/q, where p and q are integers and q ≠ 0.

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

Solution:

$0.\overline{6} = 0.666...$

Assume that $x = 0.666...$

$10x = 6.666...$

$10x = 6 + x$

$9x = 6$

$x = 2/3$

(ii) $0.4\overline{7}$

Solution :

Assume that x = 0.4777...

10x = 4.777...

$\qquad$ **= 4.3 + 0.477**

10x = 4.3 + x

$\quad$ **9x = 4.3**

$\qquad$ **x = $\dfrac{43}{90}$**

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

Solution :

$0.\overline{001} = 0.001001...$

Assume that $x = 0.001001...$

$1000x = 1.001001...$

$1000x = 1 + x$

$999x = 1$

$x = 1/999$

4. Express 0.99999.... in the form p/q . Are you surprised by your answer? With your teacher and classmates discuss why the answer makes sense.

Solution:

Assume that x = 0.9999..... Eq (a)

Multiplying both sides by 10,

10x = 9.9999.... Eq. (b)

Eq.(b) - Eq. (a), we get

$10x = 9.9999...$

$- X = - 0.9999...$

$9x = 9$

$x = 1$

The difference between 1 and 0.999999 is 0.000001 which is negligible.

Hence, we can conclude that, 0.999 is too much near 1, therefore, 1 as the answer can be justified.