0.73073007300073....

0.74074007400074....

0.76076007600076....

Q9. Classify the following numbers as rational or irrational:

(i) 23

(ii) 225

(iii) 0.3796

(iv) 7.478478...

(v) 1.1010010001000001...

Ans: (i) $\sqrt{23}$

We know that on finding the square root of 23, we will not get an integer.

Therefore, we conclude that $\sqrt{23}$ is an irrational number.

(ii) $\sqrt{225}$

We know that on finding the square root of 225, we get 15, which is an integer.

Therefore, we conclude that $\sqrt{225}$ is a rational number.

(iii) 0.3796

We know that 0.3796 can be converted into $\frac{p}{q}$.

While, converting 0.3796 into $\frac{p}{q}$ form, we get

$0.3796 = \frac{3796}{10000}$.

The rational number $\frac{3796}{10000}$ can be converted into lowest fractions, to get $\frac{949}{2500}$.

We can observe that 0.3796 can be converted into a rational number.

Therefore, we conclude that 0.3796 is a rational number.

(iv) 7.478478....

We know that 7.478478.... is a non-terminating recurring decimal, which can be converted into $\frac{p}{q}$ form.

While, converting 7.478478.... into $\frac{p}{q}$ form, we get

$x = 7.478478....$ $....(a)$

$1000x = 7478.478478.....(b)$

While, subtracting (a) from (b), we get

$$\begin{array}{r} 1000x = 7478.478478.... \\ -x = \quad 7.478478.... \\ \hline 999x = 7471 \end{array}$$

We know that $999x = 7471$ can also be written as $x = \frac{7471}{999}$.

Therefore, we conclude that 7.478478.... is a rational number.

(v) 1.1010010001000001....

We can observe that the number 1.1010010001000001.... is a non-terminating on recurring decimal.

We know that non-terminating and non-recurring decimals cannot be converted into $\frac{p}{q}$ form.

Therefore, we conclude that 1.1010010001000001.... is an irrational number.

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