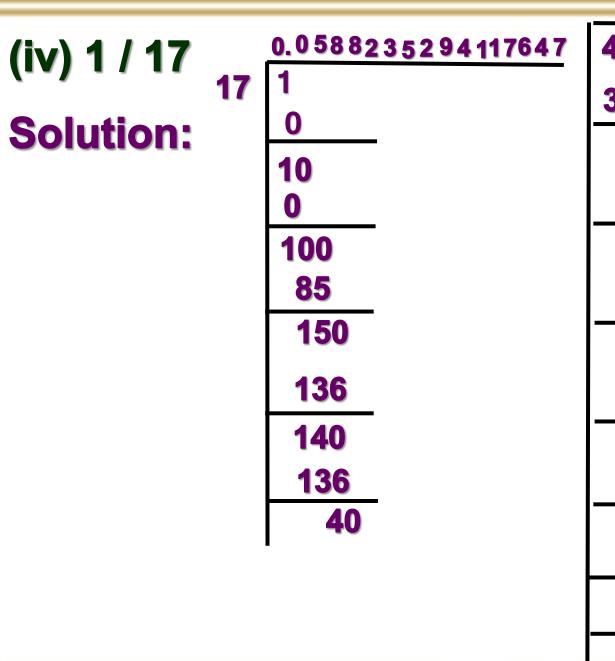# STD – 9   MATHS

CHAPTER - 1

NUMBER SYSTEM

EXERCISE - 1.3 (Q. 5 to 9)

5. What can the maximum number of digits be in the repeating block of digits in the decimal expansion of 1/17? Perform the division to check your answer.

Solution:

1/17

Dividing 1 by 17:

(iv) 1 / 17

Solution:

$$
\begin{array}{r}
0.0588235294117647 \\
17 \overline{\smash{\big)}\ 1} \\
\underline{0} \\
10 \\
\underline{0} \\
100 \\
\underline{85} \\
150 \\
\underline{136} \\
140 \\
\underline{136} \\
40
\end{array}
$$

$$
\begin{array}{r}
40 \\
\underline{34} \\
60 \\
\underline{51} \\
90 \\
\underline{85} \\
50 \\
\underline{34} \\
160 \\
\underline{153} \\
70 \\
\underline{68} \\
20 \\
\underline{17} \\
30
\end{array}
$$

$$
\begin{array}{r}
30 \\
\underline{17} \\
130 \\
\underline{119} \\
110 \\
\underline{102} \\
80 \\
\underline{68} \\
120 \\
\underline{119} \\
1
\end{array}
$$

$= \dfrac{1}{17} = 0.\overline{0588535294117647}$

$\therefore$ There are 16 digits in the repeating block of the decimal expansion of 1/17.

6. Look at several examples of rational numbers in the form p/q (q +0), where p and q are integers with no common factors other than 1 and having terminating decimal representations (expansions). Can you guess what property q must satisfy?

Solution:

   We observe that when q is 2, 4, 5, 8, 10... Then the decimal expansion is terminating. For example:

$1/2 = 0.5$, denominator $q = 2^1$

$7/8 = 0.875$, denominator $q = 2^3$

$4/5 = 0.8$, denominator $q = 5^1$

We can observe that the terminating decimal may be obtained in the situation where prime factorization of the denominator of the given fractions has the power of only 2 or only 5 or both.

7. Write three numbers whose decimal expansions are non-terminating non-recurring.

Solution:

We know that all irrational numbers are non-terminating non-recurring.

∴ three numbers with decimal expansions that are non terminating non-recurring are:

(a) $\sqrt{3} = 1.732050807568$

(b) $\sqrt{26} = 5.099019513592$

(c) $\sqrt{101} = 10.04987562112$

8. Find three different irrational numbers between the rational numbers 5/7 and 9/11.

Solution:

$$\frac{5}{7} = 0.\overline{714285}$$

$$\frac{9}{11} = 0.\overline{81}$$

∴ **Three different irrational numbers are:**

(a) 0.73073007300073000073...

(b) 0.75075007300075000075...

(c) 0.760760076000 76000076...

9. Classify the following numbers as rational or irrational according to their type:

(1) $\sqrt{23}$

Solution:

$\sqrt{23}$ = 4.79583152331...

Since the number is non-terminating non-recurring therefore, it is an irrational number.

(ii) $\sqrt{225}$

$\sqrt{225}$ = 15

     = 15/1

Since the number can be represented in p/q form, it is a rational number.

(i) 0.3796

Solution:

    Since the number,0.3796, is terminating, it is a rational number.

(ii) 7.478478

Solution:

    The number, 7.478478, is non-terminating but recurring, it is a rational number.

(iii) 1.101001000100001...

Solution:

Since the number, 1.101001000100001..., is non terminating non-repeating (non-recurring), it is an Irrational number.

Thanks

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For watching