NCERT TEXTUAL EXERCISES AND ASSIGNMENTS

EXERCISE - 1.1

1. Use Euclid's division algorithm to find the HCF of:
   (i) 135 and 225 (ii) 196 and 38220
   (iii) 867 and 255
2. Show that any positive odd integer is of the form $6q + 1$, or $6q + 3$, or $6q + 5$, where q is some integer.
3. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?
4. Use Euclid's division lemma to show that the square of any positive integer is either of the form 3m or $3m + 1$ for some integer m.
5. Use Euclid's division lemma to show that the cube of any positive integer is of the form $9m$, $9m + 1$ or $9m + 8$ for some integer m.

TEST YOURSELF – RN 1

1. Use Euclid's Division Algorithm to find the HCF of:
   (i) 56 and 814 (ii) 2165 and 272
   (iii) 3444 and 410 (iv) 105 and 245
   (v) 12576 and 4052
2. An army contingent of 798 is to march behind an army band of 28 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?
3. There are 120 boys and 114 girls in class IX of a school. They are to be distributed into different sections so as to have equal number of boys and girls and maximum sections. What is the maximum number of such sections?
4. Show that any positive odd integer is of the form $8q + 1$, $8q + 3$, $8q + 5$ or $8q + 7$, where q is some integer.
5. Show that an odd integer is of the form $4q + 1$ or $4q + 3$, where q is some positive integer.
6. Using Euclid's division lemma, show that the square of any positive integer is of the form $5m$, $5m + 1$ or $5m + 4$ for some integer m.

EXERCISE - 1.2

1. Express each number as a product of its prime factors.
   (i) 140 (ii) 156
   (iii) 3825 (iv) 5005
   (v) 7429
2. Find the LCM and HCF of the following pairs of integers and verify that LCM × HCF = Product of the two numbers.
   (i) 26 and 91 (ii) 510 and 92
   (iii) 336 and 54
3. Find the LCM and HCF of the following integers by applying the prime factorisation method.
   (i) 12, 15 and 21 (ii) 17, 23 and 29
   (iii) 8, 9 and 25
4. Given that HCF (306, 657) = 9, find LCM (306, 657).
5. Check whether 6^n can end with the digit 0 for any natural number n.
6. Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.
7. There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

TEST YOURSELF – RN 2

1. Find the prime factorisation of:
   (i) 96 (ii) 130
   (iii) 8008 (iv) 32844
2. Show that $2 \times 3 \times 5 \times 13 \times 7 + 13$ is a composite number.
3. Show that the number 7^n cannot end with the digit 0 for any $n \in N$.
4. Show that 9^n cannot end with the digit 2 for any $n \in N$.
5. Find the HCF and LCM by prime factorisation method.
   (i) 52 and 182 (ii) 270, 405 and 315
   (iii) 1176 and 6384 (iv) 50, 160 and 400
6. Given that HCF (306, 1314) = 18, find the LCM (306, 1314).
7. Find the LCM of 1160 and 1240, if HCF of 1160 and 1240 is 40.

NCERT TEXTUAL EXERCISES AND ASSIGNMENTS

EXERCISE - 1.3

1. Prove that $\sqrt{5}$ is irrational.
2. Prove that $3+2\sqrt{5}$ is irrational.
3. Prove that the following are irrationals.

   (i) $\frac{1}{\sqrt{2}}$ (ii) $7\sqrt{5}$

   (iii) $6+\sqrt{2}$

TEST YOURSELF – RN 3

1. Prove that the following are irrationals.

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

   (iii) $5-\sqrt{5}$
2. Prove that the following are irrational numbers.

   (i) $2+\sqrt{3}$ (ii) $4-3\sqrt{7}$

   (iii) $\sqrt{3}-\sqrt{2}$

EXERCISE - 1.4

1. Without actually performing the long division, state whether the following rational numbers will have a terminating decimal expansion or a non-terminating repeating decimal expansion:

   (i) $\frac{13}{3125}$ (ii) $\frac{17}{8}$

   (iii) $\frac{64}{455}$ (iv) $\frac{15}{1600}$

   (v) $\frac{29}{343}$ (vi) $\frac{23}{2^3 5^2}$

   (vii) $\frac{129}{2^2 5^7 7^5}$ (viii) $\frac{6}{15}$

   (ix) $\frac{35}{50}$ (x) $\frac{77}{210}$

2. Write down the decimal expansions of those rational numbers in Question 1 above which have terminating decimal expansions.

(i) $\frac{13}{3125}$ (ii) $\frac{17}{8}$

(iii) $\frac{15}{1600}$ (iv) $\frac{23}{2^3 \times 5^2}$

(v) $\frac{6}{15}$ (vi) $\frac{35}{50}$

3. The following real numbers have decimal expansions as given below. In each case, decide whether they are rational or not. If they are rational, and of the form $\frac{p}{q}$, what can you say about the prime factors of q?

(i) 43.123456789 (ii) 0.120120012000120000…

(iii) $43.\overline{123456789}$

TEST YOURSELF – RN 4

1. Which of the following have terminating and which have non-terminating repeating decimal expansions. Give reasons.

(i) $\frac{3}{25}$ (ii) $\frac{12}{400}$

(iii) $\frac{21}{1500}$ (iv) $\frac{1}{7}$

(v) $\frac{35}{91}$ (vi) $\frac{115}{2^3 \times 5^2 \times 7^1}$

(vii) $\frac{209}{2 \times 3 \times 5}$ (viii) $\frac{403}{8125}$

2. The following real numbers have decimal expansions as given below. In each case, decide whether they are rational or not. If they are rational and of the form $\frac{p}{q}$, write prime factors of q so that p and q are co-prime.

(i) –2.101001000… (ii) $0.\overline{123}$

(iii) 18.675

ANSWERS

NCERT Textual Exercises and Assignments

Exercise – 1.1

1. (i) Since 225 > 135,

Applying Euclid's Division Algorithm, we get

$225 = 135 \times 1 + 90$

Now, consider 90 as divisor and 135 as dividend. Applying Euclid's Division Algorithm, we get

$135 = 90 \times 1 + 45$

Now consider 45 as divisor and 90 as dividend. Applying Euclid's Division Algorithm, we get

$90 = 45 \times 2 + 0$

Since remainder = 0

$\therefore$ **HCF (135, 225) = 45**

```
      1
135 ) 225
    − 135
      90 ) 135 (1
         −  90
            45 ) 90 (2
               − 90
                  0
```

(ii) Since 38220 > 196,

Applying Euclid's Division Algorithm, we get

$38220 = 196 \times 195 + 0$

Since remainder = 0

$\therefore$ **HCF (196, 38220) = 196**

```
          195
196 )   38220
        –196
         1862
        –1764
          980
         –980
           00
```

(iii) Since 867 > 255,

Applying Euclid's Division Algorithm, we get

$867 = 255 \times 3 + 102$

Now, consider 102 as divisor and 255 as dividend. Applying Euclid's Division Algorithm we get,

$255 = 102 \times 2 + 51$

Now consider 51 as divisor and 102 as dividend. Applying Euclid's Division Algorithm we get,

$102 = 51 \times 2 + 0$

Since remainder = 0

$\therefore$ **HCF (867, 255) = 51**

```
      3
255 ) 867
    − 765
     102 ) 255 (2
         − 204
            51 ) 102 (2
               − 102
                   0
```

2. Let a be any positive odd integer and $b = 6$,

Applying Euclid's Division Algorithm, we get

$a = 6q + r$ where $0 \leq r < 6$

$\therefore$ The possible remainders are 0, 1, 2, 3, 4, 5

$\therefore$ $a = 6q$ or $6q + 1$ or $6q + 2$ or $6q + 3$ or $6q + 4$ or $6q + 5$

Since a is odd, we neglect $6q$, $6q + 2$ and $6q + 4$, as they are divisible by 2.

$\therefore$ $a = 6q + 1$ or $6q + 3$ or $6q + 5$

$\therefore$ **Hence any odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$.**

3. The number of columns must be selected in such a way that they should be maximum and must divide both the numbers, i.e., 616 and 32.

Since $616 > 32$,

Applying Euclid's Division Algorithm, we get

$616 = 32 \times 19 + 8$

Now, consider 8 as divisor and 32 as dividend. Applying Euclid's Division Algorithm we get,

$32 = 8 \times 4 + 0$

Since remainder = 0

$\therefore$ HCF (616, 32) = **8**

$\therefore$ **Maximum number of columns in which they can march = 8.**

$$
\begin{array}{r}
19 \\
32\,\overline{)\,616} \\
-\,32 \\
\hline
296 \\
-\,288 \\
\hline
8\,\overline{)\,32}\,(4 \\
-\,32 \\
\hline
0
\end{array}
$$

4. Let x be any positive integer and $b = 3$

$\therefore$ Applying Euclid's Division Algorithm

$x = 3q + r$ where $0 \leq r < 3$

$\therefore$ The possible remainders are 0, 1, 2

$\therefore$ $x = 3q$ or $3q + 1$ or $3q + 2$

Now,

(i) If $x = 3q$

$\Rightarrow x^2 = (3q)^2$

$= 9q^2$

$= 3\,(3q^2)$

$= \mathbf{3m}$ for some integer m, where $m = 3q^2$

(ii) If $x = 3q + 1$

$\Rightarrow x^2 = (3q + 1)^2$

$= 9q^2 + 6q + 1$

$= 3q\,(3q + 2) + 1$

$= \mathbf{3m + 1}$ for some integer m, where $m = q\,(3q + 2)$

(iii) If $x = 3q + 2$

$\Rightarrow x^2 = (3q + 2)^2$

$= 9q^2 + 12q + 4$

$= 9q^2 + 12q + 3 + 1$

$= 3\,(3q^2 + 4q + 1) + 1$

$= \mathbf{3m + 1}$ for some integer m, where $m = 3q^2 + 4q + 1$

Hence, the square of any positive integer is either of the form 3m or 3*m* + 1

5. Let x be any positive integer and b = 3

Applying Euclid's Division Algorithm,

$\therefore \quad x = 3q + r \quad$ where $0 \leq r < 3$

The possible remainders are 0, 1, 2

$\therefore \quad x = 3q$ or $3q + 1$ or $3q + 2$

(i) If $x = 3q$

$\Rightarrow x^3 = (3q)^3 = 27q^3 = 9(3q^3)$

$= \mathbf{9m}$ for some integer m, where $m = 3q^3$

(ii) If $x = 3q + 1$

$\Rightarrow x^3 = (3q + 1)^3$

$= (3q)^3 + 3(3q)^2(1) + 3(3q)(1)^2 + (1)^3 \qquad [\because (a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3]$

$= 27q^3 + 27q^2 + 9q + 1$

$= 9q(3q^2 + 3q + 1) + 1$

$= \mathbf{9m + 1}$ for some integer m, where $m = q(3q^2 + 3q + 1)$

(iii) If $x = 3q + 2$

$\Rightarrow x^3 = (3q + 2)^3 = (3q)^3 + 3(3q)^2(2) + 3(3q)(2)^2 + (2)^3 [\because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3]$

$= 27q^3 + 54q^2 + 36q + 8$

$= 9q(3q^2 + 6q + 4) + 8$

$= \mathbf{9m + 8}$ for some integer m, where $m = q(3q^2 + 6q + 4)$

Hence, the cube of any positive integer is of the form 9*m*, 9*m* + 1 or 9*m* + 8

TEST YOURSELF – RN 1

1. (i) 2 (ii) 1

(iii) 82 (iv) 35

(v) 4

2. 14 **3.** 6

Exercise – 1.2

1. (i) $140 = 2^2 \times 5 \times 7$

2	140
2	70
5	35
7	7
	1

(ii) $156 = 2^2 \times 3 \times 13$

2	156
2	78
3	39
13	13
	1

(iii) $3825 = 3^2 \times 5^2 \times 17$

$$\begin{array}{r|l} 3 & 3825 \\ \hline 3 & 1275 \\ \hline 5 & 425 \\ \hline 5 & 85 \\ \hline 17 & 17 \\ \hline & 1 \end{array}$$

(iv) $5005 = 5 \times 7 \times 11 \times 13$

$$\begin{array}{r|l} 5 & 5005 \\ \hline 7 & 1001 \\ \hline 11 & 143 \\ \hline 13 & 13 \\ \hline & 1 \end{array}$$

(v) $7429 = 17 \times 19 \times 23$

$$\begin{array}{r|l} 17 & 7429 \\ \hline 19 & 437 \\ \hline 23 & 23 \\ \hline & 1 \end{array}$$

2. (i) $26 = 2 \times 13$

$91 = 13 \times 7$

HCF (26, 91) = **13** (Product of common factors raised to least powers)

LCM (26, 91) = 13 × 2 × 7 = **182** (Product of all the prime factors raised to highest powers)

Verification:

LCM × HCF = 182 × 13 = **2366**

Product of the two numbers = 26 × 91 **= 2366**

∴ LCM × HCF = Product of the two numbers.

(ii) $510 = 2 \times 3 \times 5 \times 17$

$92 = 2^2 \times 23$

HCF (510, 92) = **2** (Product of common factors raised to least powers)

LCM (510, 92) = $2^2 \times 3 \times 5 \times 17 \times 23$ = **23460**

(Product of all the prime factors raised to highest powers)

Verification:

LCM × HCF = 23460 × 2 = **46920**

Product of the two numbers = 510 × 92 = **46920**

∴ LCM × HCF = Product of the two numbers.

(iii) $336 = 2^4 \times 3 \times 7$

$54 = 2 \times 3^3$

HCF (336 and 54) = 2 × 3 = **6** (Product of common factors raised to least powers)

LCM (336 and 54) = $2^4 \times 3^3 \times 7$ = **3024**

(Product of all the prime factors raised to highest powers)

Verification:

LCM × HCF = 6 × 3024 = **18144**

Product of the two numbers = 336 × 54 = **18144**

∴ LCM × HCF = Product of the two numbers.

3. (i) $12 = 2^2 \times 3$

$15 = 3 \times 5$

$21 = 3 \times 7$

$\therefore$ HCF (12, 15, 21) = **3** (Product of common factors raised to least powers)

LCM (12, 15, 21) = $3 \times 2^2 \times 5 \times 7$ = **420**

(Product of all the prime factors raised to highest powers)

(ii) $17 = 17 \times 1$

$23 = 23 \times 1$

$29 = 29 \times 1$

$\therefore$ HCF (17, 23, 29) = **1** (Product of common factors raised to least powers)

LCM (17, 23, 29) = $17 \times 23 \times 29$ = **11339**

(Product of all the prime factors raised to highest powers)

(iii) $8 = 2^3 \times 1$

$9 = 3^2 \times 1$

$25 = 5^2 \times 1$

$\therefore$ HCF (8, 9, 25) = **1** (Product of common factors raised to least powers)

LCM (8, 9, 25) = $2^3 \times 3^2 \times 5^2$ = **1800**

(Product of all the prime factors raised to highest powers)

4. HCF (306, 657) = 9

Now HCF (306, 657) × LCM (306, 657) = 306 × 657

$\therefore$ LCM (306, 657) = $\frac{306 \times 657}{9} = \frac{201042}{9}$ = **22338**

5. If the number 6^n for any $n \in$ N ends with the digit 0, then it is divisible by 5, i.e., the prime factorisation of 6^n must contain the prime number 5. But this is not possible because the primes in the prime factorisation of 6^n are 2 and 3. Also, the uniqueness of Fundamental Theorem of Arithmetic guarantees that there are no other primes in the factorisation of 6^n. So, there is no $n \in$ N for which 6^n ends with the digit 0.

6. $7 \times 11 \times 13 + 13 = 13\ (7 \times 11 + 1)$

$= 13\ (77 + 1)$

$= 13 \times 78$

$= 13 \times 13 \times 6$

= $13^2 \times 2 \times 3$ which is a composite number

Also, $7\times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5 = 5\ (7 \times 6 \times 4 \times 3 \times 2 + 1)$

$= 5\ (1008 + 1)$

= 5 × 1009 which is a composite number

7. LCM of 18 and 12

$18 = 2 \times 3^2$

$12 = 2^2 \times 3$

LCM $= 2^2 \times 3^2$ (Product of all the prime factors raised to highest powers)

$=$ **36**

In 36 minutes Sonia arrived at the starting point after making 2 rounds, while in 36 minutes, Ravi arrived at the starting point after making 3 rounds.

Hence, they meet each other at the starting point after 36 minutes.

TEST YOURSELF – RN 2

1. (i) $96 = 2^5 \times 3$ (ii) $130 = 2 \times 5 \times 13$

(iii) $8008 = 2^3 \times 7 \times 11 \times 13$, (iv) $32844 = 2^2 \times 3 \times 7 \times 17 \times 23$

5. (i) 26, 364 (ii) 45, 5670

(iii) 168, 44688 (iv) 10, 800

6. 22338 **7.** 35960

Exercise – 1.3

1. Let us assume that $\sqrt{5}$ is a rational number.

$\therefore$ There exist co-prime integers a and b ($\neq 0$) such that,

$$\sqrt{5} = \frac{a}{b}$$

$$\sqrt{5}b = a$$

Squaring both sides,

$5b^2 = a^2$ ... (1)

$\therefore$ 5 divides a^2

$\Rightarrow$ **5 divides *a*** ... (2)

Let $a = 5c$, where c is some integer

Substituting this value of a in (1)

$5b^2 = (5c)^2$

$5b^2 = 25c^2$

$\therefore$ $b^2 = 5c^2$

$\therefore$ 5 divides b^2

$\Rightarrow$ **5 divides *b*** ... (3)

From (2) and (3), we get, a and b both have common factor 5. This contradicts the fact that a and b are co-prime.

$\therefore$ Our assumption that $\sqrt{5}$ is a rational number is wrong.

$\therefore$ $\sqrt{5}$ **is an irrational number.**

2. Let us assume that $3 + 2\sqrt{5}$ is a rational number.

$\therefore$ There exist co-prime integers a and b ($\neq 0$) such that,

$$3 + 2\sqrt{5} = \frac{a}{b}$$

$$\therefore \quad 2\sqrt{5} = \frac{a}{b} - 3$$

$$\therefore \quad 2\sqrt{5} = \frac{a - 3b}{b}$$

$$\therefore \quad \sqrt{5} = \frac{a - 3b}{2b}$$

Since a and b are integers,

$\therefore \quad \frac{a - 3b}{2b}$ is rational. $\Rightarrow$ $\sqrt{5}$ is also rational.

This contradicts the fact that $\sqrt{5}$ is irrational.

$\therefore$ Our assumption that $3 + 2\sqrt{5}$ is a rational number is wrong.

$\therefore$ **$3 + 2\sqrt{5}$ is irrational.**

3. (i) $\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

Let us assume that $\frac{\sqrt{2}}{2}$ is rational.

$\therefore$ There exist co-prime integers a and b ($\neq 0$) such that

$$\frac{\sqrt{2}}{2} = \frac{a}{b}$$

$$\therefore \quad \sqrt{2} = \frac{2a}{b}$$

Since a and b are integers,

$\therefore \quad \frac{2a}{b}$ is rational $\Rightarrow$ $\sqrt{2}$ is also rational, but this contradicts the fact that $\sqrt{2}$ is irrational.

$\therefore$ Our assumption that $\frac{\sqrt{2}}{2}$, i.e., $\frac{1}{\sqrt{2}}$, is rational is wrong.

$\therefore$ **$\frac{1}{\sqrt{2}}$ is irrational**

(ii) Let us assume that $7\sqrt{5}$ is rational.

$\therefore$ There exist co-prime integers a and b ($\neq 0$) such that,

$$7\sqrt{5} = \frac{a}{b}$$

$\therefore\ \sqrt{5} = \dfrac{a}{7b}$

Since a and b are integers,

$\therefore\ \dfrac{a}{7b}$ is rational $\Rightarrow \sqrt{5}$ is also rational, but this contradicts the fact that $\sqrt{5}$ is irrational.

$\therefore$ Our assumption that $7\sqrt{5}$ is rational is wrong.

$\therefore$ **$7\sqrt{5}$ is irrational.**

(iii) Let us assume that $6+\sqrt{2}$ is rational.

$\therefore$ There exist co-prime integers a and b ($\neq 0$) such that,

$6+\sqrt{2} = \dfrac{a}{b}$

$\therefore\ \sqrt{2} = \dfrac{a}{b} - 6$

$\therefore\ \sqrt{2} = \dfrac{a-6b}{b}$

Since a and b are integers,

$\therefore\ \dfrac{a-6b}{b}$ is rational $\Rightarrow \sqrt{2}$ is also rational,

But this contradicts the fact that $\sqrt{2}$ is irrational.

$\therefore$ Our assumption that $6+\sqrt{2}$ is rational is wrong.

$\therefore$ **$6+\sqrt{2}$ is irrational.**

Exercise – 1.4

1. (i) $\dfrac{13}{3125} = \dfrac{13}{5^5} = \dfrac{13}{2^0 \times 5^5}$

$\therefore$ **$\dfrac{13}{3125}$ has terminating decimal expansion.**

(ii) $\dfrac{17}{8} = \dfrac{17}{2^3} = \dfrac{17}{2^3 \times 5^0}$

$\therefore$ **$\dfrac{17}{8}$ has terminating decimal expansion.**

(iii) $\dfrac{64}{455} = \dfrac{64}{5 \times 7 \times 13}$

$\therefore$ **$\dfrac{64}{455}$ has a non-terminating repeating decimal expansion.**

(iv) $\frac{15}{1600}=\frac{3}{320}=\frac{3}{2^6\times5^1}$

$\therefore$ $\frac{\mathbf{15}}{\mathbf{1600}}$ **has a terminating decimal expansion.**

(v) $\frac{29}{343}=\frac{29}{7^3}$

$\therefore$ $\frac{29}{343}$ **has a non-terminating repeating decimal expansion.**

(vi) $\frac{\mathbf{23}}{\mathbf{2^3 5^2}}$ **has a terminating decimal expansion.**

(vii) $\frac{\mathbf{129}}{\mathbf{2^2 5^7 7^5}}$ **has a non-terminating repeating decimal expansion.**

(viii) $\frac{6}{15}=\frac{2}{5}=\frac{2}{5^1\times2^0}$

$\therefore$ $\frac{\mathbf{6}}{\mathbf{15}}$ **has a terminating decimal expansion.**

(ix) $\frac{35}{50}=\frac{7}{10}=\frac{7}{2^1\times5^1}$

$\therefore$ $\frac{\mathbf{35}}{\mathbf{50}}$ **has a terminating decimal expansion.**

(x) $\frac{77}{210}=\frac{11}{30}=\frac{11}{2\times3\times5}$

$\therefore$ $\frac{\mathbf{77}}{\mathbf{210}}$ **has a non-terminating repeating decimal expansion.**

2. (i) $\frac{13}{3125}=\frac{13}{5^5}=\frac{13\times2^5}{5^5\times2^5}=\frac{416}{(10)^5}=\mathbf{0.00416}$

(ii) $\frac{17}{8}=\frac{17}{2^3}=\frac{17\times5^3}{2^3\times5^3}=\frac{2125}{(10)^3}=\mathbf{2.125}$

(iii) $\frac{15}{1600}=\frac{3}{320}=\frac{3}{2^6\times5}=\frac{3\times5^5}{2^6\times5^1\times5^5}=\frac{3\times5^5}{2^6\times5^6}=\frac{9375}{(10)^6}=0.009375$

(iv) $\frac{23}{2^3\times5^2}=\frac{23\times5^1}{2^3\times5^2\times5^1}=\frac{23\times5}{2^3\times5^3}=\frac{115}{(10)^3}=\mathbf{0.115}$

(v) $\frac{6}{15}=\frac{2}{5}=\frac{2\times2}{5\times2}=\frac{4}{10}=\mathbf{0.4}$

(vi) $\frac{35}{50}=\frac{7}{10}=\mathbf{0.7}$

3. (i) $43.123456789 = \dfrac{43123456789}{10^9}$

$\therefore$ **43.123456789 is a rational number of the form $\dfrac{p}{q}$**

$q = 10^9 = (2 \times 5)^9 = \mathbf{2^9 \times 5^9}$

$\therefore$ **Prime factors of q will be either 2 or 5 or both only.**

(ii) 0.120120012000120000......... is a **non-terminating** and **non-repeating decimal** and therefore it is **irrational**.

(iii) $43.\overline{123456789}$ is **non-terminating and repeating**,

$\therefore$ $43.\overline{123456789}$ **is a rational number of the form $\dfrac{p}{q}$**

Prime factors of q will also have factors other than 2 or 5 because the decimal expansion is non-terminating repeating.

$\therefore$ **Prime factors of q will also have a factor other than 2 or 5.**

Test Yourself – RN 4

1. (i) Terminating (ii) Terminating

(iii) Terminating (iv) Non-terminating and repeating

(v) Non-terminating and repeating (vi) Non-terminating and repeating

(vii) Non-terminating and repeating (viii) Terminating

2. (i) Irrational (ii) Rational, $0.\overline{123} = \dfrac{123}{999}$, $q = 3 \times 3 \times 111$

(iii) Rational, $q = 2^3 \times 5^1$