RD SHARMA

Solutions

Class 10 Maths

Chapter 1

Ex 1.6

Q.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) $238\frac{23}{8}$

(ii) $125441\frac{125}{441}$

(iii) $3550\frac{35}{50}$

(iv) $77210\frac{77}{210}$

(v) $1292^2 \times 5^7 \times 7^{17}\frac{129}{2^2 \times 5^7 \times 7^{17}}$

Sol:

(i) The given number is $238\frac{23}{8}$

Here, $8 = 2^3$ and 2 is not a factor of 23.

So, the given number is in its simplest form.

Now, $8 = 2^3$ is of the form $2^m \times 5^n$, where m = 3 and n = 0.

So, the given number has a terminating decimal expansion.

(ii) The given number is $125441\frac{125}{441}$

Here, $441 = 3^2 \times 7^2$ and none of 3 and 7 is a factor of 125.

So, the given number is in its simplest form.

Now, $441 = 3^2 \times 7^2$ is not of the form $2^m \times 5^n$

So, the given number has a non-terminating repeating decimal expansion.

(iii) The given number is $3550\frac{35}{50}$ and HCF(35, 50) = 5.

$\therefore 3560 = 35/550/5 = 710 \therefore \frac{35}{60} = \frac{35/5}{50/5} = \frac{7}{10}$

Here, $710\frac{7}{10}$ is in its simplest form.

Now, 10 = 2 x 5 is of the form 2^m x 5^n, where in = 1 and n = 1.

So, the given number has a terminating decimal expansion.

(iv) The given number is $77210\frac{77}{210}$ and HCF(77, 210) = 7.

$\therefore 77:7210:7 = 1130 \therefore \frac{77:7}{210:7} = \frac{11}{30}$

Here, $1130\frac{11}{30}$ is in its simplest form. 30

Now, 30 = 2 x 3 x 5 is not of the form 2^m x 5^n.

So, the given number has a non-terminating repeating decimal expansion.

(v) The given number is $1292^2 \times 5^7 \times 7^{17} \frac{129}{2^2 \times 5^7 \times 7^{17}}$

Clearly, none of 2, 5 and 7 is a factor of 129.

So, the given number is in its simplest form.

Q.2: Write down the decimal expansions of the following rational numbers by writing their denominators in the form of 2^m x 5^n, where m, and n, are the non- negative integers.

(i) $38\frac{3}{8}$

(ii) $13125\frac{13}{125}$

(iii) $780\frac{7}{80}$

(iv) $14588625\frac{14588}{625}$

(v) $1292^4 \times 5^7 \frac{129}{2^4 \times 5^7}$

Sol:

(i) The given number is $38\frac{3}{8}$

Clearly, $8 = 2^3$ is of the form $2^m \times 5^n$, where m = 3 and n = 0.

So, the given number has terminating decimal expansion.

$\therefore 3\times5^3 2^3\times5^3 = 3\times125(2\times5)^3 = 375(10)^3 = 3751000 = 0.375 \therefore \frac{3\times5^3}{2^3\times5^3} = \frac{3\times125}{(2\times5)^3} = \frac{375}{(10)^3} = \frac{375}{1000} = 0.375$

(ii) The given number is $13125\frac{13}{125}$.

Clearly, $125 = 5^3$ is of the form 2m x 5″, where m = 0 and n = 3.

So, the given number has terminating decimal expansion.

$38 = 3\times5^3(2\times5)^3 = 3751000\ \frac{3}{8} = \frac{3\times5^3}{(2\times5)^3} = \frac{375}{1000}$

(iii) The given number is $780\frac{7}{80}$.

Clearly, $80 = 2^4 \times 5$ is of the form $2^m \times 5^n$, where m = 4 and n = 1.

So, the given number has terminating decimal expansion.

$\therefore 780 = 7\times5^3 2^4\times5\times5^3 = 7\times125(2\times5)^4 = 87510^4 = 87510000 = 0.0875$

$\therefore \frac{7}{80} = \frac{7\times5^3}{2^4\times5\times5^3} = \frac{7\times125}{(2\times5)^4} = \frac{875}{10^4} = \frac{875}{10000} = 0.0875$

(iv) The given number is $14588625\ \frac{14588}{625}$

Clearly, $625 = 5^4$ is of the form $2^m \times 5^n$, where m = 0 and n = 4.

So, the given number has terminating decimal expansion.

$\therefore 14588625 \therefore \frac{14588}{625} = 14588\times2^4 2^4\times5^4\ \frac{14588\times2^4}{2^4\times5^4} = 23340810^4\ \frac{233408}{10^4} = 23340810000\ \frac{233408}{10000} = 23.3408$

23.3408

(v) The given number is $1292^4\times5^7\ \frac{129}{2^4\times5^7}$

Clearly, $2^2 \times 5^7$ is of the form $2^m \times 5^n$, where in = 2 and n = 7.

So, the given number has terminating decimal expansion.

$\therefore 1292^2 \times 5^7 \therefore \frac{129}{2^2 \times 5^7} = 129 \times 2^5 2^2 \times 5^7 \times 2^5 \frac{129 \times 2^5}{2^2 \times 5^7 \times 2^5} = 129 \times 32 (2 \times 5)^7 \frac{129 \times 32}{(2 \times 5)^7} = 418210^7 \frac{4182}{10^7} = 412810000000$

$\frac{4128}{10000000} = 0.00041820.0004182$

Q.4: what can you say about the prime factorization of the denominators of the following rational:

(i) 43.123456789

(ii) $43.\overline{12345678}$ $43.\overline{123456789}$

(iii) $27.\overline{142857}$ $27.\overline{142857}$

(iv) 0.120120012000120000

Sol:

(i) Since 43.123456789 has terminating decimal expansion. So, its denominator is of the form $2^m \times 5^n$, where m, n are non-negative integers.

(ii) Since $43.\overline{12345678}$ $43.\overline{123456789}$ has non-terminating decimal expansion. So, its denominator has factors other than 2 or 5.

(iii) Since $27.\overline{142857}$ $27.\overline{142857}$ has non-terminating decimal expansion. So, its denominator has factors other than 2 or 5.

(iv) Since 0.120120012000120000 … has non-terminating decimal expansion. So, its denominator has factors other than 2 or 5.