

If $\frac{a}{b}$ is a rational number and (b#0) in its lowest form. What is the condition on b so that the decimal representation of $\frac{a}{b}$ is terminating.

Solution

For a terminating decimal representation $b=2^m \times 5^n$ when 'm' and 'n' are not negative.

It is correct to say that the number $\frac{343}{2 \times 7 \times 5^2}$ has a non terminating and repeating decimal expansion.

Solution $\frac{343}{2 \times 7 \times 5^2} = \frac{49}{2 \times 5^2}$

Denominator = 2×5^2

When we express in simplest form

$$\frac{343}{2 \times 7 \times 5^2} = \frac{49}{2 \times 5^2}$$

∴ It is not correct to say that decimal representation is not terminating repeating decimal.

Without actually performing the long division, state whether the following rational number will have a terminating decimal expression or a non terminating repeating decimal expansion $\frac{125}{44}$

Solution , $\frac{125}{44} = \frac{5^3}{2^2 \times 11}$

Denominator = $2^2 \times 11$

∴ It is non terminating repeating decimal.

23

8

Solution

$$\frac{23}{8} = \frac{23}{2^3}$$

Denominator = 2^3

∴ it is a terminating decimal .

$$\frac{129}{2^2 \times 5^7 \times 7^{17}}$$

Solution $\frac{129}{2^2 \times 5^7 \times 7^{17}}$

Denominator = $2^2 \times 5^7 \times 7^{17}$

∴ it is non terminating repeating decimal

Write down the decimal expression of the following rational number by writing m,n are non negative integers, $\frac{3}{8}$

Solution = $\frac{3}{8}$ (divide 3 by 8)
 $= \frac{3}{2^3}$
= 0.375

Write down the decimal expression of the following rational number by writing m,n are non negative integers,

$$\frac{7}{80}$$

Solution = $\frac{7}{80}$ (divide 7 by 80)
 $= \frac{7}{2^4 \times 5}$
= 0.0875

Write down the decimal expression of the following rational number by writing m,n are non negative integers,

$$\frac{14588}{625}$$

$$\begin{aligned} \text{Solution} &= \frac{14588}{625} \\ &= \frac{14588}{5^4} \\ &= 23.3408 \end{aligned}$$

(divide 14588 by 625)

Categories each of the following as rational or irrational number. If they are rational of the form, what can you say about prime factorization of b?

14.2312345

Solution

Since it is a terminating decimal it is a rational number of the form, where $b = 2^m \times 5^n$, m and n are non negative integers.

3.121012100121000121

Solution

Since it is a non terminating repeating decimal, it is an irrational number

8.020567

Solution

Since the number is a non terminating repeating decimal it is a rational number. The denominator b# $2^m \times 5^n$

3.1235

Solution

Since the number is a non terminating and repeating decimal it is a rational number. The denominator b# $2^m \times 5^n$

Which rationals are represented by ?

0.125

Solution

$$0.125 = \frac{125}{1000} = \frac{1}{8}$$

11.225

Solution

$$11.225 = \frac{1125}{1000} = \frac{449}{40}$$

123.123

Solution

$$123.123 = \frac{123123}{1000} = \frac{1}{8}$$

What can you say about the prime factorization of denominator of following rational numbers

43.4305

Solution

Since it is a terminating decimal, it is a rational number where $b = 2^m \times 5^n$

43.123456789

Solution

Since it is a terminating decimal, it is a rational number where $b = 2^m \times 5^n$

27.142857

Solution,

Since it is a non terminating and repeating decimal it is a rational number where b# $2^m \times 5^n$