

## EXERCISE 1.4 PAGE: 17

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) 13/3125 (ii) 17/8 (iii) 64/455 (iv) 15/1600 (v) 29/343 (vi) 23/(2352) (vii) 129/(225753) (viii) 6/15 (ix) 35/50 (x) 77/210

#### **Solutions:**

**Note:** If the denominator has only factors of 2 and 5 or in the form of  $2^m \times 5^n$  then it has terminating decimal expansion.

If the denominator has factors other than 2 and 5 then it has a non-terminating decimal expansion.

#### (i) 13/3125

Factorizing the denominator, we get,

$$3125 = 5 \times 5 \times 5 \times 5 \times 5 = 5^5$$

Since, the denominator has only 5 as its factor, 13/3125 has a terminating decimal expansion.

#### (ii) 17/8

Factorizing the denominator, we get,

$$8 = 2 \times 2 \times 2 = 2^{3}$$

Since, the denominator has only 2 as its factor, 17/8 has a terminating decimal expansion.

#### (iii) 64/455

Factorizing the denominator, we get,

$$455 = 5 \times 7 \times 13$$

Since, the denominator is not in the form of  $2^m \times 5^n$ , thus 64/455 has a non-terminating decimal expansion.

#### (iv) 15/1600

Factorizing the denominator, we get,

$$1600 = 2^6 \times 5^2$$

Since, the denominator is in the form of  $2^m \times 5^n$ , thus 15/1600 has a terminating decimal expansion.

#### (v) 29/343

Factorizing the denominator, we get,

 $343 = 7 \times 7 \times 7 = 7^3$  Since, the denominator is not in the form of  $2^m \times 5^n$  thus 29/343 has a non-terminating decimal expansion.

### $(vi)23/(2^35^2)$

Clearly, the denominator is in the form of  $2^m \times 5^n$ .

Hence, 23/ (2<sup>3</sup>5<sup>2</sup>) has a terminating decimal expansion.

#### (vii) 129/(2<sup>2</sup>5<sup>7</sup>7<sup>5</sup>)

As you can see, the denominator is not in the form of  $2^m \times 5^n$ .

Hence,  $129/(2^25^77^5)$  has a non-terminating decimal expansion.

# NCERT Solutions for Class 10 Maths Chapter 1 – Real Numbers

(viii) 6/15

6/15 = 2/5

Since, the denominator has only 5 as its factor, thus, 6/15 has a terminating decimal expansion.

(ix) 35/50

35/50 = 7/10

Factorising the denominator, we get,

 $10 = 2 \times 5$ 

Since, the denominator is in the form of  $2^m \times 5^n$  thus, 35/50 has a terminating decimal expansion.

(x) 77/210

$$77/210 = (7 \times 11)/(30 \times 7) = 11/30$$

Factorising the denominator, we get,

$$30 = 2 \times 3 \times 5$$

As you can see, the denominator is not in the form of  $2^m \times 5^n$ . Hence, 77/210 has a non-terminating decimal expansion.

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

**Solutions:** 

(i) 13/3125

3125)13.00000(0.00416

0

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130

0

13000

- 12500

5000

-3125

18750

18750

00000

13/3125 = 0.00416

(ii) 17/8



8) 17 (2.125 -16	
10 -8	
20 -16	
40 -40	
00	
17/8 = 2.125	
(iii) 64/455 has a non	terminating decimal expansion
(iv)15/1600	
1600) 15.000000 (0. 0	009375
150 0	
1500 0	
15000 -14400	
6000 -4800	
12000 -11200	

15/1600 = 0.009375

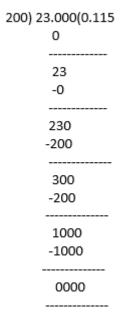
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8000 -8000

(v) 29/343 has a non terminating decimal expansion

(vi)23/ (2 $^3$ 5 $^2$ ) = 23/(8×25)= 23/200





 $23/(2^35^2) = 0.115$ 

(vii) 129/ (2 $^{2}5^{7}7^{5}$ ) has a non terminating decimal expansion

(viii) 6/15 = 2/5

5) 2.0 (0.4 0 ------20 -20 -----00

(ix) 35/50 = 7/10

10) 7 (0.7 0 ----70 -70 ----

35/50 = 0.7

(x) 77/210 has a non-terminating decimal expansion.

- 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, p q what can you say about the prime factors of q?
- (i) 43.123456789





(ii) 0.120120012000120000...

# (iii) 43.123456789

#### **Solutions:**

(i) 43.123456789

Since it has a terminating decimal expansion, it is a rational number in the form of p/q and q has factors of 2 and 5 only.

(ii) 0.120120012000120000. . .

Since, it has non-terminating and non-repeating decimal expansion, it is an irrational number.

(iii) 43.123456789

Since it has non-terminating but repeating decimal expansion, it is a rational number in the form of p/q and q has factors other than 2 and 5.

