

Chapter 8: Rational Numbers

NCERT Exemplar · Class 7 · Maths

Questions

Question 1

A rational number is defined as a number that can be expressed in the form p/q , where p and q are integers and

(a) $q = 0$ (b) $q = 1$ (c) $q \neq 1$ (d) $q \neq 0$

Solution

Solution:-

(d) $q \neq 0$

A number that can be expressed in the form p/q , where p and q are integers and $q \neq 0$, is called a rational number.

Question 2

Which of the following rational numbers is positive?

(a) $-8/7$ (b) $19/-13$ (c) $-3/-4$ (d) $-21/13$

Solution

Solution:-

(c) $-3/-4$

When the numerator and denominator both are positive integers or both are negative integers, it is a positive rational number.

Question 3

Which of the following rational numbers is negative?

(a) $-(-3/7)$ (b) $(-5/-8)$ (c) $9/8$ (d) $(3/-7)$

Solution

Solution:-

(d) $(3/-7)$

When either the numerator or the denominator is a negative integer, it is a negative rational number.

Question 4

In the standard form of a rational number, the common factor of numerator and denominator is always:

(a) 0 (b) 1 (c) - 2 (d) 2

Solution

Solution:-

(b) 1

A rational number is said to be in the standard form, if its denominator is a positive integer and the numerator and denominator have no common factor other than 1.

Question 5

Which of the following rational numbers is equal to its reciprocal?

(a) 1 (b) 2 (c) $\frac{1}{2}$ (d) 0

Solution

Solution:-

(a) 1

We know that, the numerator and denominator have no common factor other than 1.

So. $1/1$

Reciprocal of $1/1 = 1$

Question 6

The reciprocal of $\frac{1}{2}$ is

(a) 3 (b) 2 (c) - 1 (d) 0

Solution

Solution:-

(b) 2

The reciprocal of $\frac{1}{2} = \frac{2}{1}$

Question 7

The standard form of $-\frac{48}{60}$ is

(a) $\frac{48}{60}$ (b) $-\frac{60}{48}$ (c) $-\frac{4}{5}$ (d) $-\frac{4}{-5}$

Solution

Solution:-

(c) $-\frac{4}{5}$

The standard form of $-\frac{48}{60}$ is $= (-\frac{4}{5})$

Divide both numerator and denominator by 12

$= -\frac{4}{5}$

Question 8

Which of the following is equivalent to $\frac{4}{5}$?

(a) $\frac{5}{4}$ (b) $\frac{16}{25}$ (c) $\frac{16}{20}$ (d) $\frac{15}{25}$

Solution

Solution: –

(c) $\frac{16}{20}$

$\frac{4}{5}$ is equivalent $= \frac{(4 \times 4)}{(5 \times 4)}$

$= \frac{16}{20}$

Question 9

How many rational numbers are there between two rational numbers?

(a) 1 (b) 0 (c) unlimited (d) 100

Solution

Solution:-

(c) unlimited

Question 10

In the standard form of a rational number, the denominator is always a

(a) 0 (b) negative integer (c) positive integer (d) 1

Solution

Solution:-

(c) positive integer

A rational number is said to be in the standard form, if its denominator is a positive integer.

Question 11

To reduce a rational number to its standard form, we divide its numerator and denominator by their

(a) LCM (b) HCF (c) product (d) multiple

Solution

Solution:-

(b) HCF

Question 12

Which is greater number in the following:

(a) $-\frac{1}{2}$ (b) 0 (c) $\frac{1}{2}$ (d) -2

Solution

Solution:-

(c) $\frac{1}{2}$

In Questions 13 to 46, fill in the blanks to make the statements true.

Question 13

$-(3/8)$ is a rational number.

Solution

Solution:-

$-(3/8)$ is a negative rational number.

Question 14

1 is a rational number.

Solution

Solution:-

1 is a positive rational number

Question 15

The standard form of $(-8/-36)$ is .

Solution

Solution:-

The standard form of $(-8/-36)$ is $2/9$.

$$-8/-36 = 8/36$$

So, HCF of 8 and 36 is 4

Then, divide both numerator and denominator by 4.

$$= 8/36$$

$$= 2/9$$

Question 16

The standard form of $18/-24$ is

Solution

Solution:-

The standard form of $18/-24$ is $-3/4$.

So, HCF of 18 and -24 is 6

Then, divide both numerator and denominator by 6.

$$= 18/-24$$

$$= 3/-4$$

Now, multiplying -1 to both numerator and denominator.

$$= (3 \times -1)/(-4 \times -1)$$

$$= -3/4$$

Question 17

On a number line, $-1/2$ is to the _____ of zero (0).

Solution

Solution:-

On a number line, $-1/2$ is to the left of zero (0).

On a number line, rational number present to the left of the zero (0) are negative rational numbers and rational numbers present to the right of the zero (0) are positive rational numbers.

Question 18

On a number line, $4/3$ is to the of zero (0).

Solution

Solution:-

On a number line, $\frac{4}{3}$ is to the right of zero (0).

On a number line, rational number present to the left of the zero (0) are negative rational numbers and rational numbers present to the right of the zero (0) are positive rational numbers.

Question 19

$-\frac{1}{2}$ is than $\frac{1}{5}$.

Solution

Solution:-

$-\frac{1}{2}$ is smaller than $\frac{1}{5}$.

Question 20

$-\frac{3}{5}$ is than 0.

Solution

Solution:-

$-\frac{3}{5}$ is smaller than 0.

Question 21

$-\frac{16}{24}$ and $\frac{20}{-16}$ represent rational numbers.

Solution

Solution:-

$-\frac{16}{24}$ and $\frac{20}{-16}$ represent different rational numbers.

So, HCF of $-\frac{16}{24}$ is 4

Then divide both numerator and denominator by 4.

= $-\frac{4}{6}$

HCF of $20/-16$ is 1

Therefore, $-16/24$ and $20/-16$ represent different rational numbers.

Question 22

$-27/45$ and $-3/5$ represent rational numbers.

Solution

Solution:-

$-27/45$ and $-3/5$ represent same rational numbers.

So, HCF of $-27/45$ is 9

Divide both numerator and denominator by 9.

$$= -3/5$$

Then, HCF of $-3/5$ is 1

Therefore, $-27/45$ and $-3/5$ represent same rational numbers.

Question 23

Additive inverse of $2/3$ is _____.

Solution

Solution:-

Additive inverse of $2/3$ is $-2/3$.

Question 24

$$(-3/5) + (2/5) = .$$

Solution

Solution:-

$$(-3/5) + (2/5) = -1/5.$$

$$= (-3/5) + (2/5)$$

$$= (-3 + 2)/5$$

$$= -1/5$$

Question 25

$$(-5/6) + (-1/6) = .$$

Solution

Solution:-

$$(-5/6) + (-1/6) = -1.$$

$$= (-5/6) - (1/6)$$

$$= (-5 - 1)/6$$

$$= -6/6$$

$$= -1$$

Question 26

$$(3/4) \times (-2/3) = .$$

Solution

Solution:-

$$(3/4) \times (-2/3) = -1/2.$$

$$= (3 \times -2) / (4 \times 3)$$

$$= (1 \times -1) / (2 \times 1)$$

$$= -1/2$$

Question 27

$$(-5/3) \times (-3/5) = .$$

Solution

Solution:-

$$(-5/3) \times (-3/5) = 1.$$

$$= (-5 \times -3) / (3 \times 5)$$

$$= (-1 \times -1) / (1 \times 1)$$

$$= 1$$

Question 28

$$(-6/7) = (/42)$$

Solution

Solution:-

$$(-6/7) = (-36/42)$$

Let us assume the missing letter be x.

$$(-6/7) = (x/42)$$

$$(-6/7) \times 42 = x$$

$$(-6 \times 6) = x$$

$$x = -36$$

Question 29

$$(1/2) = (6/)$$

Solution

Solution:-

$$(1/2) = (6/12)$$

Let us assume the missing letter be x.

$$(1/2) = (6/x)$$

$$(2/1) \times 6 = x$$

$$x = 12$$

Question 30

$$(-2/9) - (7/9) =$$

Solution

Solution:-

$$(-2/9) - (7/9) = -1$$

$$= (-2 - 7)/9$$

$$= -9/9$$

$$= -1$$

In questions 31 to 35, fill in the boxes with the correct symbol $>$, $<$ or $=$.

Question 31

$$(7/-8) [] (8/9)$$

Solution

Solution:-

$$(7/-8) [<] (8/9)$$

Negative rational number is less than positive rational number.

Question 32

$$(3/7) [] (-5/6)$$

Solution

Solution:-

$$(3/7) [>] (-5/6)$$

Negative rational number is less than positive rational number.

Question 33

$$(5/6) [] (8/4)$$

Solution

Solution:-

$$(5/6) [<] (8/4)$$

The LCM of 6 and 4 is 12

$$\therefore (5/6) = [(5 \times 2) / (6 \times 2)] = (10/12)$$

$$\text{and } (8/4) = [(8 \times 3) / (4 \times 3)] = (24/12)$$

Now, $10 < 24$

$$\Rightarrow (10/12) < (24/12)$$

Hence, $(5/6) < (8/4)$

Question 34

$$(-9/7) [] (4/-7)$$

Solution

Solution:-

$$(-9/7) [<] (4/-7)$$

Let us write $(4/-7)$ with a positive denominator.

$$= (4/-7)$$

$$= [(4 \times (-1)) / (-7 \times -1)]$$

$$= (-4/7)$$

So, $(-9/7) < (-4/7)$

Question 35

$$(8/8) [] (2/2)$$

Solution

Solution:-

$$(8/8) [=] (2/2)$$

(8/8) divide both denominator and numerator by 8

$$\text{Then, } 1/1 = 1$$

(2/2) divide both denominator and numerator by 2

$$\text{Then, } 1/1 = 1$$

$$\text{Therefore, } 1 = 1$$

Question 36

The reciprocal of _____ does not exist.

Solution

Solution:-

The reciprocal of 0 does not exist.

Question 37

The reciprocal of 1 is _____.

Solution

Solution:-

The reciprocal of 1 is 1.

$$\text{Reciprocal of } 1 = (1/1) = 1$$

Question 38

$$(-3/7) \div (-7/3) = .$$

Solution

Solution:-

$$(-3/7) \div (-7/3) = 9/49.$$

$$(-3/7) \div (-7/3)$$

$$= (-3/7) \times (3/-7)$$

$$= (-3 \times 3) / (7 \times -7)$$

$$= -9/-49$$

Question 39

$$0 \div (-5/6) = .$$

Solution

Solution:-

$$0 \div (-5/6) = 0.$$

We know that, division of zero by any number is zero.

Question 40

$$0 \times (-5/6) = .$$

Solution

Solution:-

$$0 \times (-5/6) = 0.$$

We know that, multiplication of zero by any number is zero.

Question 41

$$\times (-2/5) = 1$$

Solution

Solution:-

$$(-5/2) \times (-2/5) = 1$$

Let u assume the missing rational number be y.

Then,

$$y \times (-2/5) = 1$$

$$y = -5/2$$

Question 42

The standard form of rational number -1 is _____.

Solution**Solution:-**

The standard form of rational number -1 is -1 .

A rational number is said to be in the standard form, if its denominator is a positive integer and the numerator and denominator have no common factor other than 1.

Question 43

If m is a common divisor of a and b , then $(a/b) = (a \div m) / (b \div m)$.

Solution**Solution:-**

If m is a common divisor of a and b , then $(a/b) = (a \div m) / (b \div m)$.

Question 44

If p and q are positive integers, then p/q is a _____ rational number and $-p/q$ is a _____ rational number.

Solution**Solution:-**

If p and q are positive integers, then p/q is a positive rational number and $-p/q$ is a negative rational number.

As we know that, When the numerator and denominator both are positive integers or both are negative integers, it is a positive rational number. When either the numerator or the denominator is a negative integer, it is a negative rational number.

Question 45

Two rational numbers are said to be equivalent or equal, if they have the same _____ form.

Solution**Solution:-**

Two rational numbers are said to be equivalent or equal, if they have the same simplest form.

If the numerator and denominator of a rational number are multiplied or divided by a non-zero integer, we get a rational number which is said to be equivalent to the given rational number.

Question 46

If p/q is a rational number, then q cannot be _____.

Solution**Solution:-**

If p/q is a rational number, then q cannot be zero.

A number that can be expressed in the form p/q , where p and q are integers and $q \neq 0$, is called a rational number.

State whether the statements given in question 47 to 65 are True or False.

Question 47

Every natural number is a rational number but every rational number need not be a natural number.

Solution**Solution:-**

True.

Question 48

Zero is a rational number.

Solution

Solution:-

True.

Zero can be written as $0 = 0/1$

We know that a number of a form p/q where p, q are integers and q is not equal to zero is a rational number.

Hence, zero is a rational number.

Question 49

Every integer is a rational number but every rational number need not be an integer.

Solution

Solution:-

True.

$6/3$ is rational number. Since if we simplify $6/3$ to its lowest term we get $2/1 = 2$, which is an integer.

Every integer is a rational number but every rational number is not an integer.

Question 50

Every negative integer is not a negative rational number.

Solution

Solution:-

False.

Question 51

If p/q is a rational number and m is a non-zero integer, then

$$(p/q) = (p \times m)/(q \times m)$$

Solution

Solution:-

True.

A fraction is not changed whether the both numerator and denominator are multiplied by the same number or divided by the same number.

Question 52

If p/q is a rational number and m is a non-zero common divisor of p and q , then

$$p/q = (p \div m)/(q \div m)$$

Solution

Solution:-

True.

A fraction is not changed whether the both numerator and denominator are multiplied by the same number or divided by the same number.

Question 53

In a rational number, denominator always has to be a non-zero integer.

Solution

Solution:-

True.

A number that can be expressed in the form p/q , where p and q are integers and $q \neq 0$, is called a rational number.

Question 54

If p/q is a rational number and m is a non-zero integer, then $(p/q) = (p \times m)/(q \times m)$ is a rational number not equivalent to p/q .

Solution

Solution:-

False.

We know that, a fraction is not changed whether the both numerator and denominator are multiplied by the same number or divided by the same number.

Question 55

Sum of two rational numbers is always a rational number.

Solution

Solution:-

True.

Let us consider the two rational numbers $(1/2)$ and $(3/4)$

Then, sum of two rational numbers = $(1/2) + (3/4)$

LCM of 2 and 4 is 4

$$= (2/4) + (3/4)$$

$$= (2 + 3)/4$$

= $5/4$ is a rational number.
