Q1. Is 0 a rational number? Can you write it in the form $\frac{P}{Q}$, where P and Q are integers and Q ≠ 0?

Solution:

Yes, 0 is a rational number and it can be written in $P \div Q$ form provided that Q ≠ 0

0 is an integer and it can be written various forms, for example

$0 \div 2, 0 \div 100, 0 \div 95$ etc.

Q2. Find five rational numbers between 1 and 2

Solution:

Given that to find out 5 rational numbers between 1 and 2

Rational number lying between 1 and 2

$= \frac{1+2}{2}$

$= \frac{3}{2}$

$= 1 < \frac{3}{2} < 2$

Rational number lying between 1 and $\frac{3}{2}$

$= \frac{1+\frac{3}{2}}{2}$

$= \frac{5}{4}$

$= 1 < \frac{5}{4} < \frac{3}{2}$

Rational number lying between 1 and $\frac{5}{4}$

$= \frac{1+\frac{5}{4}}{2}$ Rational number lying between $\frac{3}{2}$ and 2

$= \frac{9}{8}$

$= 1 < \frac{9}{8} < \frac{5}{4}$

Rational number lying between $\frac{3}{2}$ and 2

$= \frac{\frac{3}{2}+2}{2}$

$= \frac{7}{4}$

$= \frac{3}{2} < \frac{7}{4} < 2$

Rational number lying between $\frac{7}{4}$ and 2

$= \frac{\frac{7}{4}+2}{2}$

$= \frac{15}{8}$

$= \frac{7}{4} < \frac{15}{8} < 2$

Therefore, $1 < \frac{9}{8} < \frac{5}{4} < \frac{3}{2} < \frac{7}{4} < \frac{15}{8} < 2$

Q3. Find out 6 rational numbers between 3 and 4

Solution:

Given that to find out 6 rational numbers between 3 and 4

We have,

$3 \times \frac{7}{7} = \frac{21}{7}$ and

$4 \times \frac{6}{6} = \frac{28}{7}$

We know 21 < 22 < 23 < 24 < 25 < 26 < 27 < 28

$$\frac{21}{7} < \frac{22}{7} < \frac{23}{7} < \frac{24}{7} < \frac{25}{7} < \frac{26}{7} < \frac{27}{7} < \frac{28}{7}$$
$$3 < \frac{22}{7} < \frac{23}{7} < \frac{24}{7} < \frac{25}{7} < \frac{26}{7} < \frac{27}{7} < 4$$

Therefore, 6 rational numbers between 3 and 4 are

$\frac{22}{7}, \frac{23}{7}, \frac{24}{7}, \frac{25}{7}, \frac{26}{7}, \frac{27}{7}$

Similarly to find 5 rational numbers between 3 and 4, multiply 3 and 4 respectively with $\frac{6}{6}$ and in order to find 8 rational numbers between 3 and 4 multiply 3 and 4 respectively with $\frac{8}{8}$ and so on.

Q4. Find 5 rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$

Solution : Given to find out the 5 rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$

To find 5 rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$ with $\frac{6}{6}$

We have,

$\frac{3}{5} \times \frac{6}{6} = \frac{18}{30}$

$\frac{4}{5} \times \frac{6}{6} = \frac{24}{30}$

We know 18 < 19 < 20 < 21 < 22 < 23 < 24

$$\frac{18}{30} < \frac{19}{30} < \frac{20}{30} < \frac{21}{30} < \frac{22}{30} < \frac{23}{30} < \frac{24}{30}$$
$$\frac{3}{5} < \frac{19}{30} < \frac{20}{30} < \frac{21}{30} < \frac{22}{30} < \frac{23}{30} < \frac{4}{5}$$

Therefore, 5 rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$ are $\frac{19}{30}, \frac{20}{30}, \frac{21}{30}, \frac{22}{30}, \frac{23}{30}$

Q5. Answer whether the following statements are true or false? Give reasons in support of your answer.

(i) Every whole number is a rational number

(ii) Every integer is a rational number

(iii) Every rational number is an integer

(iv) Every natural number is a whole number

(v) Every integer is a whole number

(vi) Every rational number is a whole number

Solution:

(i) True. As whole numbers include and they can be represented

For example – $\frac{0}{10}, \frac{1}{1}, \frac{2}{1}, \frac{3}{1}$…. And so on.

(ii) True. As we know 1, 2, 3, 4 and so on, are integers and they can be represented in the form of $\frac{1}{1}, \frac{2}{1}, \frac{3}{1}\frac{4}{1}$.

(iii) False. Numbers such as $\frac{3}{2}, \frac{1}{2}, \frac{3}{5}, \frac{4}{5}$ are rational numbers but they are not integers.

(iv) True. Whole numbers include all of the natural numbers.

(v) False. As we know whole numbers are a part of integers.

(vi) False. Integers include -1, -2, -3 and so on….. .which is not whole number