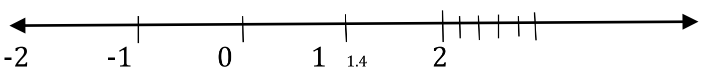
Chapter 1 :- Number System

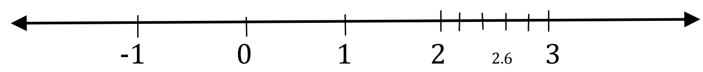
Exercise 1A

Answer1. Yes 0 is rational number because 0 can be written as $\frac{0}{1}$ which is in form of $\frac{p}{q}$, where p and q are integers and q $\neq$ 0

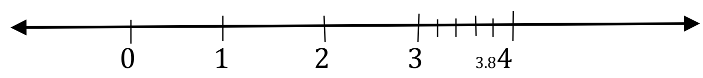
Answer 2.i)$\frac{5}{7}$=1.4



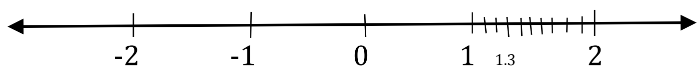
ii)$\frac{8}{3} = 2.6$



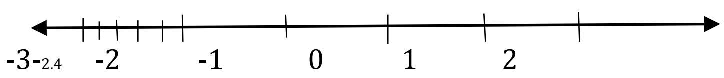
iii)$-\frac{23}{6} = 3.83$



iv)1.3



v)-2.4



Answer3. i) $\frac{3}{8}$ *and* $\frac{2}{5}$

Let, $\frac{3}{8} = x$ and $\frac{2}{5} = y$

Rational number lying between these two are

$$\frac{1}{2}(x+y) = \frac{1}{2}(\frac{3}{8}+\frac{2}{5}) = \frac{1}{2}\times\frac{31}{40} = \frac{31}{80}$$

ii)1.3 and 1.4

Let, x = 1.3 and y = 1.4

Rational number lying between these two are

$\frac{1}{2}(x+y) = \frac{1}{2}(1.3+1.4) = \frac{1}{2}(2.7) = 1.35$

iii) -1 and $\frac{1}{2}$

Let, x = -1 and y = $\frac{1}{2}$

Rational number lying between these two are

$$\frac{1}{2}(x+y) = \frac{1}{2}\left(-1+\frac{1}{2}\right) = \frac{1}{2}\left(\frac{-2+1}{2}\right) = \frac{1}{2}\times\frac{-1}{2} = -\frac{1}{4}$$

iv) $-\frac{3}{4}$ and $-\frac{2}{5}$

Let $x = -\frac{3}{4}$ and $y = -\frac{2}{5}$

Rational number lying between these two are

$$\frac{1}{2}(x+y) = \frac{1}{2}\left((-\frac{3}{4}) + (-\frac{2}{5})\right) = \frac{1}{2}\left(-\frac{23}{20}\right) = -\frac{23}{40}$$

v) $\frac{1}{9}$ *and* $\frac{2}{9}$

Let $x = \frac{1}{9}$ and $y = \frac{2}{9}$

Rational number lying between these two are

$\frac{1}{2}(x+y) = \frac{1}{2}\left(\frac{1}{9}+\frac{2}{9}\right) = \frac{1}{2}\times\frac{3}{9} = \frac{3}{18}$ or $\frac{1}{6}$

Answer4.

A rational number lying between $\frac{3}{5}$ *and* $\frac{7}{8}$ is $\frac{1}{2}\left(\frac{3}{5}+\frac{7}{8}\right)$,

That is, $\frac{59}{80}$

Now rational number between $\frac{59}{80}$ *and* $\frac{7}{8}$ is

$$\frac{1}{2}\left(\frac{59}{80}+\frac{7}{8}\right) = \frac{1}{2}\times\frac{129}{80} = \frac{129}{160}$$

And, a rational lying between $\frac{3}{5}$ *and* $\frac{59}{80}$

$$\frac{1}{2}\left(\frac{3}{5}+\frac{59}{80}\right)=\frac{1}{2}\times\frac{107}{80}=\frac{107}{160}$$

3 rational numbers are -$\frac{107}{160},\frac{59}{80},\frac{129}{160}$

Answer5.

Let n = 4

We convert $\frac{3}{7}$ and $\frac{5}{7}$ into equivalent rational number by multiplying the number by multiplying the numerator and denominator by (n+1), i.e., 5.

Thus, $\frac{3}{7}=\frac{3}{7}\times\frac{5}{5}=\frac{15}{35}$ *and* $\frac{5}{7}=\frac{5}{7}\times\frac{5}{5}=\frac{25}{35}$

We have $\frac{15}{35}<\frac{16}{35}<\frac{17}{35}<\frac{18}{35}<\frac{19}{35}<\frac{20}{35}<\frac{21}{35}<\frac{22}{35}<\frac{23}{35}<\frac{24}{35}<\frac{25}{35}$

OR

$$\frac{3}{7}<\frac{16}{35}<\frac{17}{35}<\frac{18}{35}<\frac{19}{35}<\frac{4}{7}<\frac{22}{35}<\frac{23}{35}<\frac{24}{35}<\frac{5}{7}$$

Hence, 4 rational numbers are $\frac{19}{35}$, $\frac{4}{7}$,$\frac{22}{35}$, $\frac{23}{35}$

Answer 6.

Let n = 6

We convert 2 and 3 into equivalent rational number by multiplying the number by multiplying the numerator and denominator by (n+1), i.e., 7.

Thus,$\frac{2}{1}=\frac{2}{1}\times\frac{7}{7}=\frac{14}{7}$ *and* $\frac{3}{1}=\frac{3}{1}\times\frac{7}{7}=\frac{21}{7}$

We have, $\frac{14}{7}<\frac{15}{7}<\frac{16}{7}<\frac{17}{7}<\frac{18}{7}<\frac{19}{7}<\frac{20}{7}<\frac{21}{7}$

OR

$$2<\frac{15}{7}<\frac{16}{7}<\frac{17}{7}<\frac{18}{7}<\frac{19}{7}<\frac{20}{7}<3$$

Hence 6 rational numbers are $\frac{15}{7}<\frac{16}{7}<\frac{17}{7}<\frac{18}{7}<\frac{19}{7}<\frac{20}{7}$

Answer7.

Let x = $\frac{3}{5}$ and y = $\frac{2}{3}$. clearly x < y. n = 6

Make denominator same $\frac{3}{5}\times\frac{3}{3}=\frac{9}{15}$ *and* $\frac{2}{3}\times\frac{5}{5}=\frac{10}{15}$

Let n = 5

We convert $\frac{9}{15}$ and $\frac{10}{15}$ into equivalent rational number by multiplying the number by multiplying the numerator and denominator by (n+1), i.e., 6.

Thus, $\frac{9}{15} = \frac{9}{15} \times \frac{6}{6} = \frac{54}{90}$ *and* $\frac{9}{15} = \frac{10}{15} \times \frac{6}{6} = \frac{60}{90}$

We have, $\frac{54}{90} < \frac{55}{90} < \frac{56}{90} < \frac{57}{90} < \frac{58}{90} < \frac{59}{90} < \frac{60}{90}$

OR

$$\frac{9}{15} < \frac{11}{18} < \frac{28}{25} < \frac{19}{30} < \frac{29}{30} < \frac{59}{90} < \frac{10}{15}$$

Hence 5 rational numbers are $\frac{11}{18} < \frac{28}{25} < \frac{19}{30} < \frac{29}{30} < \frac{59}{90}$

Answer8.

Here x = 2.1 and y = 2.2, clearly x < y, n= 16

Let d $= \frac{y-x}{(n+1)} = \frac{2.2-2.1}{17} = \frac{0.1}{17} = 0.005$

Hence, the required numbers between 2.1 and 2.2 are

(x + d), (x + 2d), (x + 3d), (x + 4d), (x + 5d), (x + 6d), (x + 7d), (x + 8d), (x + 9d), (x + 10d), (x + 11d),

(x + 11d), (x + 12d), (x + 13d), (x + 14d), (x + 15d), (x + 16d)

i.e., 2.105, 2.110, 2.115, 2.120, 2.125, 2.130, 2.135, 2.140, 2.145, 2.150, 2.155, 2.160, 2.165, 2.170

2.175, 2.180

Answer.9.

- i) True,all natural numbers together with 0 form the collection W of all whole numbers, written as W = [0,1,2,3,4…….].
- ii) False, 0 is not a natural number but it's a whole number.
- iii) False, the least whole number is 0. Negative integers are not whole number.
- iv) True, every integer in the $\frac{p}{q}$ can be written, where p and q are integers and $q \neq 0$.
- v) False, fractional numbers are not integers.
- vi) False, fractional numbers are not whole numbers.