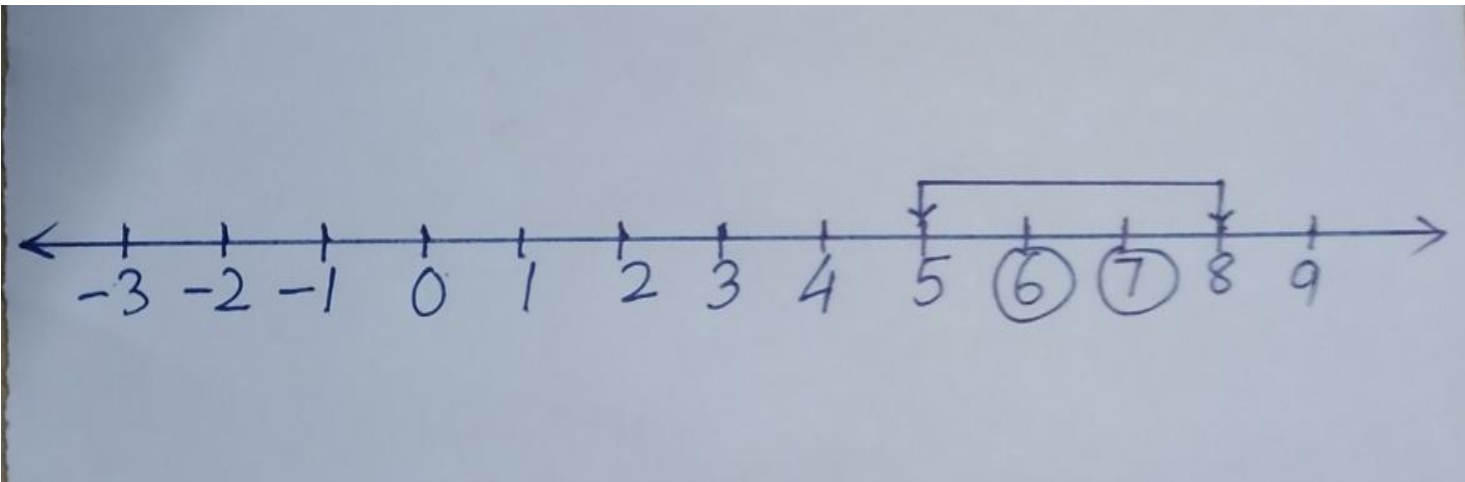# Chapter-1
# Rational Numbers
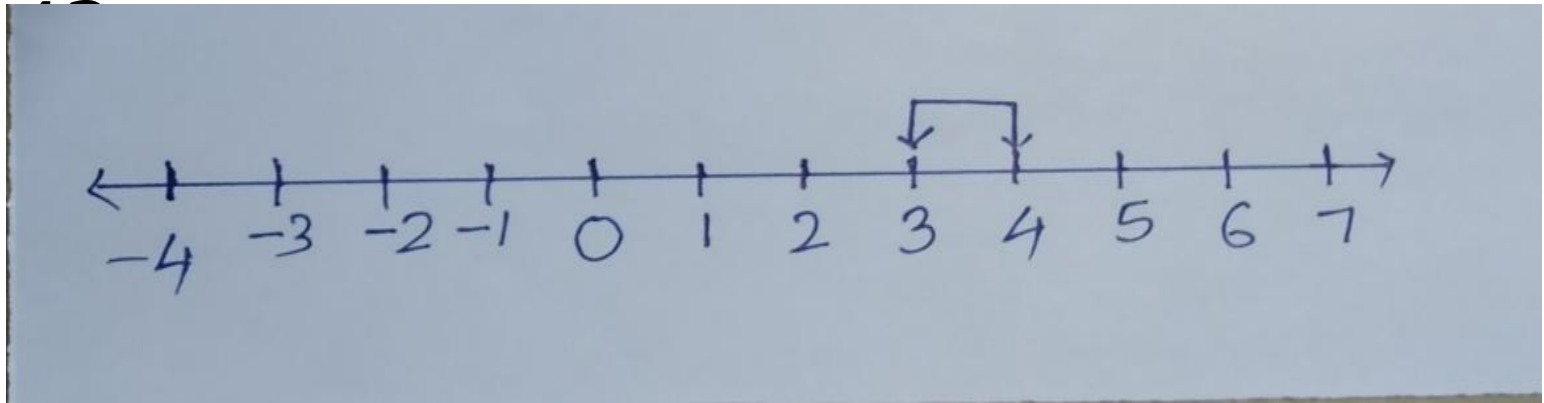# Module 4

By R C Tandi,
AECS TURAMDIH

# 1.4 Rational Numbers between Two Rational Numbers

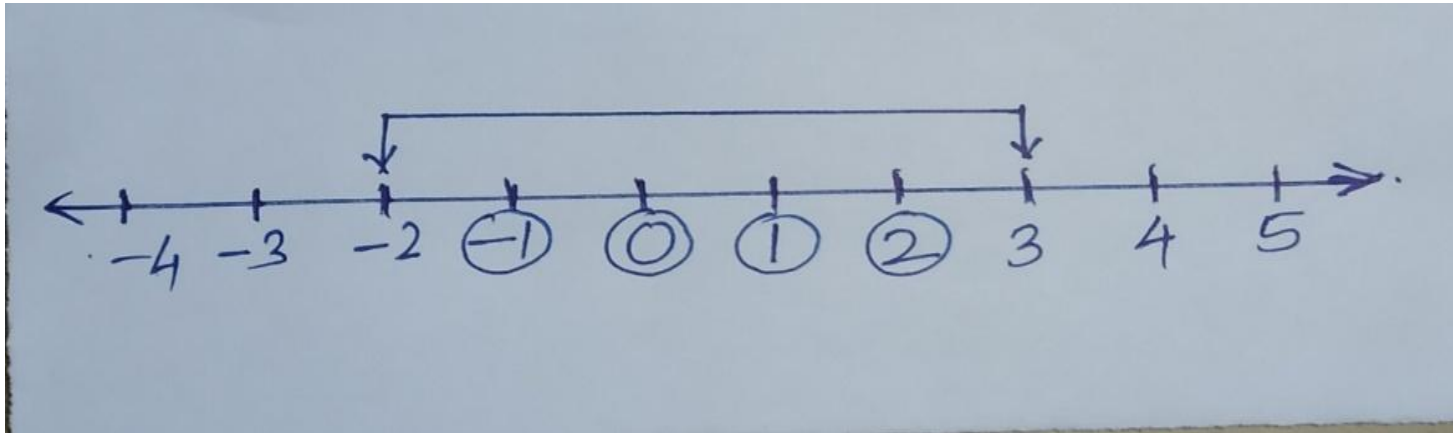Can you say how many natural numbers are there between 5 and 8



- Two. They are 6 and 7.

Can you say how many natural numbers are there between 3 and



• No number.

# Now how many integers are there between -2 and 3 ?



- Four. They are

From this discussion we can say that:

➢*There is finite number of natural numbers between any two natural numbers.*

➢ *There are finite numbers of integers between any two integers.*

Q. How many rational numbers are there between $\frac{2}{7}$ $and$ $\frac{6}{7}$ ?

$$\frac{2}{7} = \frac{2 \times 10}{7 \times 10} = \frac{20}{70} \; and \; \frac{6}{7} = \frac{6 \times 10}{7 \times 10} = \frac{60}{70}$$

The numbers : $\frac{21}{70}, \frac{22}{70}, \frac{23}{70} \dots till \; \frac{59}{70}$

fall between $\frac{2}{7}$ $and$ $\frac{6}{7}$

Now as done above $\qquad$ $\frac{2}{7}$ and $\frac{6}{7}$

can be written as:

$$\frac{2}{7} = \frac{2 \times 100}{7 \times 100} = \frac{200}{700} \quad and \quad \frac{6}{7} = \frac{6 \times 100}{7 \times 100} = \frac{600}{700}$$

➢ *There are infinite numbers of rational number between any two rational numbers.*

Q. Find any two rational numbers between 3 and 5.

**Solution:**    $3 = \dfrac{30}{10}$  $and$  $5 = \dfrac{50}{10}$

Thus, we have    $\dfrac{31}{10} , \dfrac{32}{10} , \dfrac{33}{10} , \ldots \dfrac{49}{10}$

betwen    $\dfrac{30}{10}$  $and$  $\dfrac{50}{10}$

**or** we can say between 3 and 5.

Two rational numbers between

3 and 5 are:    $\dfrac{31}{10}$  $and$  $\dfrac{32}{10}$

**Another method:**

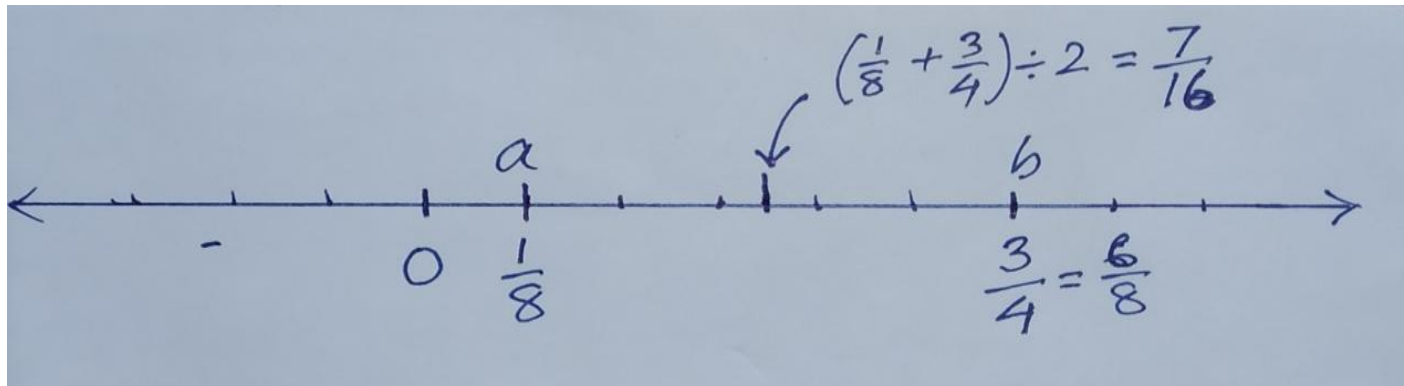Q. Find a rational number between $\dfrac{1}{8}$ $and$ $\dfrac{3}{4}$

**Solution:**

To find a rational number between two rational numbers by alternative method we will find the mean of two given numbers.

The sum is:

$$\frac{1}{8} + \frac{3}{4} = \frac{1+6}{8} = \frac{7}{8}$$

Now divide the sum by 2

$$\frac{7}{8} \div 2 = \frac{7}{8} \times \frac{1}{2} = \frac{7}{16}$$

Symbolically, we can write for any two rational numbers a and b such that: $a < b$

Then $\dfrac{a+b}{2}$ lies between a and b.

That is, $a < \left(\dfrac{a+b}{2}\right) < b$

Q. Find any two rational numbers between $\frac{3}{4}$ and $\frac{5}{3}$

**Solution:**

$$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12} \; and \; \frac{5}{3} = \frac{5 \times 4}{3 \times 4} = \frac{20}{12}$$

Now, the rational between them will be : $\frac{10}{12}, \frac{11}{12}, \frac{12}{12}, \dots till \; \frac{19}{12}$ .

So, any two rational numbers between $\frac{9}{12}$ and $\frac{20}{12}$ are:

$$\frac{11}{12} \; and \; \frac{19}{12}$$

# RECAPETULATION OF THE LESSION

•Rational numbers are closed under addition, subtraction and multiplication.

•The operation addition and multiplication are commutative and associative for rational numbers.

•Zero is called the additive identity for rational numbers.

•One is called the multiplicative identity for rational numbers.

•The additive inverse of a rational number $\frac{p}{q}$ $is$ $-\frac{p}{q}$

•For all rational numbers a,b and c:

$$a(b + c) = ab + ac$$

$$a(b - c) = ab - ac$$

This is called the distributivity of rational number.

•There are infinite number of rational numbers between any two rational numbers.

# THANK YOU