

Subject - Maths

class - VIII

To find Rational numbers Between
Two given Rational numbers \rightarrow

An Important Result. If $\frac{a}{b}$ and $\frac{c}{d}$

are two rational numbers, such that

$\frac{a}{b} < \frac{c}{d}$ then $\frac{1}{2} \left(\frac{a}{b} + \frac{c}{d} \right)$ is

a rational number lying between

$\frac{a}{b}$ and $\frac{c}{d}$.

Type 1. To find one Rational
number between two given
distinct rational numbers.

Example Find a Rational number between
 $\frac{1}{6}$ and $\frac{1}{3}$

Sol Required rational number.

$$\begin{aligned} & \frac{1}{2} \left(\frac{1}{6} + \frac{1}{3} \right) \\ &= \frac{1}{2} \left(\frac{1+2}{6} \right) = \frac{1}{2} \left(\frac{3}{6} \right) = \frac{3}{12} \\ &= \frac{1}{4} \end{aligned}$$

Type - 2

To find many rational number between two given distinct rational number.

Example Find four Rational number between $\frac{1}{6}$ and $\frac{1}{3}$

Solⁿ Let $q_1, q_2, q_3,$ and $q_4,$ be the four required rational number.
Then

$$q_1 = \frac{1}{2} \left(\frac{1}{6} + \frac{1}{3} \right)$$

$$= \frac{1}{2} \left(\frac{1+2}{6} \right) = \frac{1}{4}$$

$$q_2 = \frac{1}{2} \left(\frac{1}{4} + \frac{1}{3} \right)$$

$$= \frac{1}{2} \left(\frac{3+4}{12} \right)$$

$$= \frac{7}{24}$$

$$q_3 = \frac{1}{2} \left(\frac{7}{24} + \frac{1}{3} \right)$$

$$= \frac{1}{2} \left(\frac{7+8}{24} \right)$$

$$= \frac{5}{16}$$

$$q_4 = \frac{1}{2} \left(\frac{5}{16} + \frac{1}{3} \right)$$

$$= \frac{1}{2} \left(\frac{15+16}{48} \right)$$

$$= \frac{31}{96}$$

Hence four rational number
 between $\frac{1}{6}$ and $\frac{1}{3}$ are $\frac{1}{4}$, $\frac{7}{24}$, $\frac{5}{16}$
 and $\frac{31}{96}$.

Exercise

Q.: Find a rational number between a and b if.

[a] $a = \frac{1}{5}, b = \frac{1}{4}$

[b] $a = \frac{1}{8}, b = \frac{7}{12}$

[c] $a = -\frac{5}{6}, b = -\frac{2}{5}$

[d] $a = -\frac{4}{9}, b = \frac{11}{6}$

Q.: Find two rational number between -2 and 2

Q.: Find three rational number between $-\frac{7}{2}$ and -2

Q.: Find four rational number between -1 and $-\frac{1}{2}$