Exercise 1A

Question 3:

(i) $\frac{1}{4}$ and $\frac{1}{3}$

Let $x = \frac{1}{4}$ and $y = \frac{1}{3}$

Then, $x < y$ because $\frac{1}{4} < \frac{1}{3}$

$\therefore$ Rational number lying between x and y

$$= \frac{1}{2}(x + y)$$
$$= \frac{1}{2}\left(\frac{1}{4} + \frac{1}{3}\right)$$
$$= \frac{1}{2}\left(\frac{3 + 4}{12}\right)$$
$$= \frac{1}{2} \times \frac{7}{12} = \frac{7}{24}$$

Hence, $\frac{7}{24}$ is a rational number lying between $\frac{1}{4}$ and $\frac{1}{3}$.

(ii) $\frac{3}{8}$ and $\frac{2}{5}$

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

Then, $x < y$ because $\frac{3}{8} < \frac{2}{5}$

$\therefore$ Rational number lying between x and y

$$= \frac{1}{2}(x + y)$$
$$= \frac{1}{2}\left(\frac{3}{8} + \frac{2}{5}\right)$$
$$= \frac{1}{2}\left(\frac{15 + 16}{40}\right)$$
$$= \frac{1}{2} \times \frac{31}{40} = \frac{31}{80}$$

Hence, $\frac{31}{80}$ is a rational number lying between $\frac{3}{8}$ and $\frac{2}{5}$.

(iii) 1.3 and 1.4

Let x = 1.3 and y = 1.4

Then, x < y, because 1.3 < 1.4

∴ Rational number lying between x and y

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

Hence, 1.35 is a rational number lying between 1.3 and 1.4.

(iv) 0.75 and 1.2

Let x = 0.75 and y = 1.2

Then, x < y because 0.75 < 1.2

∴ Rational number lying between x and y

$$= \frac{1}{2}(0.75 + 1.2)$$
$$= \frac{1}{2} \times 1.95 = \frac{1.95}{2} = 0.975$$

Hence, 0.975 is a rational number lying between 0.75 and 1.2

(v) -1 and $\frac{1}{2}$

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

Then, x < y, because -1 < $\frac{1}{2}$

∴ Rational number lying between x and y

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

Hence, $\frac{-1}{4}$ is a rational number lying between -1 and $\frac{1}{2}$.

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

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

Then, x < y, because $-\frac{3}{4} < -\frac{2}{5}$

∴ Rational number lying between x and y

$$= \frac{1}{2}\left[\left(\frac{-3}{4}\right) + \left(\frac{-2}{5}\right)\right]$$
$$= \frac{1}{2}\left(\frac{-15-8}{20}\right)$$
$$= \frac{1}{2} \times \frac{-23}{20} = -\frac{23}{40}$$

Hence, $-\frac{23}{40}$ is rational number lying between $-\frac{3}{4}$ and $-\frac{2}{5}$.

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