Exercise 1C

Questions 4:

Let us rewrite $\frac{1}{\sqrt{3}}$ as follows:

$$\frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{1}{3}\sqrt{3} ----(1)$$

If possible, let $\frac{1}{\sqrt{3}}$ be rational

Then, from (1) it follows that $\frac{1}{3}\sqrt{3}$ is rational.

Let $\frac{1}{3}\sqrt{3} = \frac{a}{b}$ where a and b are non-zero integers having no common factor other than 1.

Now, $\frac{1}{3}\sqrt{3} = \frac{a}{b} \Rightarrow \sqrt{3} = \frac{3a}{b}$ ------ (2)

But 3a and b are non-zero integers

$\therefore \frac{3a}{b}$ is rational.

Thus, from (2), it follows that $\sqrt{3}$ is rational.

This contradicts the fact that $\sqrt{3}$ is irrational

The contradiction arises by assumed that $\frac{1}{\sqrt{3}}$ is rational.

Hence $\frac{1}{\sqrt{3}}$ is irrational.

Questions 5:

(i) Consider the irrational numbers $2+\sqrt{3}$ are $2-\sqrt{3}$.

Their sum $= \left(2+\sqrt{3}\right) + \left(2-\sqrt{3}\right) = 4 =$ Rational

(ii) Consider the irrational numbers $2+\sqrt{3}$ and $2-\sqrt{3}$.

Their product $= \left(2+\sqrt{3}\right)\left(2-\sqrt{3}\right)$

$= 4 - 3 = 1 =$ Rational.

Questions 6:

(i) The sum of two rationals is always rational - True
(ii) The product of two rationals is always rational - True
(iii) The sum of two irrationals is an irrational - False
(iv) The product of two irrationals is an irrational - False
(v) The sum of a rational and an irrational is irrational - True
(vi) The product of a rational and an irrational is irrational - True

*********** END **********