Real Numbers Ex 1.5 Q6

(i) Let us assume that $\dfrac{2}{\sqrt{7}}$ is rational .Then , there exist positive co primes a and b such that

$$\dfrac{2}{\sqrt{7}} = \dfrac{a}{b}$$

$$\sqrt{7} = \dfrac{2b}{a}$$

$\sqrt{7}$ is rational number which is a contradication.

$$\boxed{\text{Hence } \dfrac{2}{\sqrt{7}} \text{ is irrational}}$$

(ii) Let us assume that $\dfrac{3}{2\sqrt{5}}$ is rational .Then , there exist positive co primes a and b such that

$$\dfrac{3}{2\sqrt{5}} = \dfrac{a}{b}$$

$$\sqrt{5} = \dfrac{3b}{2a}$$

$\sqrt{5}$ is a rational number which is a contradication.

$$\boxed{\text{Hence } \dfrac{3}{2\sqrt{5}} \text{ is irrational}}$$

(iii) Let us assume that $4 + \sqrt{2}$ is rational .Then , there exist positive co primes a and b such that

$$4 + \sqrt{2} = \dfrac{a}{b}$$

$$\sqrt{2} = \dfrac{a}{b} - 4$$

$$\sqrt{2} = \dfrac{a - 4b}{b}$$

$\sqrt{2}$ is a rational number which is a contradication.

$$\boxed{\text{Hence } 4 + \sqrt{2} \text{ is irrational}}$$

(iv) Let us assume that $5\sqrt{2}$ is rational .Then , there exist positive co primes a and b such that

$$5\sqrt{2} = \dfrac{a}{b}$$

$$\sqrt{2} = \dfrac{a}{b} - 5$$

$$\sqrt{2} = \dfrac{a - 5b}{b}$$

$\sqrt{2}$ is a rational number which is a contradication.

$$\boxed{\text{Hence } 5\sqrt{2} \text{ is irrational}}$$

Real Numbers Ex 1.5 Q7

Let us assume that $2 - \sqrt{3}$ is rational .Then, there exist positive co primes a and b such that

$$2 - \sqrt{3} = \dfrac{a}{b}$$

$$\sqrt{3} = 2 - \dfrac{a}{b}$$

This implies, $\sqrt{3}$ is a rational number, which is a contradiction.

Hence, $2 - \sqrt{3}$ is irrational number.

Real Numbers Ex 1.5 Q8

Answer :

Let us assume that $3 + \sqrt{2}$ is rational. Then, there exist positive co primes a and b such that

$$3 + \sqrt{2} = \frac{a}{b}$$

$$\sqrt{2} = \frac{a}{b} - 3$$

$$\sqrt{2} = \frac{a - 3b}{b}$$

This implies,

$\sqrt{2}$ is a rational number which is a contradication.

Hence $3 + \sqrt{2}$ is irrational

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

Let us assume that $3 + \sqrt{2}$ is rational. Then, there exist positive co primes a and b such that

$$3 + \sqrt{2} = \frac{a}{b}$$

$$\sqrt{2} = \frac{a}{b} - 3$$

$$\sqrt{2} = \frac{a - 3b}{b}$$