

# Mathematics

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(Chapter – 1) (Real Numbers)(Exemplar Problems)  
(Class – X)

## Exercise 1.3

### Question 10:

Prove that  $\sqrt{3} + \sqrt{5}$  is irrational.

### Answer 10:

Let us suppose that  $\sqrt{3} + \sqrt{5}$  is rational

Let  $\sqrt{3} + \sqrt{5} = a$ , where  $a$  is rational.

Therefore,  $\sqrt{3} = a - \sqrt{5}$

Squaring both sides, we get

$$(\sqrt{3})^2 = (a - \sqrt{5})^2$$

$$\Rightarrow 3 = a^2 + 5 - 2a\sqrt{5}$$

$$[\because (a - b)^2 = a^2 + b^2 - 2ab]$$

$$\Rightarrow 2a\sqrt{5} = a^2 + 2$$

$$\Rightarrow \sqrt{5} = \frac{a^2 + 2}{2a} \text{ which is contradiction.}$$

As the right hand side is rational number while left hand side  $\sqrt{5}$  is irrational.  
Which is contradiction.

Hence,  $\sqrt{3} + \sqrt{5}$  is irrational.

