Exercise 2.1

1. Identify $\sqrt{48}$ as rational or irrational number.

2. Give an example of each, of two irrational numbers to show that

(*i*) their sum is an irrational number.

(*ii*) their difference is a rational number.

(*iii*) their product is not always an irrational number.

(*iv*) their quotient is a rational number.

(*v*) their quotient is an irrational number.

3. Which of the following statements are true or false?

(*i*) $\left(7+\sqrt{7}\right)\left(7-\sqrt{7}\right)$ is not a rational number.

(*ii*) $\left(5+\sqrt{3}\right)^2$ is a rational number.

(*iii*) The product of a non-zero rational number and an irrational number is an irrational number.

(*iv*) The difference of a rational number and an irrational number is an irrational number.

(*v*) The quotient of a rational number and an irrational number is an irrational number.

4. Give three examples to show that square roots of all the positive integers are not always irrational.

5. Fill in the blanks.

(*i*) The decimal form of an irrational number is neither ..... nor .....

(*ii*) 3.7777... when expressed in the form $\frac{p}{q}$ is ..... .

(*iii*) The product of $\sqrt{27}$ and $\sqrt{3}$ is ..... which is a ..... number 9.

(*iv*) An irrational number cannot be written in the form ....., where p and q are both integers and $q \neq 0$.

(*v*) Sum of the irrational numbers $\sqrt{3}$ and $-\sqrt{3}$ is ....., which is a ..... .

(*vi*) The product of $\sqrt{3}$ and $\sqrt{5}$ is $\sqrt{15}$, which is an ..... .

Answers

1. Irrational number

2. (*i*) $\sqrt{5}+\sqrt{3}$ and $\sqrt{5}-\sqrt{3}$ (*ii*) $5+\sqrt{2}$ and $3+\sqrt{2}$

(*iii*) $3+\sqrt{5}$ and $3-\sqrt{5}$ (*iv*) $6\sqrt{50}$ and $3\sqrt{2}$ (*v*) $8\sqrt{15}$ and $2\sqrt{3}$

3. (*i*) False (*ii*) False (*iii*) True (*iv*) True

(*v*) True

4. $\sqrt{16}$, $\sqrt{25}$, $\sqrt{81}$

5. (*i*) terminating; recurring (*ii*) $\frac{34}{9}$ (*iii*) $\sqrt{81}$; rational

(*iv*) $\frac{p}{q}$ (*v*) 0; rational number

(*vi*) irrational number