Exercise 3.1

1. Fill in the blanks.

(*i*) Rational and irrational numbers taken together are known as ..... .

(*ii*) There is a ..... number corresponding to every point on the number line.

(*iii*) For positive real numbers a and b, $\left(\sqrt{a}+\sqrt{b}\right)\left(\sqrt{a}-\sqrt{b}\right)$ = ...

(*iv*) If x is a real number, then

$$|x| = x, \text{ if } x \geq 0$$

and

$$|x| = \ldots\ldots, \text{ if } x < 0$$

(*v*) $|5|$ = ... and $|-5| = -(\ldots) = 5$

2. Classify the following numbers as rational or irrational:

(*a*) $\frac{-2}{3}$ (*b*) $\frac{-1}{\sqrt{5}}$ (*c*) $\frac{13}{\sqrt{5}}$ (*d*) $\frac{\sqrt{2}}{3}$

(*e*) $(3+\sqrt{3})^2$ (*f*) $(2+\sqrt{2})(2-\sqrt{2})$

3. Represent 2.567 on the number line.

4. State true or false for each of the following statements:

(*i*) Every real number is either rational or irrational.

(*ii*) Corresponding to each point on the number line, there is a real number.

(*iii*) For positive real numbers a and b, $\left(a+\sqrt{b}\right)\left(a-\sqrt{b}\right) = a^2 - b$.

5. Discuss the properties of real number system.

Answers

1. (*i*) real numbers (*ii*) real (*iii*) $a-b$

(*iv*) $-x$ (*v*) $5, -5$

2. (*a*) a rational number (*b*) an irrational number

(*c*) an irrational number (*d*) an irrational number

(*e*) an irrational number (*f*) a rational number

4. (*i*) True (*ii*) True (*iii*) True