



SpeedLabs
Maths

CBSE 11th

TEEVRA EDUTECH PVT. LTD.

Mathematical Reasoning

Chapter 14.3

Question 1: For each of the following compound statements first identify the connecting words and then break it into component statements.

- (i) All rational numbers are real and all real numbers are not complex.
- (ii) Square of an integer is positive or negative.
- (iii) The sand heats up quickly in the Sun and does not cool down fast at night.
- (iv) $x = 2$ and $x = 3$ are the roots of the equation $3x^2 - x - 10 = 0$.

Answer:

(i) Here, the connecting word is 'and'.

The component statements are as follows.

p: All rational numbers are real.

q: All real numbers are not complex.

(ii) Here, the connecting word is 'or'.

The component statements are as follows.

p: Square of an integer is positive.

q: Square of an integer is negative.

(iii) Here, the connecting word is 'and'.

The component statements are as follows.

p: The sand heats up quickly in the sun.

q: The sand does not cool down fast at night.

(iv) Here, the connecting word is 'and'.

The component statements are as follows.

p: $x = 2$ is a root of the equation $3x^2 - x - 10 = 0$

q: $x = 3$ is a root of the equation $3x^2 - x - 10 = 0$

Question 2: Identify the quantifier in the following statements and write the negation of the statements.

(i) There exists a number which is equal to its square.

(ii) For every real number x , x is less than $x + 1$.

(iii) There exists a capital for every state in India.

Answer:

(i) The quantifier is "There exists".

The negation of this statement is as follows.

There does not exist a number which is equal to its square.

(ii) The quantifier is "For every".

The negation of this statement is as follows.

There exist a real number x such that x is not less than $x + 1$.

(iii) The quantifier is "There exists".

The negation of this statement is as follows.

There exists a state in India which does not have a capital.

Question 3: Check whether the following pair of statements is negation of each other. Give reasons for the answer.

- (i) $x + y = y + x$ is true for every real numbers x and y .
- (ii) There exists real number x and y for which $x + y = y + x$.

Answer:

The negation of statement (i) is as follows.

There exists real number x and y for which $x + y \neq y + x$. This is not the same as statement (ii).

Thus, the given statements are not the negation of each other.

Question 4: State whether the “Or” used in the following statements is “exclusive or” inclusive. Give reasons for your answer.

- (i) Sun rises or Moon sets.
- (ii) To apply for a driving licence, you should have a ration card or a passport.
- (iii) All integers are positive or negative.

Answer:

(i) Here, “or” is exclusive because it is not possible for the Sun to rise and the moon to set together.

(ii) Here, “or” is inclusive since a person can have both a ration card and a passport to apply for a driving licence.

(iii) Here, “or” is exclusive because all integers cannot be both positive and negative.

