EXERCISE 14.4 PAGE NO: 338

1. Rewrite the following statement with "if-then" in five different ways conveying the same meaning.

If a natural number is odd, then its square is also odd.

Solution:

The five different ways of the given statement can be written as follows

(i) A natural number is odd indicates that its square is odd.

(ii) A natural number is odd only if its square is odd.

(iii) For a natural number to be odd, it is necessary that its square is odd.

(iv) It is sufficient that the number is odd, for the square of a natural number to be odd.

(v) If the square of a natural number is not odd, then the natural number is not odd

2. Write the contrapositive and converse of the following statements.

(i) If *x* is a prime number, then *x* is odd.

(ii) It the two lines are parallel, then they do not intersect in the same plane.

(iii) Something is cold implies that it has low temperature.

(iv) You cannot comprehend geometry if you do not know how to reason deductively.

(v) *x* is an even number implies that *x* is divisible by 4

Solution:

(i) The contrapositive of the given statement is as follows

If a number x is not odd, then x is not a prime number.

The converse of the given statement is as follows

If a number x is odd, then it is a prime number

(ii) The contrapositive of the given statement is as follows

If two lines intersect in the same plane, then the two lines are not parallel.

The converse of the given statement is as follows

If two lines do not intersect in the same plane, then they are parallel

(iii) The contrapositive of the given statement is as follows

If something does not have low temperature, then it is not cold.

The converse of the given statement is as follows

If something is at low temperature, then it is cold.

(iv) The contrapositive of the given statement is as follows

If you know how to reason deductively, then you can comprehend geometry.

The converse of the given statement is as follows

If you do not know how to reason deductively, then you cannot comprehend geometry.

(v) The given statement can be written as 'if x is an even number, then x is divisible by 4'.

The contrapositive of the given statement is as follows

If x is not divisible by 4, then x is not an even number.
The converse of the given statement is as follows
If x is divisible by 4, then x is an even number.

3. Write each of the following statement in the form "if-then".
(i) You get a job implies that your credentials are good.
(ii) The Banana trees will bloom if it stays warm for a month.
(iii) A quadrilateral is a parallelogram if its diagonals bisect each other.
(iv) To get A^+ in the class, it is necessary that you do the exercises of the book.
Solution:
(i) If you get a job, then your credentials are good.
(ii) If the Banana trees stays warm for a month, then the trees will bloom.
(iii) If the diagonals of a quadrilateral bisect each other, then it is a parallelogram.
(iv) If you want to score an A^+ in the class, then you do all the exercises of the book.

4. Given statements in (a) and (b). Identify the statements given below as contrapositive or converse of each other.
(a) If you live in Delhi, then you have winter clothes.
(i) If you do not have winter clothes, then you do not live in Delhi.
(ii) If you have winter clothes, then you live in Delhi.
(b) If a quadrilateral is a parallelogram, then its diagonals bisect each other.
(i) If the diagonals of a quadrilateral do not bisect each other, then the quadrilateral is not a parallelogram.
(ii) If the diagonals of a quadrilateral bisect each other, then it is a parallelogram.
Solution:
(a) If you live in Delhi, then you have winter clothes.
(i) If you do not have winter clothes, then you do not live in Delhi [Contrapositive of statement (a)]
(ii) If you have winter clothes, then you live in Delhi [Converse of statement (a)]
(b) If a quadrilateral is a parallelogram, then its diagonals bisect each other.
(i) If the diagonals of a quadrilateral do not bisect each other, then the quadrilateral is not a parallelogram [Contrapositive of statement (b)]
(ii) If the diagonals of a quadrilateral bisect each other, then it is a parallelogram [Converse of statement (b)]