



## EXERCISE.14.1

### Question-1

Which of the following sentences are statements? Give reasons for your answer.

- (i) There are 35 days in a month.
- (ii) Mathematics is difficult.
- (iii) The sum of 5 and 7 is greater than 10.
- (iv) The square of a number is an even number.
- (v) The sides of a quadrilateral have equal length.
- (vi) Answer this question.
- (vii) The product of  $(-1)$  and 8 is 8.
- (viii) The sum of all interior angles of a triangle is  $180^\circ$ .
- (ix) Today is a windy day.
- (x) All real numbers are complex numbers.

Ans.

- (i) This sentence is incorrect because the maximum number of days in a month is 31. Hence, it is a statement.
- (ii) This sentence is subjective in the sense that for some people, mathematics can be easy and for some others, it can be difficult. Hence, it is not a statement.
- (iii) The sum of 5 and 7 is 12, which is greater than 10. Therefore, this sentence is always correct. Hence, it is a statement.
- (iv) This sentence is sometimes correct and sometimes incorrect. For example, the square of 2 is an even number. However, the square of 3 is an odd number. Hence, it is not a statement.
- (v) This sentence is sometimes correct and sometimes incorrect. For example, squares and rhombus have sides of equal lengths. However, trapezium and rectangles have sides of unequal lengths. Hence, it is not a statement.
- (vi) It is an order. Therefore, it is not a statement.
- (vii) The product of  $(-1)$  and 8 is  $(-8)$ . Therefore, the given sentence is incorrect. Hence, it is a statement.
- (viii) This sentence is correct and hence, it is a statement.
- (ix) The day that is being referred to is not evident from the sentence. Hence, it is not a statement.
- (x) All real numbers can be written as  $a \times 1 + 0 \times i$ . Therefore, the given sentence is always correct. Hence, it is a statement.

### Question-1

Give three examples of sentences which are not statements. Give reasons for the answers.

Ans.

Give three examples of sentences which are not statements. Give reasons for the answers.

Solution-

The three examples of sentences, which are not statements, are as follows.

(i) He is a doctor.

It is not evident from the sentence as to whom 'he' is referred to. Therefore, it is not a statement.

(ii) Geometry is difficult.

This is not a statement because for some people, geometry can be easy and for some others, it can be difficult.

(iii) Where is she going?

This is a question, which also contains 'she', and it is not evident as to who 'she' is. Hence, it is not a statement.

## EXERCISE.14.2

Question-1

Write the negation of the following statements:

(i) Chennai is the capital of Tamil Nadu.

(ii)  $\sqrt{2}$  is not a complex number.

(iii) All triangles are not equilateral triangle.

(iv) The number 2 is greater than 7.

(v) Every natural number is an integer.

Ans.

(i) Chennai is not the capital of Tamil Nadu.

(ii)  $\sqrt{2}$  is a complex number.

(iii) All triangles are equilateral triangles.

(iv) The number 2 is not greater than 7.

(v) Every natural number is not an integer.

Question-2

Are the following pairs of statements negations of each other?

(i) The number  $x$  is not a rational number.

The number  $x$  is not an irrational number.

(ii) The number  $x$  is a rational number.

The number  $x$  is an irrational number.

Ans.

(i) The negation of the first statement is "the number  $x$  is a rational number".

This is same as the second statement. This is because if a number is not an irrational number, then it is a rational number.

Therefore, the given statements are negations of each other.

(ii) The negation of the first statement is "the number  $x$  is not a rational number". This means that the number  $x$  is an irrational number, which is the same as the second statement.

Therefore, the given statements are negations of each other.

### Question-3

Find the component statements of the following compound statements and check whether they are true or false.

- (i) Number 3 is prime or it is odd.
- (ii) All integers are positive or negative.
- (iii) 100 is divisible by 3, 11 and 5.

Ans.

(i) The component statements are as follows.

$p$ : Number 3 is prime.

$q$ : Number 3 is odd.

Both the statements are true.

(ii) The component statements are as follows.

$p$ : All integers are positive.

$q$ : All integers are negative.

Both the statements are false.

(iii) The component statements are as follows.

$p$ : 100 is divisible by 3.

$q$ : 100 is divisible by 11.

$r$ : 100 is divisible by 5.

Here, the statements,  $p$  and  $q$ , are false and statement  $r$  is true.

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