

**EXERCISE 31.2****PAGE NO: 31.6****1. Write the negation of the following statement:****(i) Bangalore is the capital of Karnataka.****(ii) It rained on July 4, 2005.****(iii) Ravish is honest.****(iv) The earth is round.****(v) The sun is cold.****Solution:****(i)** Bangalore is the capital of Karnataka.

The negation of the statement is:

It is false that “Bangalore is the capital of Karnataka.”

Or

“Bangalore is not the capital of Karnataka.”

**(ii)** It rained on July 4, 2005.

The negation of the statement is:

It is false that “It rained on July 4, 2005”.

Or

“It did not rain on July 4, 2005”.

**(iii)** Ravish is honest.

The negation of the statement is:

It is false that “Ravish is honest.”

Or

“Ravish is not honest.”

**(iv)** The earth is round.

The negation of the statement is:

It is false that “The earth is round.”

Or

“The earth is not round.”

**(v)** The sun is cold.

The negation of the statement is:

It is false that “The sun is cold.”

Or

“The sun is not cold.”

2. (i) All birds sing.  
(ii) Some even integers are prime.  
(iii) There is a complex number which is not a real number.  
(iv) I will not go to school.  
(v) Both the diagonals of a rectangle have the same length.  
(vi) All policemen are thieves.

**Solution:**

- (i) All birds sing.

The negation of the statement is:

It is false that “All birds sing.”

Or

“All birds do not sing.”

- (ii) Some even integers are prime.

The negation of the statement is:

It is false that “even integers are prime.”

Or

“Not every even integers is prime.”

- (iii) There is a complex number which is not a real number.

The negation of the statement is:

It is false that “complex numbers are not a real number.”

Or

“All complex number are real numbers.”

- (iv) I will not go to school.

The negation of the statement is:

“I will go to school.”

- (v) Both the diagonals of a rectangle have the same length.

The negation of the statement is:

“There is at least one rectangle whose both diagonals do not have the same length.”

- (vi) All policemen are thieves.

The negation of the statement is:

“No policemen are thief”.

3. Are the following pairs of statements are a negation 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 not a rational number.**

**The number  $x$  is an irrational number.**

**Solution:**

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

“The number  $x$  is an irrational number.”

Since, the statement “The number  $x$  is not a rational number.” Is a negation of the first statement.

**(ii)** The number  $x$  is not a rational number.

“The number  $x$  is an irrational number.”

Since, the statement “The number  $x$  is a rational number.” Is not a negation of the first statement.

**4. Write the negation of the following statements:**

**(i)  $p$ : For every positive real number  $x$ , the number  $(x - 1)$  is also positive.**

**(ii)  $q$ : For every real number  $x$ , either  $x > 1$  or  $x < 1$ .**

**(iii)  $r$ : There exists a number  $x$  such that  $0 < x < 1$ .**

**Solution:**

**(i)  $p$  :** For every positive real number  $x$ , the number  $(x - 1)$  is also positive.

The negation of the statement:

$p$ : For every positive real number  $x$ , the number  $(x - 1)$  is also positive.

is

$\sim p$ : There exists a positive real number  $x$ , such that the number  $(x - 1)$  is not positive.

**(ii)  $q$ :** For every real number  $x$ , either  $x > 1$  or  $x < 1$ .

The negation of the statement:

$q$ : For every real number  $x$ , either  $x > 1$  or  $x < 1$ .

is

$\sim q$ : There exists a real number such that neither  $x > 1$  or  $x < 1$ .

**(iii)  $r$ :** There exists a number  $x$  such that  $0 < x < 1$ .

The negation of the statement:

$r$ : There exists a number  $x$  such that  $0 < x < 1$ .

is

$\sim r$ : For every real number  $x$ , either  $x \leq 0$  or  $x \geq 1$ .

**5. Check whether the following pair of statements is a negation of each other. Give reasons for your answer.**

**(i)  $a + b = b + a$  is true for every real number  $a$  and  $b$ .**

**(ii) There exist real numbers  $a$  and  $b$  for which  $a + b = b + a$ .**

**Solution:**

The negation of the statement:

$p$ :  $a + b = b + a$  is a true for every real number  $a$  and  $b$ .

is

$\sim p$ : There exist real numbers are ' $a$ ' and ' $b$ ' for which  $a+b \neq b+a$ .

So, the given statement is not the negation of the first statement.

