

EXERCISE 31.4

Write the negation of each of the following statements:

(i) For every $x \in \mathbf{N}$, $x + 3 < 10$

(ii) There exists $x \in \mathbf{N}$, $x + 3 = 10$

Solution:

(i) For every $x \in \mathbf{N}$, $x + 3 < 10$

The negation of the statement is

“There exist $x \in \mathbf{N}$, such that $x + 3 \geq 10$.”

(ii) There exists $x \in \mathbf{N}$, $x + 3 = 10$

The negation of the statement is

“There exist $x \in \mathbf{N}$, such that $x + 3 \neq 10$.”

2. Negate each of the following statements:

(i) All the students complete their homework.

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

Solution:

(i) All the students complete their homework.

The negation of the statement is

“Some of the students did not complete their homework.”

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

The negation of the statement is

“For every real number x , $x^2 \neq x$.”