

**CBSE Class-11 Mathematics**  
**NCERT Solutions**  
**Chapter - 14 Mathematical Reasoning**  
**Exercise 14.2**

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

**(i) Chennai is the capital of Tamilnadu.**

**(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)** Negation of statement is: Chennai is not the capital of Tamilnadu.

**(ii)** Negation of statement is:  $\sqrt{2}$  is a complex number.

**(iii)** Negation of statement is: All triangles are equilateral triangles.

**(iv)** Negation of statement is: The number 2 is not greater than 7.

**(v)** Negation of statement is: Every natural number is not an integer.

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**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)** Let  $p$ : The number  $x$  is not a rational number.

$q$  : The number  $x$  is not an irrational number.

Now  $\sim p$  : The number  $x$  is a rational number.

And  $\sim q$  : The number  $x$  is an irrational number.

$$\therefore \sim p = q \text{ and } \sim q = p$$

Therefore,  $p$  and  $q$  are negation of each other.

**(ii)** Let  $p$  : The number  $x$  is a rational number.

$q$  : The number  $x$  is an irrational number.

Now  $\sim p$  : The number  $x$  is not a rational number.

And  $\sim q$  : The number  $x$  is not an irrational number.

$$\therefore \sim p = q \text{ and } \sim q = p$$

Therefore,  $p$  and  $q$  are negation of each other.

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

**(i) The 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:

$p$  : The number 3 is prime.

$q$  : It is an odd number.

Both the component statements  $p$  and  $q$  are true.

**(ii)** The component statements are:

$p$  : All integers are positive.

$q$  : All integers are negative.

Both the component statements  $p$  and  $q$  are false.

**(iii)** The component statements are:

$p$  : 100 is divisible by 3.

$q$  : 100 is divisible by 11.

$r$  : 100 is divisible by 5.

The component statements  $p$  and  $q$  are false whereas  $r$  is true.