

RD Sharma
Solutions
Class 11 Maths
Chapter 31
Ex 31.3

Mathematical Reasoning Ex 31.3 Q1

(i)

The components of the compound statement:

The sky is blue and the grass is green.

are:

p : The sky is blue

q : The grass is green

(ii)

The components of the compound statement:

The earth is round or the sun is cold.

are:

p : The earth is round

q : The sun is cold.

(iii)

The components of the compound statement:

All rational numbers are real and all real numbers are complex.

are:

p : All rational numbers are real

q : All real numbers are complex

(iv)

The components of the compound statement:

25 is a multiple of 5 and 8.

are:

p : 25 is multiple of 5

q : 25 is multiple of 8.

Mathematical Reasoning Ex 31.3 Q2

(i)

In the statement

Students can take Hindi or Sanskrit as their third language.

an exclusive "OR" is used because

A student cannot take both Hindi and Sanskrit as the third language.

(ii)

In the statement

To enter a country, you need a passport or a voter registration card.

an inclusive "OR" is used because

Since a person can have both a passport and a voter registration card to enter a country.

(iii)

In the statement

A lady gives birth to a baby boy or a baby girl.

an exclusive "OR" is used because

A lady cannot give birth to a baby who is both a boy and a girl.

(iv)

In the statement

To apply for a driving licence, you should have a ration card or a passport.

an inclusive "OR" is used because

A person can have both a ration card and passport to apply for a driving licence.

Mathematical Reasoning Ex 31.3 Q3

(i)

The component statements of the compound statement

To enter into a public library children need an identity card from the school or a letter from the school authorities.

are

p : To get into a public library children need an identity card.

q : To get into a public library children need a letter from the school authorities.

We know that if p and q are true then p or q must also be true.

Hence, the compound statement is true.

(ii)

The component statements of the compound statement

All rational numbers are real and all real numbers are not complex.

are

p : All rational numbers are real.

q : All real numbers are not complex.

We know that p is true and q is false.

∴ The compound statement " p and q " is false.

(iii)

The component statements of the compound statement

Square of an integer is positive or negative.

are

p : Square of an integer is positive.

q : Square of an integer is negative.

We know that if p and q are true then p or q must also be true.

Hence, the compound statement is true.

(iv)

The component statements of the compound statement

$x = 2$ and $x = 3$ are the roots of the equation $3x^2 - x - 10 = 0$.

are

p : $x = 2$ is a root of the equation $3x^2 - x - 10 = 0$.

q : $x = 3$ is a root of the equation $3x^2 - x - 10 = 0$.

Here, p is true but q is false.

\therefore The compound statement " p and q " is false.

(v)

The component statements of the compound statement

The sand heats up quickly in the sun and does not cool down fast at night.

are

p : The sand heats up quickly in the sun.

q : The sand does not cool down fast at night.

The compound statement p and q is false, because p is true and q is false.

Mathematical Reasoning Ex 31.3 Q4

(i)

The component statements of the compound statement

Delhi is in India and $2+2=4$.

are

p : Delhi is in India.

q : $2+2=4$.

We know that if p and q are true then p or q must also be true.

Hence, the compound statement is true.

(ii)

The component statements of the compound statement

Delhi is in England and $2+2=4$.

are

p : Delhi is in England

q : $2+2=4$.

Here p is false and q is true. So, p and q must be false.
Hence, the compound statement is false.

(iii)

The component statements of the compound statement
Delhi is in India and $2+2=5$.

are

p : Delhi is in India

q : $2+2=5$.

Here, p is true and q is false. So, p and q must be false.
Hence, the compound statement is false.

(iv)

The component statements of the compound statement
Delhi is in England and $2+2=5$.

are

p : Delhi is in England.

q : $2+2=5$.

We know that if p and q are false then p and q must also be false.
Hence, the compound statement is false.