EXERCISE 14.1 - Question No. 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)

EXERCISE 14.1 - Question No. 2

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

EXERCISE 14.2 - Question No. 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

EXERCISE 14.2 - Question No. 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.

EXERCISE 14.2 - Question No. 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.

EXERCISE 14.3 - Question No. 1

For each of the following compound statements first identify the connecting words and then break it into component statements. (i) All rational numbers are real and all real numbers are not complex. (ii) Square of an integer is positive or negati

EXERCISE 14.3 - Question No. 2

Identify the quantifier in the following statements and write the negation of the statements. (i) There exists a number which is equal

to its square. (ii) For every real number x, x is less than $x + 1$. (iii) There exists a capital for every state in india.

EXERCISE 14.3 - Question No. 3

Check whether the following pair of statements are negation of each other. Give reasons for your answer. (i) $x + y = y + x$ is true for every real numbers x and y. (ii) There exists real numbers x and y for which `x + y = y +

EXERCISE 14.3 - Question No. 4

State whether the Or used in the following statements is exclusive of' inclusive. Give reasons for your answer. (i) Sun rises or Moon sets. (ii) To apply for a driving license, you should have a ration card or a passport. (iii) All integers are positive or negative.

EXERCISE 14.4 - Question No. 1

Rewrite the following statement with if-then in five different ways conveying the same meaning. If a natural number is odd, then its square is also odd.

EXERCISE 14.4 - Question No. 2

Write the contrapositive and converse of the following statements.

(i) If x is a prime number, then x is odd. (ii) If the two lines are parallel, then they do not intersect in the same plane, (iii) Something is cold implies that it has low temperature. (iv) You cannot comprehend geometry if you do not know how to reason deductively. (v) x is an even number implies that x is divisible by 4.

EXERCISE 14.4 - Question No. 3

Write each of the following statements in the form if-then' (i) You get a job implies that your credentials are good. (ii) The Banana trees will bloom if it stays warm for a month. (iii) A quadrilateral is a parallelogram if its diagonals bisect each other. (iv) To get an A in the class, it is necessary that you do all the exercises the book.

EXERCISE 14.4 - Question No. 4

Given statements in (a) and (b). Identify the statements given below as contrapositive or converse of each other. (a) If you live in Delhi, then you have winter clothes. (i) If you do not have winter clothes, then you do not live in Delhi. (ii) If you have winter clothes, then

you live in Delhi. (b) If a quadrilateral is a parallelogram, then its diagonals bisect each other. (i) If the diagonals of a quadrilateral do not bisect each other, then the quadrilateral is not a parallelogram. (ii) If the diagonals of a quadrilateral bisect each other, then it is a parallelogram.

EXERCISE 14.5 - Question No. 1

Show that the statement p: If x is a real number such that $x^3 + 4x = 0$. then x is 0 is true by (i) direct method, (ii) method of contradiction, (iii) method of contrapositive.

EXERCISE 14.5 - Question No. 2

Show that the statement For any real numbers a and b, $a^2 = b^2$ implies that $a = b$ is not true by giving a counter-example.

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EXERCISE 14.5 - Question No. 3

Show that the following statement is true by the method of contrapositive. p: If x is an integer and x^2 is even, then x is also even.

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EXERCISE 14.5 - Question No. 4

By giving a counter example, show that the following statements are not true. (i) p: If all the angles of a triangle are equal, then the triangle is an obtuse angled triangle. (ii) q: The equation $x^2 - 1 = 0$ does not have a root lying between 0

EXERCISE 14.5 - Question No. 5

Which of the following statements are true and which are false? In each case give a valid reason for saying so. (i) p : Each radius of a circle is a chord of the circle. (ii) q : The centre of a circle bisects

each chord of the circle, (iii)r: Circle is a aprticular case of an ellipse, (iv) s : If x an y are integerss such that $x > y$, (v) t : $\sqrt{11}$ is a rational number.

MISCELLANEOUS EXERCISE - Question No. 1

Write the negation of the following statements: (i) p : For every positive real number x, the number $x - 1$ is also positive. (ii) q : All cats scratch. (iii) r : For every real number x, either $x > 1$ or $x < 1$. (iv) s : There exist

MISCELLANEOUS EXERCISE - Question No. 2

State the converse and contrapositive of each of the following statements: (i) p : A positive integer is prime only if it has no divisors other than 1 and itself. (ii) q : I go to a beach whenever it is a sunny day. (iii) r : If it is hot outside, then you feel thirsty.

MISCELLANEOUS EXERCISE - Question No. 3

Write each of the statements in the form if p, then q (i) p : It is necessary to have a password to log on to the server. (ii) q : There

is traffic jam whenever it rains. (iii) r : You can access the website only if you pay a subscription fee.

MISCELLANEOUS EXERCISE - Question No. 4

Rewrite each of the following statements in the form p if and only if q (i) p: If you watch television, then your mind is free and if your mind is free, then you watch television. (ii) q: For you to get an A grade, it is necessary and sufficient that you do all the homework regularly. (iii) r : If a quadrilateral is equiangular, then it is a rectangle and if a quadrilateral is a rectangle, then it is equiangular.

MISCELLANEOUS EXERCISE - Question No. 5

Given below are two statements p : 25 is a multiple of 5. q : 25 is a multiple of 8. Write the compound statements connecting these two statements with 'And and Or. In both cases check the validity of the compound statement.

MISCELLANEOUS EXERCISE - Question No. 6

Check the validity of the statements given below by the method given against it. (i) p: The sum of an irrational number and a

rational number is irrational (by contradiction method). (ii) q: If n is a real number with $n > 3$, then `n^2 gt 9

MISCELLANEOUS EXERCISE - Question No. 7

Write the following statement in five different ways, conveying the same meaning. p: If a mangle is equiangular, then it is an obtuse angled triangle.

SOLVED EXAMPLES - Question No. 1

Check whether the following sentences are statements. Give reasons for your answer. (i) 8 is less than 6. (ii) Every set is a finite set. (iii) The sun is a star. (iv) Mathematics is fun. (v) There is no rain without clouds. (vi) How far is Chennai from here?

SOLVED EXAMPLES - Question No. 2

Write the negation of the following statements. (i) Both the diagonals of a rectangle have the same length. (ii) $\sqrt{2}$ is rational.

SOLVED EXAMPLES - Question No. 3

Write the negation of the following statements and check whether the resulting statements are true, (i) and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; Australia is a continent. (ii) and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; There does not exist a quadrilateral which has all its sides equal, (iii) and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; Every natural number is greater than 0. (iv) and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; and nbsp; The sum of 3 and 4 is 9.

SOLVED EXAMPLES - Question No. 4

Find the component statements of the following compound statements. (i) The sky is blue and the grass is green. (ii) It is raining and it is cold. (iii) All rational numbers are real and all real numbers are complex. (iv) 0 is a positive number or a negative number.

SOLVED EXAMPLES - Question No. 5

Find the component statements of the following and check whether they are true or not. (i) A square is a quadrilateral and its four sides equal (ii) All prune numbers are either even or odd (iii) A person who has taken Mathematics or Computer

SOLVED EXAMPLES - Question No. 6

Write the component statements of the following compound statements and check whether the compound statement is true or false. (i) A line is straight and extends indefinitely in both directions. (ii) 0 is less than every positive integer and every negative integer. (iii) All living things have two legs and two eyes.

SOLVED EXAMPLES - Question No. 7

For each of the following statements, determine whether an inclusive Or or exclusive Or is used. Give reasons for your answer. (i) To enter a country, you need a passport or a voter registration card. (ii) The school is closed if it is a holiday or a Sunday. (iii) Two lines intersect at a point or are parallel. (iv) Students can take French or Sanskrit as their third language.

SOLVED EXAMPLES - Question No. 8

Identify the type of Or used in the following statements and cheek whether the statements are true or false: (i) $\sqrt{2}$ is a rational number or an irrational number. (ii) To enter into a public library children

need an identity card from the school authorities. (iii) A rectangle is a quadrilateral or a 5-sided polygon.

SOLVED EXAMPLES - Question No. 9

Write the contra positive of the following statement: (i) If a number is divisible by 9, then it is divisible by 3. (ii) If you are born in India, then you are a citizen of India. (iii) If a triangle is equilateral, it is isosceles.

SOLVED EXAMPLES - Question No. 10

Write the converse of the following statements. (i) If a number n is even, then n^2 is even. (ii) If you do all the exercises in the book, you get an A grade in the class. (iii) If two integers a and b are such that$a$ and $> ; b$, then $a - b$ is always a positive integer.

SOLVED EXAMPLES - Question No. 11

For each of the following compound statements, first identify the corresponding component statements. Then check whether the statements are true or not. (i) If a triangle ABC is equilateral, then it is isosceles. (ii) If a and b are integers, then ab is a rational number.

SOLVED EXAMPLES - Question No. 12

Given below are two pairs of statements. Combine these two statements using if and only if. (i) p: If a rectangle is a square, then all its four sides are equal. q: If all the four sides of a rectangle are equal, then the rectangle is a square. (ii) p: If the sum of digits of a number is divisible by 3, then the number is divisible by 3. q: If a number is divisible by 3, then the sum of its digits is divisible by 3.

SOLVED EXAMPLES - Question No. 13

Check whether the following statement is true or not. If x, $y \in Z$ are such that x and y are odd, then xy is odd.

SOLVED EXAMPLES - Question No. 14

Check whether the following statement is true of false by proving its contra positive. If $x,\ y \in Z$ such that xy is odd, then both x and y are odd.

SOLVED EXAMPLES - Question No. 15

Verify by the method of contradiction. $p: \sqrt{7}$ is irrational.

SOLVED EXAMPLES - Question No. 16

By giving a counter example, show that the following statement is false. If n is an odd integer, then n is prime.

SOLVED EXAMPLES - Question No. 17

Cheek whether Or used in the following compound statement is exclusive or inclusive? Write the component statements of the

compound statements and use them to check whether the compound statement is true or not. Justify your answer. t: you are wet when it rains or you are in a river.

SOLVED EXAMPLES - Question No. 18

Write the negation of the following statements: (i) p: For every real number x, $x^2 > x$. (ii) q: There exists a rational number x such that $x^2 = 2$. (iii) r: All birds have wings. (iv) s: All students study mathematics at the element

SOLVED EXAMPLES - Question No. 19

Using the words necessary and sufficient rewrite the statement The integer n is odd if and only if n^2 is odd. Also check whether the statement is true.

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SOLVED EXAMPLES - Question No. 20

For the given statements identify the necessary and sufficient conditions. t: If you drive over 80 km per hour, then you will get a fine

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