Important Questions for Class 11 Maths Chapter 14: Chapter 14 of Class 11 Maths, "Mathematical Reasoning," focuses on the development of logical reasoning skills through the exploration of mathematical statements, their truth values, and logical connectives. Key topics include the basics of propositions, logical operators (AND, OR, NOT, etc.), truth tables, logical equivalence, and implications.

The chapter emphasizes understanding the structure of logical arguments, the use of quantifiers (universal and existential), and the process of proving mathematical statements. Important questions often involve constructing truth tables, determining the validity of logical expressions, and applying rules of inference to solve problems related to mathematical proofs.

Important Questions for Class 11 Maths Chapter 14 Overview

Important Questions for Class 11 Maths Chapter 14 Mathematical Reasoning is crucial for building a foundation in logical thinking and mathematical proof techniques. Important questions in this chapter often involve understanding propositions, logical operators, and truth tables.

These questions help students develop skills to evaluate the truth value of statements, construct logical arguments, and apply logical connectives. Mastery of this chapter is essential for students pursuing higher mathematics, as it lays the groundwork for subjects like set theory, algebra, and calculus. Additionally, it enhances critical thinking, which is vital for problem-solving in both mathematics and real-world applications.

Important Questions for Class 11 Maths Chapter 14 Mathematical Reasoning

Practice the following important questions in class 11 Maths Mathematical reasoning, which would help you everywhere. Solving these kinds of questions is the best way to learn the topic thoroughly.

Question 1:

Write the negation of the following statements

1) The number 3 is less than 1.

2) Every whole number is less than 0.

3) The sun is cold

Solution:

The negation of the given statements are:

1)The number 3 is not less than 1 (or) The number 3 is more than 1.

2) Every whole number is not less than 0 (or) Every whole number is more than 0.

3) The sun is not cold (or)The sun is hot.

Question 2:

Write a component statement for the following compound statements:

50 is a multiple of both 2 and 5.

Solution:

Given compound statement: 50 is a multiple of both 2 and 5.

p: 50 is multiple of 2

q: 50 is multiple of 5.

Question 3:

Identify the quantifier in the following statement.

There exists a real number which is twice itself.

Solution:

Given statement:

There exists a real number which is twice itself.

For the given statement, the quantifier is "**There exists**".

Question 4:

Write the contrapositive of the given if-then statements:

(a) If a triangle is equilateral, then it is isosceles

(b) If a number is divisible by 9, then it is divisible by 3.

Solution:

(a) Given statement: If a triangle is equilateral, then it is isosceles

Contrapositive statement: If a triangle is not isosceles, then it is not equilateral.

(b) Given statement: If a number is divisible by 9, then it is divisible by 3.

Contrapositive statement: If a number is not divisible by 3, then it is not divisible by 9.

Question 5:

Show that the statement, p: if a is a real number such that $a^3 + 4a = 0$, then a is 0″, is true by direct method?

Solution: Let q and r are the statements given by q: a is a real number such that $a^3 + 4a = 0$

r: a is 0.

let q be true then

a is a real number such that $a^3 + 4a = 0$

a is a real number such that $a(a^2 + 4) = 0$

a = 0

r is true

So, q is true and r is true, so p is true.

Question 6:

Find the component statements for the following given statements and check whether it is true or false:

(a) A square is a quadrilateral and its four sides are equal

(b) All prime numbers are either even or odd

Solution:

(a) Given statement: A square is a quadrilateral and its four sides are equal

The component statements are:

P: A square is a quadrilateral

Q: A square has all its sides equal.

In this statement, the connecting word is "**and**"

We know that a square is a quadrilateral

So, the statement P is true.

Also, it is known that all the four sides of a square are equal.

Hence, the statement "Q" is also true.

Therefore, both the component statements are true.

(b) Given statement: All prime numbers are either even or odd

The component statements are:

P: All the prime numbers are odd numbers

Q: All the prime numbers are even numbers

In this statement, the connecting word is **"or"**

We know that all the prime numbers are not odd numbers

So, the statement P is false.

Also, it is known that all the prime numbers are not even numbers.

Hence, the statement "Q" is also false.

Therefore, both the component statements are not true.

Question 7:

Which of the following sentences are statements? Justify your answer.

(i) Answer this question

(ii) All the real numbers are complex numbers

(iii) Mathematics is difficult

Solution:

Given:

(i) Answer this question

Since it is an order, the given sentence is not a statement.

(ii) All the real numbers are complex numbers

We know that all the real numbers can be written in the form: a+i0

Where a is a real number. Hence, it always true, the given sentence is a statement

(iii) Mathematics is difficult

Mathematics is a subject that can be easy for some people and difficult for some people.

So, the given sentence can be both true or false.

Hence, it is not a statement.

Benefits of Solving Important Questions for Class 11 Maths Chapter 14

Solving important questions for Class 11 Maths Chapter 14, "Mathematical Reasoning," offers several benefits:

Improved Logical Thinking: Helps develop critical reasoning and logical thinking skills, which are essential for solving complex mathematical problems.

Concept Clarity: Reinforces understanding of key concepts like propositions, truth tables, and logical connectives.

Exam Readiness: Prepares students for exam patterns by familiarizing them with commonly asked questions and problem-solving techniques.

Better Problem-Solving Skills: Enhances the ability to approach mathematical proofs and logical arguments systematically.

Foundation for Higher Studies: Lays the groundwork for advanced mathematical topics that require strong reasoning skills.