

CHAPTER 14

MATHEMATICAL REASONING

DECEMBER 2020

1. i. Write the contra-positive of the statement:
If a triangle is equilateral, then it is
Isosceles. (1)
- ii. Prove by the method of contradiction
that $\sqrt{2}$ is irrational. (3)

MARCH 2020

2. i. Write the contra-positive of the statement:
Consider the statement:
“If a number is divisible by 9, then it is
divisible by 3”. (1)
- ii. by the method of contradiction
that $\sqrt{2}$ is irrational. (3)
- $P : \text{If } x = 2, \text{ then } x^2 = 4.$

IMPROVEMENT 2019

3. a) Consider the statement,
 $P : \text{If } x = 2, \text{ then } x^2 = 4.$
Write corresponding contrapositive
statement of P. (2)
- b) Consider the statement “If x is an integer
and x^2 is even, then x is also even”. Show
that statement is true by method of
contrapositive. (2)

MARCH 2019

4. a) Write the contrapositive of the given
statement. “If a number is divisible by

9, then it is divisible by 3”. (1)

- b) Verify by the method of contradiction:
“ $p : \sqrt{7}$ is irrational”. (3)

IMPROVEMENT 2018

5. a) Write the contra positive of the statement:
“If the integer n is odd, then n^2 is odd”. (1)
- b) Prove by the method of contradiction
“ $\sqrt{7}$ is irrational”. (3)

MARCH 2018

6. a) Which one of the following sentences is a
statement. (1)
- i) 275 is a perfect square.
ii) Mathematics is difficult subject.
iii) Answer this question.
iv) Today is a rainy day.
- b) Verify by method of contradiction:
“ $\sqrt{2}$ is irrational”. (3)

IMPROVEMENT 2017

7. a) Write the negation of the statement “ $\sqrt{2}$ is
irrational”. (1)
- b) Using the method of contradiction, prove that
“ $\sqrt{2}$ is irrational”. (3)

MARCH 2017

8. a) Write the contra positive of the statement
“If a number is divisible by 9, then it is
divisible by 3”. (1)
- b) Prove by the method of contradiction, “ $P\sqrt{5}$ is
irrational”. (3)

IMPROVEMENT 2016

9. a) Write the negation of the statement:
 “ $\sqrt{2}$ is not a complex number”. (1)
- b) Prove by the method of contradiction,
 $p : \sqrt{11}$ is irrational. (3)

MARCH 2016

10. a) Write the negation of the statement: “Every natural number is greater than zero”. (1)
- b) Verify by the method of contradiction:
 “ $p : \sqrt{13}$ is irrational”. (3)

IMPROVEMENT 2015

11. a) Which of the following is the contrapositive of the statement $p \Rightarrow q$?
- i) $q \Rightarrow p$ ii) $\sim p \Rightarrow \sim q$
 iii) $\sim q \Rightarrow \sim p$ iv) $p \Rightarrow \sim q$ (1)
- b) Prove by contrapositive method, “If x is an integer and x^2 is also even. (3)

MARCH 2015

12. a) Write the negation of the statement
 “ $\sqrt{7}$ is rational”. (1)
- b) Prove that “ $\sqrt{7}$ is rational” by the method of contradiction. (3)

IMPROVEMENT 2014

13. a) Write the negation of the statement: “the sum of 3 and 4 is 7”. (1)
- b) Write the component statements of
 “Chandigarh is the capital of Haryana and Uttar Pradesh”. (1)

- c) Write the converse of the statement “if a number n is even, then n^2 is even. (2)

MARCH 2014

14. a) Write the negation of the statement:
 “ $\sqrt{5}$ is not a complex number”. (1)
- b) Verify by the method of contradiction:
 “ $\sqrt{2}$ is rational”. (3)

IMPROVEMENT 2013

15. a) Write the contra positive of the statement:
 “If x is a prime number, then x is odd”. (1)
- b) Verify by the method of contradiction:
 $p : \sqrt{5}$ is irrational”. (3)

MARCH 2013

16. a) Write the negation of the following statement:
 “All triangles are not equilateral triangle”. (1)
- b) Verify by the method of contradiction.
 $p : \sqrt{7}$ is irrational”. (3)

IMPROVEMENT 2012

17. Verify by the method of contradiction:
 $p : \sqrt{2}$ is irrational”. (4)

MARCH 2012

18. Consider the statement:
 “If x is an integer and x^2 is even, then x is also even”.
- a) Write the converse of this statement. (1)
- b) Prove the statement by the contra-positive method. (3)

IMPROVEMENT 2011

19. Consider the statement, “If n is an odd natural number, then n is an odd natural number”.
- a) Write its contrapositive. (1)
 - b) Prove the contrapositive. (3)

MARCH 2011

20. a) Write the converse of the statement:
“If a number n is even, then n^2 is even”. (1)
- b) Verify by the method of contradiction:
“ $\sqrt{2}$ is irrational”. (3)

IMPROVEMENT 2010

21. a) Write the converse of the statement:
 p : If a divides b then b is a multiple of a . (1)
- b) Consider the compound statement.
 p : $2+2$ is equal to 4 or 6 (1)
- c) Is the compound statement true? Why? (2)

MARCH 2010

22. i) Write the negation of the statement:
“Both the diagonals of a rectangle have the same length”. (1)
- ii) Prove that the statement:
“Product of two odd integers is odd.” by proving its contra-positive”. (3)

IMPROVEMENT 2009

23. a) Write the contra-positive of the following statement: “If a triangle is equilateral, it is isosceles”. (1)
- b) Check whether the following statement is true

or false by contra-positive method: “If x and y are odd integers, then xy is odd”. (3)

MARCH 2009

24. a) Write the negation of the following statement:
“Both the diagonals of a rectangle have the same length”. (1)
- b) Verify the method of contradiction that
 $\sqrt{2}$ is irrational. (4)

