



# MATHS

## BOOKS - NCERT MATHS (HINGLISH)

### MATHEMATICAL REASONING

#### Short Answer Type Questions

1. Which of the following sentences are statement ? Justify

(i) A triangle has three sides.

(ii) 0 is a complex number.

(ii) Sky is red.

(iv) Every set is an infinite set.

(v)  $15 + 8 > 23$ .

(vi)  $y + 9 = 7$

(vii) Where is your bag?

(viii) Every square is a rectangle.

(ix) Sum of opposite angles of a cyclic quadrilateral is  $180^\circ$ .

(x)  $\sin^2 x + \cos^2 x = 0$



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2. Find the components of the following compound statements.

(i) Number 7 is prime and odd.

(ii) Chennai is in India and is the capital of Tamil Nadu.

(iii) The number 100 is divisible by 3, 11 and 5

(iv) Chandigarh is the capital of Haryana and UP.

(v)  $\sqrt{7}$  is a rational number or an irrational number.

(vi) 0 is less than every positive integer and every negative integer .

(vii) Plants use sunlight, water and carbon

dioxide for photosynthesis.

(viii) Two lines in a plane either intersect at one point or they are parallel .

(ix) A rectangle is a quadrilater or a 5 sided polygon.



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3. Write the component statement of the following compound statements and check whether the compound statement is true or false.

(i) 57 is divisible by 2 or 3 .

(ii) 24 is a multiple of 4 and 6.

(ii) All living things have two eyes and two legs.

(iv) 2 is an even number and a prime number.



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**4.** Write the negative on the following simple statements.

(i) The number 17 is not prime.

(ii)  $2 + 7 \neq 6$ .

(iii) violets are not blue .

(iv)  $\sqrt{5}$  is not a rational number .

(v) 2 is a prime number .

(vi) Every real number is not an irrational number .

(vii) Cow has not four legs .

(viii) A leap year has not 366 days.

(ix) There exist similar triangles which are not congruent.

(x) Area of a circle is not same as the perimeter of the circle.



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5. Translate the following statement into symbolic into symbolic form.

(i) Rahul passed in Hindi and English.

(ii)  $x$  and  $y$  are even integers.

(iii) 2, 3 and 6 are factors of 12.

(iv) Either  $x$  or  $x + 1$  is an odd integer.

(v) A number is either divisible by 2 or 3.

(vi) Either  $x = 2$  or  $x = 3$  is a root of  $3x^2 - x - 10 = 0$

(vii) Students can take Hindi or English as an optional paper.



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6. Write down the negative of following compound statements.

(i) All rational numbers are real and complex.

(ii) All real numbers are rationals or irrationals

.

(iii)  $x=2$  and  $x=3$  are roots of the quadratic equation  $x^2 - 5x + 6 = 0$

(iv) A triangle has either 3-sides or 4- sides.

(v) 35 is a prime number or a composite number .

(vi) All prime integers are either even or odd.



(viii)  $|x|$  is equal to either  $x$  or  $-x$ .

(viii) 6 is divisible by 2 and 3.



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7. Rewrite each of the following statements in the form of conditional statements.

The square of an odd number is odd.

(ii) You will get a sweet dish after the dinner.

(iii) You will fail, if you will not study.

(iv) The units digit of an integer is 0 or 5 if it is not prime.

(v) The square of a prime number is not prime

.

(vi)  $2b = a + c$ , if  $a$ ,  $b$  and  $c$  are in AP.



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**8.** From the biconditional statement  $p \leftrightarrow q$ ,

where.

(i)  $p$ : The units digits of an interger is zero.

$q$ : It is divisble by 5.

(ii)  $p$ : A Natural number is  $n$  not divisible by 2.

$q$ : Natyral number  $n$  is not divisible by 2.

(iii) p: A triangle is an equilateral triangle .

q: All the three sides of a triangle are equal.



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9. Write down the contrapositive of the following statements.

(i) If  $x = y$  and  $y = 3$ , then  $x = 3$  .

(ii) If  $n$  is a natural number then  $n$  is an integer.

(iii) If all the three side of a triangle are equal, then the triangle is equilateral.

(iv) If  $x$  and  $y$  are negative integers, then  $xy$  is positive.

(v) If natural number  $n$  is divisible 6 by then is divisible by 2 and 3.

(vi) If it snows, then the weather will be cold.

(vii) If  $x$  is a real number such that  $0 < x < 1$ , then  $x^2 < 1$



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**10.** Write down the converse of following statements.

(i) If the rectangle 'R' is a square, then R is a rhombus,

(ii) If today is Monday then tomorrow is Tuesday,

(iii) If you go to Monday, then you must visit Taj Mahal.

(iv) If sum of square of two sides of a triangle is equal to the square of third side of a triangle is right angled.

(v) If all three angles of a triangle are equal, then the triangle is equilateral.

(vi) If  $x : y = 3 : 2$ , then  $2x = 3y$

(vii) If S is a cyclic quadrilateral, then the

opposite angles of  $S$  are supplementary.

(viii) If  $x$  is zero, then is neither positive nor negative.

(ix) If two triangles are similar, then the ratio of their corresponding sides are equal.



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**11.** Identify the quantifiers in the following statements.

(i) There exists a triangle which is not equilateral.

(ii) For all real numbers  $x$  and  $y$ ,  $xy = yx$ .

(iii) There exists a real number which is not a rational number .

(iv) For every natural number which  $x$ ,  $x + 1$  is also a natural number.

(v) For all real number  $x$  with  $x > 3$ ,  $x^2$  is greater than 9.

(vi) There exist a traingle which is not an isosceles traingle.

(vii) For all negative  $x$ ,  $x^3$  is also a negative integers.

(viii) There exists a statements in above statements which is not true.

(ix) There exists an even prime number other than 2.

(x) There exists a real number  $x$  such that  $x^2 + 1 = 0$



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**12.** Prove by direct method that for any integer 'n',  $n^3 - n$  is always even.



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**13.** Check validity of the following statement.

(i)  $p$  : 125 is divisible by 5 and 7.

(ii)  $q$ : 131 is a multiple of 3 or 11.



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**14.** Prove the following statement by contradiction method

$p$  : The sum of an irrational number and a rational number is irrational .



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**15.** Prove by direct method that for any real number  $x, y$  if  $x = y$  then  $x^2 = y^2$ .



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**16.** Using contrapositive method prove that, if  $n^2$  is an even integer, then  $n$  is also an even integer.



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## Objective Type Questions

1. Which of the following is a statement ?

A.  $x$  is a real number

B. Switch off the fan

C. 6 is a natural number

D. Let me go

**Answer: C**



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2. Which of the following is not a statement.

A. Smoking is injurious to health

B.  $2+2 = 4$

C. 2 is the only even prime number

D. Cone here

**Answer: D**



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3. The connective in the statement

$2 + 7 > 9$  or  $2 + 7 < 9$  is

A. and

B. or

C.  $>$

D.  $<$

**Answer: B**



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4. The connective in the statement "Earth revolves round the Sun and Moon is a satellite of earth " is

A. or

B. Earth

C. Sun

D. and

**Answer: D**



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5. The negative of the statement "A circle is an ellipse" is

- A. An ellipse is a circle
- B. An ellipse is not a circle
- C. A circle is not ellipse
- D. A circle is an ellipse

**Answer: C**



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6. The negative of the statement "7 is greater than 8" is

A. 7 is equal to 8

B. 7 is not greater than 8

C. 8 is less than 8

D. None of these

**Answer: B**



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7. The negation of the statement "72 is divisible by 2 and 3" is

A. 72 is not divisible by 2 and 72 is not divisible by 3.

B. 72 is not divisible by 2 or 72 is not divisible by 3

C. 72 is not divisible by 2 and 72 is divisible by 3.

D. 72 is not divisible by 2 and 72 is divisible

**Answer: B**



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8. The negation of the statement "Plants take in  $CO_2$  and given out  $O_2$  "

A. Plants do not take in  $CO_2$  and not given out  $O_2$ .

B. Plants do not take in  $CO_2$  or do not give out  $O_2$

C. Plants take in  $CO_2$  and do not give out  $O_2$ .

D. plants take in  $CO_2$  or do not gives out

$O_2$

**Answer: B**



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9. The negative of the statement "Rajesh or Rajni lived in Bengaluru" is

A. Rajes did not Live in Bangalur or Rajesh lives in Bengaluru.

B. Rajesh lives in Bangluru and Rajni lives in  
Bangalur

C. Rajesh did not live in Bangaluru and Rajn  
did not live in Bangaluru

D. Rajesh did not live in Bangaluru or Rajni  
did not live in Bangluru

**Answer: C**



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10. The negation of the statement "101 is not multiple of 3" is

- A. 101 is a multiple 3
- B. 101 is a multiple of 2
- C. 101 is an odd number
- D. 101 is an greater than 5

**Answer: A**



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11. The contrapositive of the statement

"If 7 is greater than 5, then 8 is greater than 6"

is

A. If 8 is greater than 6, then 7 is greater

than 5

B. If 8 is not greater than 6 then 7 greater

than 5

C. If 8 is not greater than 6, then 7 is

greater tha 5

D. If 8 is greater than 6, then 7 is not greater than 5

**Answer: C**



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**12.** The converse of the statement "If  $x > y$ , then  $x + a > y + a$ " is

A. If  $x < y$ , then  $x + a < y + a$

B. If  $x + a > y + a$ , then  $x > y$

C. if  $x < y$ , then  $x < y + a$

D. If  $x > y$ , then  $x + a < y + a$

**Answer: B**



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**13.** The converse of the statement "If sun is not shining, then sky is filled with clouds " is

A. if Sky is filled with clouds, then the Sun is not shining



B. If Sun is shining, then sky is filled with clouds

C. If sky is clear, then Sun is shining

D. None of these

**Answer: A**



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**14.** The contrapositive of the statement "if  $p$ , then  $q$ ", is

A. if  $q$  , then  $p$

B. if  $p$ , then  $\sim q$

C. if  $\sim q$ . then  $\sim p$

D. if  $\sim p$ , then  $\sim q$

**Answer: C**



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**15. The statement "If  $x^2$  is not even, then  $x$  is not even" is converse of the statement**

A. If  $x^2$  is odd, then  $x$  is even

B. If  $x$  is not even, then  $x^2$  is not even

C. If  $x$  is even, then  $x^2$  is even

D. If  $x$  is odd, then  $x^2$  is even

**Answer: B**



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**16. The contrapositive of statement 'If Chandigarh is capital of Punjab, then Chandigarh is in India' is**

**A. if Chandigarh is not in India, then**

**Chandigarh is not the of punjab**

**B. if Chandigarh is in India is India, the**

**chandigarh is not the capital of Punjab**

**C. if Chandigarh is notcapital of Punjab ,**

**then Chandigarh is not capital of India.**

**D. If Chandigarh is not Capital of Punjab,**

**then Chandigarh is not is India.**

**Answer: A**



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17. Which of the following is the conditional

$$p \rightarrow q?$$

A. q is sufficient for p

B. p is necessary for q

C. p only if q

D. if q then p

**Answer: C**



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18. The negative of the statement "The product of 3 and 4 is 9" is

A. it is false that the product of 3 and 4 is 9

B. the product of 3 and 4 is 12

C. the product of 3 and 4 is not 12

D. it is false that the product of 3 and 4 is  
not 9

**Answer: A**



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**19. Which of the following is not a negative of**

**"A nature number is greater than zero"**

**A. A natural number is not greater than  
zero**

**B. It is false that a natural number is  
gerater than zero**

**C. It is false that a natural number is not  
greater than zero**

**D. None of the above**

**Answer: C**



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**20. Which of the following statement is a conjunction ?**

**A. Ram and Shyam are friends**

**B. Both Ram and Shyam are tall**

**C. Both Ram and Shyam are enemies**

**D. None of the above**



**Answer: D**



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**21. State whether the follownig sentence are statements or not**

**(i) The angle oppostie to equal sides of a triangle are equal**

**(ii) The moon is a satellites of Earth.**

**(iii) May God bless you**

**(iv) Asia is a continent.**

**(v) How are you?**



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