



MATHS

BOOKS - KUMAR PRAKASHAN KENDRA

MATHS (GUJRATI ENGLISH)

MATHEMATICAL REASONING

Practice Work

1. Which of the following sentences are statement? Give reason for your answer:

Sun is star.



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2. Which of the following sentences are statement? Give reason for your answer:

$$x + 3 = 17$$



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3. Which of the following sentences are statement? Give reason for your answer:

6 has three prime factors.



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4. Which of the following sentences are statement? Give reason for your answer:

Open the door.



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5. Which of the following sentences are statement? Give reason for your answer:

Who are you?



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6. Which of the following sentences are statement? Give reason for your answer:

All prime numbers are eve numbers.



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7. Which of the following sentences are statement? Give reason for your answer:

Sum of two positive numbers is positive numbers.



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8. Which of the following sentences are statement? Give reason for your answer:

May God bless you!



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9. Which of the following sentences are statement? Give reason for your answer:

What is your name?



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10. Which of the following sentences are statement? Give reason for your answer:

$\sqrt{2}$ is a real number.



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11. Write Negation of the following statements: 11 is a prime number.



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12. Write Negation of the following statements: In leap year there are 366 days.



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13. Write Negation of the following statements: Each rectangle is a parallelogram.



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14. Write Negation of the following statements: Mathematics is the queen of sciences.



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15. Write Negation of the following statements: Cube is a plane figure.



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16. Write Negation of the following statements: Christmas is celebrated on 25th December.



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17. Write Negation of the following statements: George Cator developed set theory.



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18. Write Negation of the following statements: Area of square is given by formula

$$A = \pi r^2.$$



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19. Find component statement of the following compound statements and check whether they are true or false.

Kanpur city is in India and $7 \times 5 = 35$



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20. Find component statement of the following compound statements and check whether they are true or false.

Gujarat is a state of India or Ahmedabad is in Maharashtra.



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21. Find component statement of the following compound statements and check whether they are true or false.

5 is an integer and $5^2 = 25$



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22. Find component statement of the following compound statements and check

whether they are true or false.

$$(30)^2 = 9 \text{ and } (-3)^2 = 9$$



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23. Find component statement of the following compound statements and check whether they are true or false.

Socrates was mathematician OR Socrates was philosopher.



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24. For each of the following compound statements first identify the connecting words and then break it into component statements:

$$3 + 4 = 7 \text{ and } 2 + 2 = 4$$



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25. For each of the following compound statements first identify the connecting words and then break it into component statements:

There are 5 days in a week or there are 24 hours in a day.



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26. For each of the following compound statements first identify the connecting words and then break it into component statements:

$$(1)^2 = 1 \text{ or } (1)^3 = 1$$



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27. For each of the following compound statements first identify the connecting words

and then break it into component statements:

Gandhiji was born in Porbandar and

Porbandar is in Gujarat.



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28. For each of the following compound

statements first identify the connecting words

and then break it into component statements:

Triangle has three sides and three angles.



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29. Give negation of the followings:

All primes are odd.



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30. Give negation of the followings:

There exists a number which is equal to its cube.



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31. Give negation of the followings:

Every natural number is an integer.



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32. Give negation of the followings:

There exists a rectangle whose both sides are equal.



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33. Give negation of the followings:

For each prime number p , \sqrt{p} is irrational number.



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34. Find the component statements of the following compound statements:

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



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35. State whether word or is used in following statement is Exclusive or Inclusive.

Proof at identity is Pancard or Bank passbook.



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36. For each of the following statements, determine whether an inclusive Or or exclusive or is used. Give reasons for your answer:

The school is closed if it is a holiday or a Sunday.



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37. In following statement 'OR' is used in inclusive sense. "Roses are yellow or pink "



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38. State whether word or is used in following statement is Exclusive or Inclusive.

Pizza is serve with cold drink or cold cofee.



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39. Write contrapositive and converse of the following statements:

If Sanjay does not give examination he will fail.



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40. Write contrapositive and converse of the following statements:

If $a^2 = b^2$ then $a = \pm b (a, b \in R)$



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41. Write contrapositive and converse of the following statements:

If 30 divides n then 2 divides n .



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42. Write contrapositive and converse of the following statements:

If $\square ABCD$ is a square then its diagonals are congruent.



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43. Write contrapositive and converse of the following statements:

If it rains then roads are wet.



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44. Write contrapositive and converse of the following statements:

If Mohan work hard continuously then he is good student.



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45. Write each of the following statements in the form of if then:

To get sweets Ram has to take lunch.



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46. Write each of the following statements in the form of if then:

Tara goes to presidential house indicates that
Tara is in Delhi.



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47. Write the contrapositive of the following statement:

if a triangle is equilateral, it is isosceles.



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48. Using direct method prove that if $x, y \in \mathbb{N}$ and x, y are odd then xy is also odd.



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49. Show that by counter example that following statement is not true.

If x is an even integer then x is a prime number.



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50. Which of the following statements are true and which are false?

$p:20$ is the multiple of 4 and 5.



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51. Which of the following statements are true and which are false?

q:30 is multiple of 8.



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52. Which of the following statements are true and which are false?

r:All factor of 6 are prime.



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53. Which of the following statements are true and which are false?

s: If x and y are odd then xy is odd.



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54. Give converse of the following statement:

Science and mathematics are useful for development.



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55. Give converse of the following statement:

if $2 + 3 = 5$ then $8 < 10$.



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56. Give converse of the following statement:

If $7 > 4$ then $6 < 7$.



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57. Give converse of the following statement:

if i will be doctor then I will open hospital.



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58. Give converse of the following statement:

If A and B are equal sets then $A \subset B$ and
 $B \subseteq A$



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59. Give converse of the following statement:

If $7 < 5$ then 7 is not prime number.



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60. Give negation of the following statement:

Some even integers are prime number.



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61. Give negation of the following statement:

All Mathematician are man.



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62. Give converse and contrapositive of following statement:

If it is Friday, I will go to watch a new movie.



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63. Give converse and contrapositive of following statement:

If x is negative x^2 is positive.



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64. Give converse and contrapositive of following statement:

If $(x - a)$ is the factor of polynomial $p(x)$ then $p(a) = 0$.



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65. Give converse and contrapositive of following statement:

It is raining out side, you must have an Umbrella.



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66. Give converse and contrapositive of following statement:

If x and y are negative x . y is positive.



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67. Write the truth value of the following statement:

80 is the multiple of 5 and 4.



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68. Write the truth value of the following statement:

If x and y are negative integers then so xy positive.



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69. Write the truth value of the following statement:

Sum of measure of an angle of triangle is 180°
or 360°



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70. Write the truth value of the following statement:

1 and 2 are roots of the equation

$$x^2 - 3x + 2 = 0.$$



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71. Write the truth value of the following statement:

$$1^3 = 1 \text{ or } 3^2 = 9$$



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72. Show that the statement if $x^5 + 16x = 0$ then $x = 0$ is true by (i) Direct method (ii) Method of contrapositive and (iii) Method of contradiction.



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73. Using method of contradiction prove that $\sqrt{2}$ is irrational.



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Exercise 14 1

1. Which of the following sentences are statements? Give reasons for your answer:

There are 35 days in a month.



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2. Which of the following sentences are statements? Give reasons for your answer:

Mathematics is difficult.



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3. Which of the following sentences are statements? Give reasons for your answer:

The sum of 5 and 7 is greater than 10.



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4. Which of the following sentences are statements? Give reasons for your answer:

The square of a number is an even number.



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5. Which of the following sentences are statements? Give reasons for your answer:

The sides of a quadrilateral have equal length.



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6. Which of the following sentences are statements? Give reasons for your answer:

Answer this question.



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7. Which of the following sentences are statements? Give reasons for your answer:

The product of (-1) and 8 is 8 .



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8. Which of the following sentences are statements? Give reasons for your answer:

The sum of all interior angles of a triangle is 180°



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9. Which of the following sentences are statements? Give reasons for your answer:

Today is a windy day.



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10. Which of the following sentences are statements? Give reasons for your answer:

All real numbers are complex numbers.



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11. Which of the following sentences are statements? Give reasons for your answer:

Mathematics is a fun.



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12. Which of the following sentences are statements? Give reasons for your answer:

What a beautiful scene!



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13. Which of the following sentences are statement? Give reason for your answer:

Open the door.



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Exercise 14 2

1. Write the negation of the following statements:

Chennai is the capital of Tamil Nadu.



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2. Write the negation of the following statements:

$\sqrt{2}$ is not a complex number.



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3. Write the negation of the following statements:

All triangles are not equilateral triangle.



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4. Write the negation of the following statements:

The number 2 is greater than 7.



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5. Give negation of the followings:

Every natural number is an integer.



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6. Are the following pairs of statements negations of each other:

The number x is not a rational number.

The number x is a rational number.



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7. Are the following pairs of statements negations of each other:

The number x is not a rational number.

The number x is a rational number.



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8. Find the component statements of the following compound statements and check whether they are true or false:

Number 3 is prime or it is odd.



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9. Find the component statements of the following compound statements and check

whether they are true or false:

All integers are positive or negative.



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10. Find the component statements of the following compound statements and check whether they are not or false:

100 is divisible by 3,11 and 5.



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Exercise 14 3

1. For each of the following compound statements first identify the connecting words and then break it into component statements:

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



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2. For each of the following compound statements first identify the connecting words

and then break it into component statements:

Square of an integer is positive or negative.



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3. For each of the following compound statements first identify the connecting words and then break it into component statements:

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



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4. For each of the following compound statements first identify the connecting words and then break it into component statements:

$x=2$ and $x=3$ are the roots of the equation

$$3x^2 - x - 10 = 0.$$



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5. Identify the quantifier in the following statements and write the negation of the statements:

There exists a number which is equal to its square.



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6. Identify the quantifier in the following statements and write the negation of the statements:

For every real number x , x is less than $x + 1$



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7. Identify the quantifier in the following statements and write the negation of the statements:

There exists a capital for every state in India.



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8. 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 number x and y for which

$$x+y=y+x$$



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9. 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 number x and y for which

$$x+y=y+x$$



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10. State whether the or used in the following statements is exclusive or inclusive. Give reasons for your answer:

Sun rises or Moon sets.



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11. State whether the or used in the following statements is exclusive or inclusive. Give reasons for your answer:

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



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12. State whether the or used in the following statements is exclusive or inclusive. Give

reasons for your answer:

All integers are positive or negative.



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Exercise 14 4

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.



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2. Write the contrapositive and converse of the following statements:

If x is a prime number, then x is odd.



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3. Write the contrapositive and converse of the following statements:

If the two lines are parallel, then they do not intersect in the same plane.



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4. Write the contrapositive and converse of the following statements:

Something is cold implies that it has low temperature.



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5. Write the contrapositive and converse of the following statements:

You cannot comprehend geometry if you do not know how to reason deductively.



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6. Write the contrapositive and converse of the following statements:

x is an even number implies that x is divisible by 4.



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7. Write each of the following statements in the form if then:

You get a job implies that your credentials are good.



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8. Write each of the following statements in the form if then:

The banana trees will bloom if it stays warm for a month.





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9. Write each of the following statements in the form if then:

A quadrilateral is a parallelogram if its diagonals bisect each other.



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10. Write each of the following statements in the form if then:

To get an A+ in the class, it is necessary that you do all the exercises of the book.



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11. Given statements (a) and (b). Identify the statements given below as contrapositive or converse of each other.

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.



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12. Given statements in a and b. Identify the statements given below as contrapositive or converse of each other.

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 the quadrilateral bisect each other then it is a parallelogram.



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Exercise 14 5

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



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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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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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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.





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5. Which of the following statements are true and which are false? In each case given a valid reason for saying so:

(i) p: Each radius of a circle is a chord of the circle.



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6. Which of the following statements are true and which are false? In each case given a valid

reason for saying so:

q: The centre of a circle bisects each chord of the circle.



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7. Which of the following statements are true and which are false? In each case given a valid reason for saying so:

r: Circle is a particular case of an ellipse.



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8. Which of the following statements are true and which are false? In each case given a valid reason for saying so:

s : If x and y are integers such that $x > y$ then $-x < -y$.



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9. Which of the following statements are true and which are false? In each case given a valid reason for saying so:

t : $\sqrt{11}$ is a rational number.



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Miscellaneous Exercise 14

1. Write the negation of the following statements:

p : For every positive real number x the number $x - 1$ is also positive.



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2. Write the negation of the following statements:

q: All cats scratch.



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3. Write the negation of the following statements:

r: For every real number x such that $x > 1$ or $x < 1$.



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4. Write the negation of the following statements:

s: There exists a number x such that $0 < x < 1$



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5. State the converse and contrapositive of each of the following statements:

p: A positive integer is prime only if it has no divisors other than 1 and itself.



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6. State the converse and contrapositive of each of the following statements:

q: I go to a beach whenever it is a sunny day.



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7. State the converse and contrapositive of each of the following statements:

r: If it is hot outside, then you feel thirsty.





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8. Write each of the statement in the form if p , then q :

p : It is necessary to have a password to log on the server.



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9. Write each of the statement in the form if p , then q :

q : There is traffic jam whenever it rains.



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10. Write each of the statement in the form if p , then q :

r : You can access the website only if you pay a subscription fee.



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11. Rewrite each of the following statements in the form p if and only if q :

p: If you watch television, then your mind is free and if your mind is free, then you watch television.



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12. Rewrite each of the following statements in the form p if and only if q :

q : For you to get an A grade, it is necessary and sufficient that you do all the homework regularly.



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13. Rewrite each of the following statements in the form p if and only if q :

r : If a quadrilateral is equiangular, then it is a rectangle and if a quadrilateral is a rectangle, then it is equiangular.



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14. Given below we 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.



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15. Check the validity of the statements given below by the method given against it:

p: The sum of an irrational number and a rational number is irrational (by contradiction method)



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16. Check the validity of the statements given below by the method given against it:

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



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17. Write the following statement in five different ways, conveying the same meaning.

p: If a triangle is equiangular, then it is an obtuse angled triangle.



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Textbook Based Mcqs

1. Which of the following is not statement.

A. $2 \times 3 = 6$

B. $2 \times 4 \neq 8$

C. Let the truth win !

D. Square of an odd number of odd

Answer: C



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2. Converse of the statement if $x^2 = y^2$ then $x = y$ is

A. If $x^2 = y^2$ then $x \neq y$

B. If $x = y$ then $x^2 = y^2$

C. If $x \neq y$ then $x^2 = y^2$

D. If $x^2 \neq y^2$ then $x = y$

Answer: B



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3. The contrapositive of $p \Rightarrow q$ is

A. $q \Rightarrow p$

B. $\sim q \Rightarrow \sim p$

C. $p \Rightarrow \sim q$

D. $\sim p \Rightarrow q$

Answer: B



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4. The negation of for all x, p , is ...

A. there exists $x, \sim p$

B. For all $x, \sim p$

C. $\sim p$

D. p

Answer: A



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5. Biconditional $p \Leftrightarrow q$ is ..

A. Conjunction of $p \Rightarrow q$ and $q \Rightarrow p$

B. Disjunctionn $p \Rightarrow q$ and $q \Rightarrow p$

C. Converse of $p \Rightarrow q$

D. Contrapositive of $q \Rightarrow p$

Answer: A



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6. $p \wedge q$ is valid (true) is

A. p and q are true

B. p and q are false

C. p is true and q is false

D. p is false and q is true

Answer: A



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7. $p \vee q$ is false if...

- A. p and q are true
- B. p and q are false
- C. p is true and q is false
- D. p is false and q is true

Answer: C



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8. $p \Rightarrow q$ is false when .

A. p and q are true

B. p and q are false

C. p is true and q is false

D. p is false and q is true

Answer: C



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9. $\sim p \Rightarrow \sim q$ is false when.....

A. p and q are true

B. p and q are false

C. p is true and q is false

D. p is false and q is true

Answer: D



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10. $\sim(p \text{ or } q) = \dots$

A. p and q

B. $(\sim p)$ and $(\sim q)$

C. $(\sim p)$ or $(\sim q)$

D. p or $(\sim q)$

Answer: B



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11. $\sim(p \text{ and } q) = \dots\dots\dots$

A. p or q

B. $(\sim p)$ and $(\sim q)$

C. $(\sim p)$ and q

D. $(\sim p)$ or $(\sim q)$

Answer: B



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12. If p : Number of factors of 20 are 5.

q : 2 is even prime number.

Then validity of $p \Rightarrow q$ and validity of contrapositive statement is

A. T,T

B. F,F

C. T,F

D. F,T

Answer: D



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13.of the following is logically equivalent statement of $\sim(\sim p \Rightarrow q)$

A. $p \wedge q$

B. $p \wedge \sim q$

C. $\sim p \wedge q$

D. $\sim p \wedge \sim q$

Answer: D



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14. $\sim(\sim p \Leftrightarrow q) = \dots\dots\dots$

A. $\sim p \wedge \sim q$

B. $\sim p \vee \sim q$

C. $(p \wedge \sim q) \vee (\sim p \wedge q)$

D. $(p \wedge \sim q) \wedge (\sim p \wedge q)$

Answer: C



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15. If $p \Rightarrow (q \vee r)$ has validity F then validity of statement p, q and r isrespectively.

A. F,T,T

B. T,T,F

C. T,F,F

D. F,F,F

Answer: C



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16.of the following is converse of the contrapositive statement of the conditional statement $p \Rightarrow \sim q$

A. p implies q

B. $\sim p$ implies $\sim p$

C. $\sim q \Rightarrow p$

D. $\sim p$ implies q

Answer: D



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17. The negation of $p \wedge (q \Rightarrow \sim r)$ is

A. $\sim p \wedge (q \wedge r)$

B. $p \vee (q \vee r)$

C. $p \vee (q \wedge r)$

D. $\sim p \vee (q \wedge r)$

Answer: D



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18. Which of the following statement is true?

A. Nalia is in Kutch and $2 + 2 = 4$

B. Nalia is in Rajasthan and $2 + 12 = 5$

C. Nalia in Maharashtra and $12 + 4 = 16$

D. Nalia is in A.P. and $2 + 7 = 10$

Answer: A



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Text Book Illustrations For Practice Work

1. Check whether the following sentences are statements. Give reasons for your answer.

8 is less than 6.



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2. Check whether the following sentences are statements. Give reasons for your answer.

Every set is a finite set.



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3. Which of the following sentences are statements? Give reason for your answer:

Sun is star.



[Watch Video Solution](#)

4. Which of the following sentences are statements? Give reasons for your answer:

Mathematics is a fun.



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5. Check whether the following sentences are statements. Give reasons for your answer.

There is no rain without clouds.



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6. Check whether the following sentences are statements. Give reasons for your answer.

How far is Chennai from here?



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7. Write the negation of the following statements.

(i) Both the diagonals of a rectangle have the same length.



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8. Write the negation of the following statement.

$\sqrt{7}$ is rational.



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9. Write the negation of the following statements and check whether the resulting statements are true:

Australia is a continent.



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10. Write the negation of the following statements and check whether the resulting statements are true:

There does not exist is quadrilateral which has all its sides equal.



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11. Write the negation of the following statements and check whether the resulting statements are true:

Every natural number is greater than 0.



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12. Write the negation of the following statements and check whether the resulting statements are true:

The sum of 3 and 4 is 9.



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13. Find the component statements of the following compound statements:

The sky is blue and the grass is green.



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14. Find the component statements of the following compound statements:

It is raining and it is cold.



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15. Find the component statements of the following compound statements:

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



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16. Find the component statements of the following compound statements:

0 is a positive number or a negative number.



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17. Find the component statements of the following and check whether they are true or not:

A square is a quadrilateral and its four sides equal.



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18. Find the component statements of the following and check whether they are true or not:

All prime numbers are either even or odd.



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19. Find the component statements of the following and check whether they are true or not:

A person who has taken Mathematics or computer Science can go for MCA.



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20. Find the component statements of the following and check whether they are true or

not:

Chadigarh is the capital of Haryana and UP.



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21. Find the component statements of the following and check whether they are true or

not:

$\sqrt{2}$ is a rational number or an irrational number.



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22. Find the component statements of the following and check whether they are true or not:

24 is a multiple of 2,4, and 8.



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

A line is straight and extends indefinitely in both directions.



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

0 is less than every positive integer and every negative integer.



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

All living things have two legs and two eyes.



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26. For each of the following statements, determine whether an inclusive Or or exclusive or is used. Give reasons for your answer:

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



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27. For each of the following statements, determine whether an inclusive Or or exclusive or is used. Give reasons for your answer:

The school is closed if it is a holiday or a Sunday.



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28. For each of the following statements, determine whether an inclusive Or or exclusive or is used. Give reasons for your answer:

Two lines intersect at a point or are parallel.



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29. For each of the following statements, determine whether an inclusive Or or exclusive or is used. Give reasons for your answer:

Students can take French or Sanskrit as their third language.



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30. Identify the type of Or used in the following statements and check whether the statements are true or false:

$\sqrt{2}$ is a rational number or an irrational number.



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31. Identify the type of Or used in the following statements and check whether the statements are true or false:

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



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32. Identify the type of Or used in the following statements and check whether the

statements are true or false:

A rectangle is a quadrilateral or a 5-sided polygon.



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33. Write the contrapositive of the following statement:

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



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34. Write the contrapositive of the following statement:

If you are born in India, then you are a citizen of India.



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35. Write the contrapositive of the following statement:

if a triangle is equilateral, it is isosceles.



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36. Write the converse of the following statements:

If a number n is even, then n^2 is even.



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37. Write the converse of the following statements:

If you do all the exercises in the book, you get an A grade in the class.



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38. Write the converse of the following statements:

If two integers a and b are such that $a > b$, then $a - b$ is always a positive integer.



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39. For each of the following compound statements, first identify the corresponding component statements. Then check whether the statements are true or not:

If a triangle ABC is equilateral, then it is isosceles.



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40. For each of the following compound statements, first identify the corresponding component statements. Then check whether the statements are true or not:

If a and b are integers, then ab is a rational number.



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41. Given below are two pairs of statements.

Combine these two statements using if and only if.

p: If a rectangle is 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.



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42. Given below are two pairs of statements.

Combine these two statements using if and only if.

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.



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43. Check whether the following statement is true or not:

If $x, y \in \mathbb{Z}$ are such that x and y are odd, then xy is odd.



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44. Check whether the following statement is true or not:

If $x, y \in \mathbb{Z}$ are such that x and y are odd, then xy is odd.





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45. Prove that $\sqrt{7}$ is irrational.



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



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47. Check 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.



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48. Write the negation of the following statements:

p: For every real number x , $x^2 < x$.



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49. Write the negation of the following statements:

q: There exists a rational number x such that

$$x^2 = 2$$



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50. Write the negation of the following statements:

r: All birds have wings.



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51. Write the negation of the following statements:

s: All students study mathematics at the elementary level.



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52. 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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53. 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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Solution Of Ncert Exemplar Problems Short Answer Type Questions

1. Which of the following sentences are statements ? Justify

A triangle has three sides.



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2. Which of the following sentences are statements ? Justify

0 is a complex number.



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3. Which of the following sentences are statements ? Justify

Sky is red.



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4. Which of the following sentences are statements ? Justify

Every set is an infinite set.



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5. Which of the following sentences are statements ? Justify

$$15 + 8 > 23$$



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6. Which of the following sentences are statements ? Justify

$$y + 9 = 7$$



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7. Which of the following sentences are statements ? Justify

Where is your bag?



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8. Which of the following sentences are statements ? Justify

Every square is a rectangle.



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9. Which of the following sentences are statements ? Justify

Sum of opposite angles of a cyclic quadrilateral is 180°



[Watch Video Solution](#)

10. Which of the following sentences are statements ? Justify

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



Watch Video Solution

11. Find the component statements of the following compound statements:

Number 7 is prime and odd.



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12. Find the component statements of the following compound statements:

Chennai is in India and it is capital of TamilNadu.



Watch Video Solution

13. Find the component statements of the following compound statements:

The number 100 is divisible by 3,11 and 5.



Watch Video Solution

14. Find the component statements of the following compound statements:

Chandigarh is the capital of Haryana and U.P.



Watch Video Solution

15. Find the component statements of the following compound statements:

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



Watch Video Solution

16. Find the component statements of the following compound statements:

0 is less than every positive integer and every negative integer.



Watch Video Solution

17. Find the component statements of the following compound statements:

Plants use sunlight, water and carbon dioxide for photosynthesis.



[Watch Video Solution](#)

18. Find the component statements of the following compound statements:

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



[Watch Video Solution](#)

19. Find the component statements of the following compound statements:

A rectangle is a quadrilateral or a 5 sided polygon.



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

false.

57 is divisible by 2 or 3.



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

24 is a multiple of 4 and 6.



[Watch Video Solution](#)

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

All living things have two legs and two eyes.



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

false.

2 is an even number and a prime number.



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24. Write the negation of the following simple statements.

(i) The number 17 is prime.



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25. Write the negation of the following simple statements.

$$2 + 7 = 6$$



Watch Video Solution

26. Write the negation of the following simple statements.

Violets are blue.



Watch Video Solution

27. Write the negation of the following simple statements.

$\sqrt{5}$ is a rational number.



Watch Video Solution

28. Write the negation of the following simple statements.

2 is not a prime number.



Watch Video Solution

29. Write the negation of the following simple statements.

Every real number is an irrational number.



Watch Video Solution

30. Write the negation of the following simple statements.

cow has four legs.



Watch Video Solution

31. Write the negation of the following simple statements.

A leap year has 366 days.



Watch Video Solution

32. Write the negation of the following simple statements.

All similar triangles are congruent.



Watch Video Solution

33. Write the negation of the following simple statements.

Area of a circle is same as the perimeter of the circle.



Watch Video Solution

34. Translate the following statements into symbolic form:

Rahul passed in Hindi and English.



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35. Translate the following statements into symbolic form:

x and y are even integers.



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36. Translate the following statements into symbolic form:

2, 3 and 6 are factors of 12.



[Watch Video Solution](#)

37. Translate the following statements into symbolic form:

Either 0 or $x + 1$ is an odd integer.



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38. Translate the following statements into symbolic form:

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

.



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39. Translate the following statements into symbolic form:

Students can take Hindi or English as an optional paper.



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40. Write down the negation of following compound statements.

All rational numbers are real and complex.



Watch Video Solution

41. Write down the negation of following compound statements.

All real numbers are rationals or irrationals.



Watch Video Solution

42. Write down the negation of following compound statements.

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



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43. Write down the negation of following compound statements.

A triangle has either 3-sides or 4-sides.



Watch Video Solution

44. Write down the negation of following compound statements.

35 is a prime number or a composite number.



Watch Video Solution

45. Write down the negation of following compound statements.

All prime integers are either even or odd.



Watch Video Solution

46. Write down the negation of following compound statements.

$|x|$ is equal to either x or $-x$.



Watch Video Solution

47. Write down the negation of following compound statements.

6 is divisible by 2 and 3.



Watch Video Solution

48. Rewrite each of the following statements in the form of conditional statements:

The square of an odd number is odd.



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49. Rewrite each of the following statements in the form of conditional statements:

You will get a sweet dish after the dinner.



Watch Video Solution

50. Rewrite each of the following statements in the form of conditional statements:

You will fail, if you will not study.



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51. Rewrite each of the following statements in the form of conditional statements:

The unit digit of an integer is 0 or 5 if it is divisible by 5.



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52. Rewrite each of the following statements in the form of conditional statements:

The square of a prime number is not prime.



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53. Rewrite each of the following statements in the form of conditional statements:

$2b = a + c$ if a, b and c are in A.P.



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54. Form the biconditional statement $p \Leftrightarrow q$.

Where

p : The unit digit of an integer is zero.

q : It is divisible by 5.



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55. Form the biconditional statement $p \Leftrightarrow q$.

Where

p: Natural number n is odd.

q: Natural number n is not divisible by 2.



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56. Form the biconditional statement $p \Leftrightarrow q$.

Where

p: A triangle is an equilateral triangle.

q: All three sides of a triangle are equal.





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57. Write down the contrapositive of the following statements.: If $x = y$ and $y=3$ then $x=3$



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58. Write down the contrapositive of the following statements.:If n is a natural number, then n is an integer.



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59. Write down the contrapositive of the following statements.: If all three sides of a triangle are equal, then the triangle is equilateral.



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60. Write down the contrapositive of the following statements.: If x and y are negative integers, then $x.y$ is positive.



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61. Write down the contrapositive of the following statements.:If natural number n is divisible by 6, then n is divisible by 2 and 3.



[Watch Video Solution](#)

62. Write down the contrapositive of the following statements.: If it snows, then the weather will be cold.



[Watch Video Solution](#)

63. Write down the contrapositive of the following statements: if x is a real number such that $0 < x < 1$, then $x^2 < 1$



Watch Video Solution

64. Write down the converse of following statements:

If a rectangle R is a square then R is a rhombus.



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65. Write down the converse of following statements:

If today is Monday then tomorrow is Tuesday.



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66. Write down the converse of following statements:

If you go to Agra, then you must visit Tajmahal.





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67. Write down the converse of following statements:

If the sum of squares of two sides of a triangle is equal to the square of third side of a triangle, then the triangle is right angled.



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68. Write down the converse of following statements:

If all three angles of a triangles are equal, then the triangle is equilateral.



[Watch Video Solution](#)

69. Write down the converse of following statements:

If $x : y = 3 : 2$ then $2x = 3y$



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70. Write down the converse of following statements:

If S is a cyclic quadrilateral, then the opposite angles fo S are supplementary.



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71. Write down the converse of following statements:

If x is zero then x is neither positive nor negative.





[Watch Video Solution](#)

72. Write down the converse of following statements:

If two triangles are similar then the ratio of their corresponding sides are equal.



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73. Identify the Quantifiers in the following statements:

There exists a triangle which is not equilateral.



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74. Identify the Quantifiers in the following statements:

for all real number x and y , $x \cdot y = y \cdot x$



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75. Identify the Quantifiers in the following statements:

There exists a real number which is not a rational number.



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76. Identify the Quantifiers in the following statements:

For every natural number x , $x + 1$ is also a natural number.



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77. Identify the Quantifiers in the following statements:

For all real numbers x with $x > 3$, x^2 is greater than 9.



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78. Identify the Quantifiers in the following statements:

There exists a triangle which is not an isosceles triangle.





[Watch Video Solution](#)

79. Identify the Quantifiers in the following statements:

for all negative integers x , x^3 is also a negative integers.



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80. Identify the Quantifiers in the following statements:

There exists a statement in above statements which is not true.



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81. Identify the Quantifiers in the following statements:

There exists a even prime number other than 2.



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82. Identify the Quantifiers in the following statements:

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



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



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84. Check the validity of the following statement:

p:125 is divisible by 5 and 7.



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85. Check the validity of the following statement:

p:131 is a multiple of 3 or 11.



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86. Check the validity of the statements given below by the method given against it:

p: The sum of an irrational number and a rational number is irrational (by contradiction method)



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87. Prove by direct method that for any real numbers x, y if $x = y$, then $x^2 = y^2$



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88. Using contrapositive method prove that if n^2 is an even integer, then n is also an even integers.



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Solution Of Ncert Exemplar Problems Objective Type Questions

1.of the following is statement.

A. x is a real number

B. Switch off the fan.

C. 6 is a natural number

D. Let me go

Answer: A::C::D



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2.of the following is not statement.

A. Smoking is injurious to health.

B. $2 + 2 = 4$

C. 2 is the only even prime number

D. Come 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 use 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 negation of the statement p : A circle is an ellipse is

A. An ellipse is an circle.

B. An ellipse is not a circle

C. A circle is not an ellipse

D. A circle is an ellipse

Answer: C



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

A. 7 is equal to 8

B. 6 is not greater than 8

C. 8 is less than 6

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 or 72 is not divisible by 3.

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

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

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

Answer: B



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8. The negation of the following statement is
.....The green plants takes CO_2 in and gives
out O_2

A. Plant do not take CO_2 is and do not give
out O_2

B. Plants do not take 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 give out O_2

Answer: B



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9. The negation of the statement

Rajesh or Rajni lived in Bangalore is.....

A. Rajesh did not live in Bangalore or Rajni lives in Bangalore.

B. Rajesth lives in Bangalore and Rajni did not live in Bangalore.

C. Rajesh did not live in Bangalore and Rajni did not live in Bangalore

D. Rajesh did not live in Bangalore or Rajni did not live in Bangalore.

Answer: C



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10. The negation of the statement

"101 is not a multiple of 3" is....

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

Answer: A::C::D



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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 greater than 6, then y is greater than 5.

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

C. If 8 is not greater than 6, then 7 is not greater than 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 $x + a > y + a^n$ is

A. If $x < y$ then $x + a > y + a$ is

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

C. If $x < y$ then $x + a > y + a$

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, the sky is filled with clouds.

C. If sky is clear, then sun is shining.

D. If sun is not shining, then sky is not filled with clouds

Answer: A::C::D



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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 capital of Punjab.

B. If Chandigarh is in India, then

Chandigarh is Capital of Punjab.

C. If Chandigarh is not capital of Punjab,

then Chandigarh is not capital of India.

D. If Chandigarh is capital of Punjab, then
Chandiagarh is not in India.

Answer: A::C::D



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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 negation 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::C::D



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19. Which of the following is not a negation of
A natural number is greater than zero.

A. A natural number is not greater than zero

B. It is false that a natural number is greater 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 Shayam are friends
- B. Both Ram and Shayam are tall.
- C. Both Ram and Shayam are enemies.
- D. None of the above

Answer: D



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21. State whether the following sentences are statements or not:

A. The angles opposite to equal sides of a triangle are equal.

B. The moon is a satellite of earth.

C. May God bless you!

D. Asia is a continent.

Answer: A



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Question Of Module Knowledge Test

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



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2. 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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