MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MATHEMATICAL REASONING

Example

1. The negation of the statement 6 is divisible by 2 and 3 " is

A. 6 is not divisible by 2 or it is not divisible by 3.

B. 6 is not divisible by 2 and it is not divisible by 3.

C. 6 is no divisible by 2 or 6 is divisible by 3.

D. 6 is divisible by 2 and it is not divisible by 3.

Answer: A

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2. The negation of the statement All prime integers are either even or odd " is

A. 1. All prime integers are not even or all prime integers are not odd.

B. 2. All prime integers are even and all prime integers are not odd .

C. 3. All prime integers are not even or all prime integers are odd.

D. 4. All prime integers are neither are neither even nor odd .

Answer: D

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3. The contrapositive of the statement If x is a prime number then x is odd is

A. 1. If x is odd then x is a prime number.

B. 2. If x is not a prime number then x is not odd .

C. 3. If x is not odd then x is not a preme number.

D. 4. If x is not then x is a prime number.

Answer: C

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4. The converse of the statement If you can vote then you are more than 18 years old is

A. 1. If you are more than 18 year old then you can vote.

B. 2. If you are not more than 18 years old then you cannot vote.

C. 3. If you cannot vote then you are not more than 18 years old.

D. 4. If you are not more than 18 years then you can vote.

Answer: A

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5. Using quantifiers convert each of the following open sentences defined on N, into a true statement.

$x+1 > x$

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6. Using quantifiers convert each of the following open sentences defined on N, into a

true statement.

$x^2 > 0$

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7. Using quantifiers convert each of the following open sentences defined on N, into a true statement.

x+2=7

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8. Using quantifiers convert each of the following open sentences defined on N, into a true statement.

x+5 <8

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9. Let A ={ 2,4,6,8,10} . Determine the truth value of each of the following :

$\forall x \in A$, x is an even number.

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10. Let A ={ 2,4,6,8,10} . Determine the truth value of each of the following :

$\exists x \in A, x$is a prime number.

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11. Let A ={ 2,4,6,8,10} . Determine the truth value of each of the following :

$\forall x \in A, x^2 < 0.$

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12. Let A ={ 2,4,6,8,10} . Determine the truth value of each of the following :

$\exists x \in A,$ such that x is an odd number.

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13. Symbolize the conjunction, "Promod is a boy and Savita is a girl".

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14. Symbolize the disjunction. " We stop inflation or we increase wages."

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15. If P stands for the statement, "It is cold today", translate the statement ~ P into English.

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16. Write the negation of the statement, P : Kolkata is a big city.

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17. Write the negation of the following statements.

P : I Went to station yesterday.

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18. Write the negation of the following statements.

$q: 3 \div 5 = 8.$

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19. Write the negation of the following statements.

r : All natural number are integers.

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20. Write the negation of each of the following conjunctions.

New Delhi is in India and Lahore is in Pakistan.

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21. Write the negation of the following conjunction.

$3 + 4 = 7$ and $6 < 9$.

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22. Write the negation of each of the following statements.

Shekhar is in class 6 or Poonam is in class 7.

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23. Write the negation of each of the following statements.

5 is greater than 3 or 4 is less than 8.

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24. Consider the two statements :

P : Raj Kapoor is alive .

Q : Raj Kapoor lives in Delhi . Write the following statements in Symbolic form.

Raj Kapoor is alive and he lives in Delhi.

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25. Consider the two statements :

P : Raj Kapoor is alive .

Q : Raj Kapoor lives in Delhi . Write the

following statements in Symbolic form.

Either Raj Kapoor is alive or he lives in Delhi .

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26. Consider the two statements :

P : Raj Kapoor is alive .

Q : Raj Kapoor lives in Delhi . Write the following statements in Symbolic form.

Raj Kapoor is neither alive, nor does he live in Delhi.

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27. Consider the two statements :

P : Raj Kapoor is alive .

Q : Raj Kapoor lives in Delhi . Write the following statements in Symbolic form.

It is not true that Raj Kapoor is alive and he lives in Delhi .

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28. Let P be the statement, " Anish likes Kiran, " and let q be the statement, " Kiran likes Anish .

" Write in words .

$\sim(p \wedge q)$

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29. Let P be the statement, " Anish likes Kiran, "

and let q be the statement, " Kiran likes Anish .

" Write in words .

$\sim p \vee \sim q$

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30. Let P be the statement, " Anish likes Kiran, " and let q be the statement, " Kiran likes Anish . " Write in words .

$\sim p \wedge \sim q$.

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31. Write the negation of each of the following statements.

My grade is an A or a B.

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32. Write the negation of each of the following statements.

It is not true that 3 is less than 4.

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33. Write the negation of each of the following statements.

All pets are mammals.

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34. Write the negation of each of the following statements.

Some students failed to qualify the entrance test.

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35. Construct the truth table for $p \wedge q$.

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36. Assign a truth value to each of the following statements :

$4 < 6 \vee 4 < 5$

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37. Assign a truth value to the following statements :

$3 + 5 = 8 \vee 0 > 1$

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38. Assign a truth value to each of the following statements :

$5 \times 3 = 16 \vee 8 + 7 = 18$

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39. Assign a truth value to each of the following statements :

$1 > 0 \vee 3x8 - 1 = 23$

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40. Construct the truth table for the statements $\sim p \vee q$.

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41. Construct a truth table for the statement $p \wedge (\sim q)$.

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42. Construct the truth table for the statement $\sim(p \wedge \sim q)$.

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43. Write the truth table for $(p \vee q) \wedge r$.

Number of rows in a truth table.

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44. Give the truth value of each of the following statements.

If $4 + 5 = 9$, then $9 - 5 = 4$.

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45. Give the truth value of each of the following statements.

If $4 + 5 = 9,$ then 9-5=0.

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46. Give the truth value of each of the following statements.

If $4 \div 5 = 21,$ then $21 \div 9 = 30.$

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47. Give the truth value of each of the following statements.

$4 \div 5 = 9,$ then 21=9.

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48. Find all possible numbers x such that the following statement is true.

If $4 \div 9 = 49,$ then $x \div 2 = 5$

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49. Let p be "x is a fruit, " and let q be " x is ripe." Under what conditions is the statement $p \Rightarrow q$ false ?

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50. State the inverse of the conditional given below :

" If it rains, then I shall not go out ".

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51. State the contrapositive of the conditional given below :

" If it rains, then I shall not go out "

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52. Given two statements

p : 12 is a multiple of 3, q : 12 is a multiple of 4.

Write the compound statement with the connective ' and ' and check its validity.

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53. If p and q are two statements given by

p : 20 is a multiple of 4, q : 20 is a multiple of 7.

Write the compound statement 'p and q' and check its validity.

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54. Given two statements .

P : 20 is a multiple of 5, q : 20 is a multiple of 7.

Write the compound statement is 'P or q' and check its validity.

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55. Check the validity of the following statement: 'Square of an integer is positive or negative' .

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

If x and y are odd integers, then xy is an odd integer.'

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57. Check the validity of the following statement : If a, b are integers such that ab is odd, then both a and b are odd.

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58. Verify by the method of contradiction that $\sqrt{3}$ is irrational.

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

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Multiple Choice Questions

1. Which of the following is a statement ?

A. Roese are black

B. Mind your own business

C. Be punctual

D. Do not tell lies

Answer: A

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2. Which of the following is a statement ?

A. Let me go

B. x is a real number

C. 6 is a natural number

D. Switch off the fan

Answer: C

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3. Which of the following is a statement ?

A. $3 + 3 = 6$

B. 2 is the only even prime number

C. $2 + 8 > 9$

D. May God bless you

Answer: D

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4. The negation of the statement It is raining and weather is cold is

A. It is not raining and weather is cold.

B. It is raining or weather is not cold.

C. It is not raining or weather is not cold .

D. It is not raining and weather is not cold .

Answer: C

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

A. A. An ellipse is a circle

B. B. A circle is not an ellipse

C. C. An ellipse is not a circle

D. D. none of these

Answer: B

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6. The negation of statement " 10 is greater than 12 " is

A. A. 10 is equal to 12

B. B. 10 is not greater than 12

C. C. 12 is less than 10

D. D. 12 is greater than 10

Answer: B

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7. The negation of the statement 24 is divisible by 2 and 3 is

A. A. 24 is not divisible by 2 or 24 is not divisible by 3

B. B. 24 is not divisible by 2 and 24 is not divisible by 3

C. C. 24 is divisible by and 24 is not divisible by 3

D. D. 24 is not divisible by 2 and 24 is divisible by 3.

Answer: A

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8. The negation of the statement Plants take in CO_2 and give out O_2 " is

A. A. Plants do not take CO_2 and do not give out O_2.

B. B. Plants do not take CO_2 or do not give O_2.

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

D. D. Planta take in CO_2 or do not give out O_2.

Answer: B

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9. The negation of the statement Aman or Ria lived in Lucknow " is

A. Aman did not live in Lucknow and Ria lived in Lucknow

B. Aman lived in Lucknow and Ria did not live in Lucknow

C. Aman did not live in Lucknow and Ria did not live in Lucknow .

D. Aman did not live in Lucknow or Ria did not live Lucknow .

Answer: C

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10. The negation of the statement The product of 2 and 3 is 5 " is

A. It is false that product of 2 and 3 is 5

B. The product of 2 and 3 is 6

C. It is false that product of 2 and 3 is not 5

D. none of these

Answer: A

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11. Which of the following statement is a conjunction ?

A. Ram and Shyam are friends

B. Both Ram and Shyam are tall

C. Ram and Shyam are enemies

D. none of above

Answer: D

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12. The connective in the statement $3+5>9$ or $3+5<9$ is

A. and

B. or

C. $>$

D. $<$

Answer: B

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

A. (a) If $x < y$ then $x = a < y + a$

B. (b) If $(x + a) > (y + a)$ then $x > y$

C. (c) If $x < y$ then $x + a > y + a$

D. (d) If $x > y$ then $x + a < y + a$

Answer: B

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14. The converse of the statement If two lines are parallel , then they do not intersect in the plane is

A. 1. If two lines do not intersect in the same plane then they are parallel.

B. 2. If two lines are not parallel then they do not intersect in the same plane.

C. 3. If two lines are not parallel then they intersect in the same plane.

D. 4. none of the above

Answer: A

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15. Which of the following is the conditional $p \rightarrow q$ is

A. q is sufficient for p

B. p is necessary for q

C. if p then q

D. If q then p

Answer: C

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16. The contrapositive of the statement If 7 is grater than 8 is greater than 6 " is

A. If q then p

B. If ~ q then ~p

C. If p then ~p

D. If ~p then ~q

Answer: B

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17. The contrapositive of the statement If 7 is grater than 8 is greater than 6 " is

A. 1. If 8 is greater than 6 then 7 is greater than 5

B. 2. If 8 is not greater than 6 then 7 is greater than 5

C. 3. If 8 is not greater than 6 then 7 is not greater than 5

D. 4 If 8 is greater than 6 then 7 is not greater than 5.

Answer: C

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18. For any statements p and q , the statement $\sim(\sim p \wedge q)$ is equivalent to

A. $p \vee \sim q$

B. $p \wedge \sim q$

C. $\sim p \wedge q$

D. $\sim p \vee q$

Answer: A

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Exercise 27 A

1. Check whether the given sentence is a statement or not : "Open the door".

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2. Check whether the given sentence is a statement or not : "5 is a prime number"

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3. check whether it is statement or not .Do you like mathematics ?

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4. Consider the following sentence: Every rectangle is a square.

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5. check whether it is statement or not Today is Sunday and tomorrow is Monday.

Watch Video Solution

6. Check whether the given sentence is a statement or not: "May you live long !"

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7. Find the component statement of the compound statement given below : Rekha is studying in class eleven and she has to offer 5 subjects.

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8. Check whether the given sentence is a statement or not: "The earth revolves around the moon ."

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9. Find the component statements of the compound statement given below : "New Delhi is a big city and it is the capital of India."

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10. Find the component statements of the compound statement given below: "20 is a prime number and 20 is less than 21."

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11. Check whether the statement is true or not:

" 8 is a prime number."

12. Check whether the statement is true or not: "Every square is a rectangle."

13. Check whether the statement is true or not: "The earth revolves around the moon ."

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14. The set of whole numbers is a finite set .

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15. Check whether the statement is true or not :

32 is a multiple of 8.

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16. Check whether the statement is true or not

:

$3 \div 4$ i is a complex number.

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Exercise 27 B

1. Identify the quantifier in the following statements.

There exists a capital city for every state of India.

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2. Identify the quantifier in the following statement,

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

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3. Identify the quantifier in the following statements.

At least one natural number is not a prime number.

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4. Symbolise the following statements.

There is at least one number in the set of natural numbers which is equal to 'its' cube.

Watch Video Solution

5. Symbolise the following statements.

The square of every real number is positive.

Watch Video Solution

6. Symbolise the following statements.

There exists at least one number in A= {5,7,8,9,10} Which is an even number.

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7. Symbolise the following statements.

For every real number $x, x < x + 1$.

Watch Video Solution

8. Symbolise the following statements.

The square roots of all prime numbers are irrational numbers. (Let P denote the set of prime numbers and Q that of irrational numbers).

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Exercise 27 C

1. Write the given statement in symbolic form using the letter in parentheses to represent the corresponding component.

This is April (p) and income tax returns must be filed (q).

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2. Write the given statement in symbolic form using the letter in parentheses to represent

the corresponding component.

Accountancy is a required subject for Chartered Accountants (m) but not for engineers (n).

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3. Write the given statement in symbolic form using the letter in parentheses to represent the corresponding component.

Mukesh patel is a teacher (t) or a lawyer (u).

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4. Write the given statement in symbolic form using the letter in parentheses to represent the corresponding component.

Jack went up the hill (c) and Jill went up the hill (d).

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5. Write the given statement in symbolic form using the letter in parentheses to represent the corresponding component.

I plan to take science (a) or commerce (c) in class 11.

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6. Write the given statement in symbolic form using the letter in parentheses to represent the corresponding component.

I will not drive to Jaipur (~d) but I shall go by train (t) or by plane (p).

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7. Let p be " Shruti can type," and let q be "Shruti takes shorthand." Write the following statements in Symbolic form :

Shruti can type and take shorthand.

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8. Lte p be " Shruti can type," and let q be "Shruti takes shorthand." Write the following statements in Symbolic form :

Shruti can type but she does not take shorthand.

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9. Let p be " Shruti can type," and let q be "Shruti takes shorthand." Write the following statements in Symbolic form :

Shruti can neither type nor take shorthand.

Watch Video Solution

10. Let p be " Shruti can type," and let q be "Shruti takes shorthand." Write the following

statements in Symbolic form :

It is not true that Shruti can type and take shorthand .

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11. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

Ramesh is poor and pradeep is rich.

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12. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

Pradeep and Ramesh are both rich.

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13. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

Neither Ramesh nor Pradeep is rich.

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14. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

Ramesh is not rich and Pradeep is poor.

Watch Video Solution

15. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

It is not true that Ramesh and Pradeep both are rich.

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16. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

Either Ramesh is poor or Pradeep is poor.

Watch Video Solution

17. Use p : Ramesh is rich , q : Pradeep is poor. Think of " poor " as " not rich " , and write each of these statements in symbolic form.

Either Ramesh is rich or Pradeep is rich .

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18. Use p : I like this school , q : I like Mr. Sexena. Express each of the following statements in words .

$p \wedge q$

Watch Video Solution

19. Use p : I like this school , q : I like Mr. Sexena. Express each of the following statements in words .

~q

Watch Video Solution

20. Use p : I like this school , q : I like Mr. Sexena. Express each of the following

statements in words .

~p

Watch Video Solution

21. Use p : I like this school , q : I like Mr. Sexena. Express each of the following statements in words .

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

Watch Video Solution

22. Use p : I like this school , q : I like Mr. Sexena. Express each of the following statements in words .

$(\sim p) \wedge q$

Watch Video Solution

23. Use p : I like this school , q : I like Mr. Sexena. Express each of the following statements in words .

$p \vee q$

Watch Video Solution

24. Use p : I like this school , q : I like Mr. Sexena. Express each of the following statements in words .

$\sim(p \wedge q)$

Watch Video Solution

25. Use p : I like this school , q : I like Mr. Sexena. Express each of the following

statements in words .

$\sim[(\sim p) \wedge q]$

Watch Video Solution

26. Give the negation of each of the following statements.

Either he is bald or he is tall .

Watch Video Solution

27. Give the negation of each of the following statements.

Nobody does not like Madhuri.

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28. Give the negation of each of the following statements.

It is not true that the set of prime numbers is finite.

 Watch Video Solution

29. Give the negation of each of the following statements.

All circles are round.

 Watch Video Solution

30. Give the negation of each of the following statements.

Some students passed this course.

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Exercise 27 D

1. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each statement expressed below :

$q \wedge r$

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2. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s

is true. Determine the truth value of each statement expressed below :

$r \vee p$

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3. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each statement expressed below :

$p \wedge s$

Watch Video Solution

4. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each statement expressed below :

$p \vee s$

Watch Video Solution

5. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each

statement expressed below :

~q

Watch Video Solution

6. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each statement expressed below :

$q \vee s$

Watch Video Solution

7. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each statement expressed below :

~r

 Watch Video Solution

8. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each

statement expressed below :

$s \wedge q$

Watch Video Solution

9. Let p,q,r and s represent simple statements. Assume that p is false, q is true, r is false, and s is true. Determine the truth value of each statement expressed below :

$r \wedge p$

Watch Video Solution

10. Let a,b,c and d represent simple statements. Assume that $a \wedge d$ is true, $b \wedge c$ is false, and ~c is false.

What is the truth value of a ?

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11. Let a,b,c and d represent simple statements. Assume that $a \wedge d$ is true, $b \wedge c$ is false, and ~c is false.

What is the truth value of d ?

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12. Let a,b,c and d represent simple statements. Assume that $a \wedge d$ is true, $b \wedge c$ is false, and ~c is false.

What is truth value of c ?

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13. Let a,b,c and d represent simple statements. Assume that $a \wedge d$ is true, $b \wedge c$ is

false, and ~c is false.

What is the truth value of b ?

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14. Assume that two given statements p and q are both true and indicate whether or not you would expect each of the following statements to be true :

$p \wedge q$

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15. Assume that two given statements p and q are both true and indicate whether or not you would expect each of the following statements to be true :

$p \vee q$

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16. Assume that two given statements p and q are both true and indicate whether or not you would expect each of the following statements

to be true :

$p \vee (\sim q)$

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17. Assume that two given statements p and q are both true and indicate whether or not you would expect each of the following statements to be true :

$(\sim p) \vee (\sim q)$

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18. construct truth table for $(\sim p) \wedge q$

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19. construct truth table for $(\sim p) \wedge (\sim q)$

Watch Video Solution

20. construct truth table for $\sim(p \wedge q)$

Watch Video Solution

21. construct truth table for $p \vee (\sim q)$

Watch Video Solution

22. Construct truth table for $\sim[p \vee (\sim q)]$

Watch Video Solution

23. construct truth table for $\sim(\sim p \wedge \sim q)$

Watch Video Solution

24. construct truth table for $(p \wedge q) v (\sim p \wedge q)$

Watch Video Solution

25. construct truth table for $p \wedge (q \vee r)$

Watch Video Solution

26. construct truth table for $(\sim p \wedge \sim q) v (p \wedge \sim q)$

Watch Video Solution

27. construct truth table for $(p \vee q) \vee (r \wedge \sim q)$

Watch Video Solution

28. Let p be " Ananya is beautiful, " and let q be " Ananya is 165 centimetres tall. "

Under what conditions is the statement, "Ananya is beautiful and 165 centimetress tall." true ?

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29. Let p be " Ananya is beautiful, " and let q be " Ananya is 165 centimetres tall. "

Under what conditions is the statement, " " Ananya is beautiful and 165 centimetres tall, " false ?

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30. Let p be " Ananya is beautiful, " and let q be " Ananya is 165 centimetres tall. "

Under what cooditions is the statement,"

Ananya is beauiful or 165 centimetres tall, " true?

Watch Video Solution

31. Let p be " Ananya is beautiful, " and let q be " Ananya is 165 centimetres tall. "

Under what conditions is the statement," Ananya is beautiful or 165 centimetres tall," false ?

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Exercise 27 E

1. Write each sentence in the " If ..... Then " form.

Roses are vegetables if carrots are flowers.

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2. Write each sentence in the " If ..... Then " form.

All ducks are birds.

Watch Video Solution

3. Write each sentence in the " If ..... Then " form.

Vertical angles are equal.

Watch Video Solution

4. Write each sentence in the " If ..... Then " form.

Freezing water expands.

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5. Write each sentence in the " If ..... Then " form.

A set with no elements is called the empty. Set.

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6. Write each sentence in the " If ..... Then " form.

A racer wins the race only if he runs fast.

Watch Video Solution

7. Write each sentence in the " If ..... Then " form.

Any two parallel lines are coplanar.

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8. Let p be " I will marry her," and let q be " she is beautiful." Translate into symbolic form.

If she is beautiful, then I will marry her.

Watch Video Solution

9. Let p be " I will marry her," and let q be " she is beautiful." Translate into symbolic form.

If I will marry her, then she is beautiful.

 Watch Video Solution

10. Let p be " I will marry her," and let q be " she is beautiful." Translate into symbolic form.

She is beautiful if and only if I will marry her.

 Watch Video Solution

11. Let p be " I will marry her," and let q be " she is beautiful." Translate into symbolic form.

If she is not beautiful, then I will not marry her.

Watch Video Solution

12. Let p be " I will marry her," and let q be " she is beautiful." Translate into symbolic form.

If I will not marry her, then she is not beautiful.

Watch Video Solution

13. Let p be " I will marry her," and let q be " she is beautiful." Translate into symbolic form.

If she is beautiful, then I will not marry her.

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14. Determine whether p,q and "If p, then q " are true or false in each case given below :

(P) 3 is a prime number

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15. Determine whether p,q and "If p, then q " are true or false in each case given below :p : $5<7$, q : 5 is an odd number

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16. Determine whether p,q and "If p, then q " are true or false in each case given below :

$3 > 2$

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17. Determine whether p,q and "If p, then q " are true or false in each case given below :

$1 > 5$

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18. Determine whether p,q and "If p, then q " are true or false in each case given below :

5x3=16

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19. Determine whether p,q and "If p, then q " are true or false in each case given below :

$3(5 \div 6) < 1$

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20. Write T before each true statement and write F before each false statement. Then give the truth value of the continent, expressed.

If Asia is a continent, then Delhi is in Japan.

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21. Write T before each true statement and write F before each false statement. Then give the truth value of the continent, expressed.

If monkeys climb trees, then 6 is divisible by 2

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22. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed. If oxygen is a gas, then gold is a compound.

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23. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed. Water is dry implies snow is hot .

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24. Write T before each true statement and write F before each false statement. Then give

the truth value of the conditional expressed.

Snow is cold implies water is wet

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25. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed.

If 3=5, then 7 is a prime number :

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26. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed.

5x6-4=21 implies 2 $(5 \div 15 + 3) = \frac{20}{3}$

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27. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed.

If a triangle is a rectangle, then a circle is a rhombus.

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28. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed.

If 51 is the product of 17 and -3, then lions can fly in the air.

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29. Write T before each true statement and write F before each false statement. Then give the truth value of the conditional expressed.

If $\sqrt{5}$ is an integer, then 3 is an integer.

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Exercise 27 F

1. Write the converse, inverse and contrapositive of the following statements.

If you do not drink your milk, you will not be strong.

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2. Write the converse, inverse and contrapositive of the following statements.

If you drink milk, you will be strong.

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3. Write the converse, inverse and contrapositive of the following statements.

you will be strong only if you drink your milk.

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4. Write the converse of each of the following statements

If an integer is even, then its square is divisible by 4.

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5. Write the converse of each of the following statements

If it is raining, then there are clouds in the sky :

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6. Write the converse of each of the following statements, In which cases is the converse true ?

In order to ger this job, I must be a graduate.

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7. Write the converse of each of the following statements, In which cases is the converse true ?

If Mr. Saxena is elected to office, then all our problems are over.,

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8. Consider the statements:

p : You will work hard q : You will become wealthy.

Translate each of the symbolic statements into an English sentence.

p implies q

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9. Consider the statements:

p : You will work hard q : You will become

wealthy.

Translate each of the symbolic statements into an English sentence.

qimplies p

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10. Consider the statements:

p : You will work hard q : You will become wealthy.

Translate each of the symbolic statements into

an English sentence.

(~p)implies(~q)

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11. Consider the statements:

p : You will work hard q : You will become wealthy.

Translate each of the symbolic statements into an English sentence.

(~q)implies(~p)

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12. Compare the following statements :

p, only if q.

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13. Compare the following statements :

p implies q

 Watch Video Solution

14. Compare the following statements :

p is a sufficient condition for q.

15. Compare the following statements :

q is a necessary condition for p.

16. Compare the following statements :

p, only if q.

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17. Construct truth tables for the following :

$(p \Rightarrow q) \wedge (q \Rightarrow p)$

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18. Construct truth tables for each of the following :

$q \Rightarrow [(\sim p) \vee q]$

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19. Construct truth tables for each of the following :

$[(\sim p) \wedge q] \Rightarrow (p \vee q)$

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20. Write the converse, inverse and contrapositive for the statement $(\sim p) \Rightarrow q$.

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21. Write the inverse of the converse of p implies q.

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22. Write the converse of the inverse of p implies q.

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23. Write the contrapositive of the inverse of p implies q .

Watch Video Solution

24. Write the converse of the contrapositive of p implies q .

Watch Video Solution

25. Write the contrapositive of the contrapositive of p implies q.

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26. What is the relationship of each resulting condition inverse , contatpositive , inverse to the original conditional $(p) \Rightarrow q$?

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27. determine whether of the following two arguments is valid ?

Given : If you work hard, then you pass the course.

Given : You did not work hard.

Conclusion : You did not pass the course.

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28. Determine whether of the following two arguments is valid ?

Given : If you work hard, then you pass the course.

Given : You did not pass the course.

Conclusion : You did not work hard .

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Exercise 27 G

1. Show that the statement .

p : 'If x is a real number such that $x^3 + 4x = 0$, then x=0' is true by

Direct method

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2. Show that the statement .

p : 'If x is a real number such that

$x^3 + 4x = 0$, then x=0' is true by

Method of contradiction

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3. Show that the statement .

p : 'If x is a real number such that

$x^3 + 4x = 0$, then x=0' is true by

Method of contrapositive

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

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5. 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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6. Given below are two statements :

p : 30 is a multiple of 5.

q : 30 is a multiple of 9.

Write the compound statement, connecting these two statements with ' and ' and 'or ' . In both cases, check the validity of the compound statement.

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

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Chapter Test

1. For each of the following compound statements, first identify the connective 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 the following compound statement, first identify the connective word 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 connective words and then break it into comonent statements.

x=2 and x =3 are the roots of the equation $3x^2 - x - 10 = 0.$

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

For every real numbers x,x is less than x+1.

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6. 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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7. For any statement 'p' prove that $\sim(\sim p) \equiv p$.

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8. Write the converse, contradiction and contrapositive of the statement 'If x+3=9,then x=6.?

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9. For any statement,p and q, prove that pimplies q -= $(\sim p \vee q)$.

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10. Write the following implications (p implies q) in the form $(\sim p \vee q)$ and write its negation. 'If ΔABC is isosceles then the base angles A and B are equal.'

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