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Question N. 1

Ans^a

Biconditional Statement :-

- The combination of a conditional Statement and its converse.
- The phrase "if and only if" is used to indicate this combination.
- A biconditional is only true when both the conditional and converse are true.
- All geometric definitions are biconditional statements.
- $P \leftrightarrow Q$ means $P \rightarrow Q$ and $Q \rightarrow P$.
- When you combine a conditional statement and its converse, you create a biconditional statement.

2

Ans

Answer b

P Sam had Pizza last night.

Q Chris finished her homework.

r Pat watched the news this morning.

i ~~$P \wedge Q$~~ $P \leftrightarrow Q$

ii $r \leftrightarrow P \rightarrow P$

iii $r \leftrightarrow Q \wedge \sim P$

iv $r \cap P \cap Q$

Question 2

a

P It is hot today

Q it is sunny

r it is raining

i $Q \leftrightarrow P$

~~It is hot ^{today} if and~~

It is sunny if and only if it is hot today

ii $P \leftrightarrow (Q \wedge r)$

It is hot today if it is sunny and it is raining

$$\text{iv}'' \quad P \leftrightarrow (q \wedge r)$$

It is hot today if it is sunny and it is raining

$$\text{iv} \quad Y \leftrightarrow (P \wedge q)$$

It is raining if it is hot today and it is sunny

Question #4

Ans^g

The union of 2 sets A and B

is denoted by $A \cup B$. This is the set

of all distinct elements that are A or B.

* Union of a collection of sets, as the

Set of all distinct elements that are in

any of these sets.

e.g. If $A = \{1, 3, 5, 7, 9\}$ and $B = \{2, 3, 5, 7\}$

the

$$A \cup B = \{1, 2, 3, 5, 7, 8\}$$

Example:

P	q	$P \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

4

b The intersection of two sets contains only the element that are in both sets.

The intersection is denoted $A \cap B$.

More, $x \in A \cap B$ if $x \in A$ and $x \in B$.

Example:

P	Q	$P \wedge Q$
T	T	T
T	F	F
F	T	F
F	F	F

Question 3

Ans Argument:

An Argument is a group of statements including one or more premises and one and only one conclusion.

Valid Argument:

An argument is invalid if the conclusion is false when all the premises are true.

Example :

$$P \rightarrow q$$

$$q$$

$$\therefore P$$

P	q	Premises $P \rightarrow q$	q	P
T	T	T	T	T
T	F	F	F	T
F	T	T	T	F
F	F	T	F	F

Invalid Argument:

An argument form may be invalid even though its conclusion is true.

→ A true conclusion does not ensure that the argument form is valid.

P	q	$\sim P$	$\sim q$	$P \rightarrow q$	$(P \rightarrow q) \wedge \sim q$	$(\sim P \rightarrow q) \wedge \sim q$
T	T	F	T	F	T	T
T	F	F	F	F	T	T
F	T	T	T	F	T	T
F	F	T	T	T	T	T

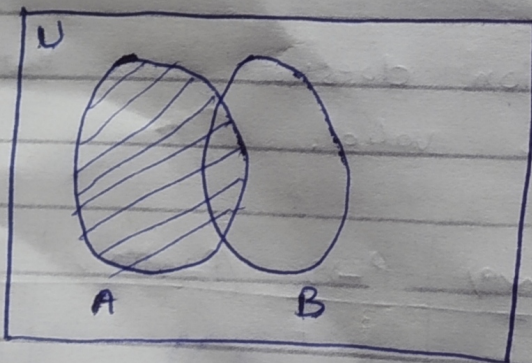
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Question

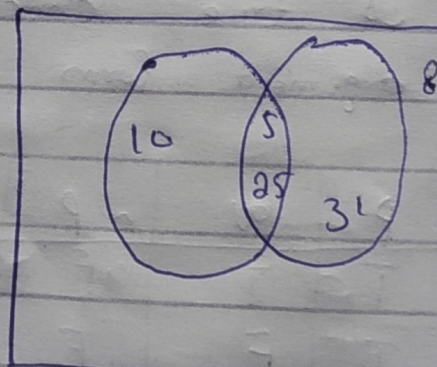
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19 A Venn diagram is an illustration that uses circles to show the relationships among things or finite groups of things. Circles that overlap have a commonality while circles that do not overlap do not share those traits.

→ Venn diagram helps to visually represent the similarities and differences between two concepts.



(2) 10, 5, 25, 31, 8



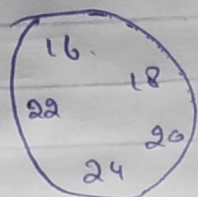
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b

List of elements of P.

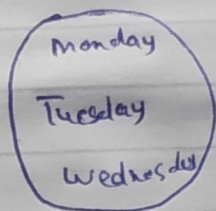
$P = \{16, 18, 20, 22, 24\}$ ← blw does not include 15 and 25.

P



b

R

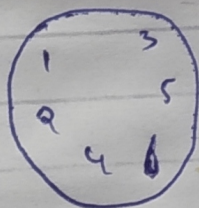


c

Since an equation is given, we need to first solve for x .

$$2x - 3 < 11 \Rightarrow 2x < 14 \Rightarrow x < 7$$

Q



So $Q = \{1, 2, 3, 4, 5, 6\}$

Draw a circle or oval. Label it Q.

Put the element in Q.