MATH - 245

QUIZ # 1

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2. Ans (a) $x \geq 2$ and $x \leq 5$

(b) If m is even and is not 2, then m is not prime.

(c) If mike doesn't enroll in statistics, then he doesn't drop calculus.

(d) The train is not late and my watch is not false.

4 Ans   Given $S = \{2, 4, 6\}$ & $T = \{1, 3, 5\}$

(a) $S \times T = \{(2,1), (2,3), (2,5), (4,1), (4,3),$
$(4,5), (6,1), (6,3), (6,5)\}$

∴ $S \times T$ has 9 elements.

(b) $T \times S = \{(1,2), (1,4), (1,6), (3,2), (3,4),$
$(3,6), (5,2), (5,4), (5,6)\}$

∴ $T \times S$ has 9 elements.

(c) $S \times S = \{(2,2), (2,4), (2,6), (4,2), (4,4),$
$(4,6), (6,2), (6,4), (6,6)\}$

∴ $S \times S$ has 9 elements.

(d) $T \times T = \{ (1,1), (1,3), (1,5), (3,1), (3,3), (3,5), (5,1), (5,3), (5,5) \}$

∴ $T \times T$ has 9 elements

1. Ans (i) P : It is raining

Q : all cows swim

R : socrates lives on.

(a) $R \wedge Q$: socrates lives on and all cows swim.

(b) $\neg P \rightarrow Q$: If it is not raining then all cows swim.

(ii) S : stocks are increasing

i : interest rates are steady

(a) $S \wedge i$

(b) $\sim(S \vee i) = \sim S \wedge \sim i$

5. Ans Given :- If a function is differentiable then it is continuous.

To find : converse, Inverse & contraposi-tion of given conditional statement.

For converse :- p = A function is differentiable.

q = It is continuous.

We know that,

$p \rightarrow q$

P.T.O

Hence, The converse of the conditional statement $p \to q$ is defined as $q \to p$.

Converse of the given statement:-

If a function is continuous then it is differentiable.

Inverse :- If not p, then not q.

$\Rightarrow$ If a function is not differentiable, then it is not continuous.

Contrapositive :- If not q, then not p.

$\Rightarrow$ If a function is not continuous, then it is not differentiable.

6.Ans. Let $A = \{4, 5, 6\}$ & $B = \{3, 6, 7\}$.

For all $(x, y) \in A \times B$

$(x, y) \in U \Leftrightarrow x > y$

$\Rightarrow$ $U = \{(4, 6), (4, 7), (5, 6), (5, 7), (6, 7)\}$

which is not a function since, $(4, 6)$ & $(4, 7) \in U$.

4 has no unique image.

$(x, y) \in V \Leftrightarrow \dfrac{x - y}{2}$ is an integer.

$\Rightarrow$ $V = \{(4, 6), (5, 3), (5, 7), (6, 6)\}$ which is not a function.

P.T.O

since $(5,3)$ & $(5,7) \in V$

meaning 5 does not have a unique image.

$W = \{ (4,7), (6,3), (5,6) \}$
which is a function since every element
of set A has a unique image in set B.