CSE 211 PS#1

1st Slide

Q1) a) Since the hypothesis is true and the conclusion is false, the conditional statement is false.

b) The hypothesis is false and the conclusion is true, the statement is true.

c) The hypothesis is false and the conclusion is false, the statement is true.

d) The hypothesis is false, the conclusion is false then the statement is true.

Q2) a) "But" is a logical synonym for "and" so $r \wedge \neg p$

b) $\neg p \wedge q \wedge r$

c) $r \rightarrow (q \leftrightarrow \neg p)$

d) $\neg q \wedge \neg p \wedge r$

e) We just need to remember that "whenever" means "if" in logic.

$(p \wedge r) \rightarrow \neg q$

Q3) Check the table 7 on the slide!

$(p \rightarrow r) \wedge (q \rightarrow r)$

$p \rightarrow r \equiv \neg p \vee r$ $\quad$ $q \rightarrow r \equiv \neg q \vee r$

$(\neg p \vee r) \wedge (\neg q \vee r) \equiv (\neg p \wedge \neg q) \vee r \equiv \boxed{(p \vee q) \rightarrow r}$

2nd Slide

Q1) $1.2 + 2.3 + 3.4 + \cdots + n(n+1) = \dfrac{n(n+1)(n+2)}{3}$ Prove that for every positive integer n by induction.

Basis Step = Apply $n=1$ on the equation.

$\underbrace{1.(1+1)}_{} = \underbrace{\dfrac{1.(1+1).(1+2)}{3}}_{}$

$2 = 2$

We prove that the equation is true for $\underline{\underline{n=1}}$

$\longrightarrow$

CamScanner ile tarandı

Inductive Step: Apply n=k on the equation and accept that the equation is true for $n=k$.

$$\underbrace{1.2+2.3+3.4+\cdots+k(k+1)}_{a}=\underbrace{\frac{k(k+1)(k+2)}{3}}_{a}$$

Apply $n=k+1$ on the equation and prove that the equation is true based on the equation of $n=k$.

$$\underbrace{1.2+2.3+3.4+\cdots+k(k+1)}_{a}+(k+1)(k+2)=\frac{(k+1)(k+2)(k+3)}{3}$$

$$\frac{k(k+1)(k+2)}{3}+(k+1)(k+2)=\frac{(k+1)(k+2)(k+3)}{3}$$

$$(k+1)(k+2)=\frac{(k+1)(k+2)(k+3)}{3}-\frac{k(k+1)(k+2)}{3}$$

$$(k+1)(k+2)=\frac{(k+1)(k+2)}{\cancel{3}}\underbrace{(k+3-k)}_{\cancel{3}}$$

$$(k+1)(k+2)=(k+1)(k+2) \checkmark$$

CamScanner ile tarandı