Given that.

① $P(n) = 1.2 + 2.3 + \dots n(n+1)$

$= n(n+1)(n+2)/3$

a) L.H.S for P(1)

L.H.S $= 1.2 = 2$

R.H.S for P(1) means $n=1$

$$R.H.S = \frac{n(n+1)(n+2)}{3}$$

$$= \frac{1.2.\cancel{3}}{\cancel{3}} = 2$$

∴ R.H.S = L.H.S = P(1)

Hence, P(1) is true Proved.

ⓒ what do you need to Prove in the inductive step?

⇒ in the inductive step, we need to Prove:

if P(K) is true for all value of K, then P(K+1) is also true.

Ans: 02

let $P(n)$ be the statement that $2^n > n^2+n$ where n is an integer greater than 4.

$\Rightarrow$ $P(5)$ is true because $2^5 = 32 > 5^2+5 = 30$

inductive step:

Assume that $P(K)$ is true.

i.e, $2^K > K^2+K$

We have to prove that $P(K+1)$ is true.

Now, $(K+1)^2+(K+1)$

$= K^2+2K+1+K+1$

$= K^2+K+2K+2$

$\leq K^2+2K+2$

$< 2^K+2^K$

$= 2.2^K$

$= 2^{K+1}$

Therefore $(K+1)^2+(K+1) < 2^{K+1}$

i.e $2^{K+1} > (K+1)^2+(K+1)$

Thus $P(K+1)$ is true

Ans: 08

⊞ How many numbers must be selected from the set {1, 2, 3, 4, 5, 6, 7, 8} to ...... 9?

⇒ Given;

Numbers must be selected from the set {1, 2, 3, 4, 5, 6, 7, 8} to guarantee that at least one Pair of these numbers add up to 9.

with 2 elements Pairs which give sum as 9

= {(1, 8), (2, 7), (3, 6)}

So choosing 1 element from each group

= 4 elements (in worst case) {1, 7, 3, 5} {2, 6, 4, 8}

Hence, there are 3 Pairs of numbers that add upto 9.