Mathematical Induction Ex 12.1 Q4

Here, $P(n): n^2+n$ is even

Given, $P(r)$ is true

$\Rightarrow \quad r^2+r$ is even

$\Rightarrow \quad r^2+r=2\lambda \qquad ---(1)$

Now,

$(r+1)^2+(r+1)$

$=r^2+2r+1+r+1$

$=\left(r^2+r\right)+2r+2$

$=2\lambda+2r+2 \qquad [\text{Using equation } (1)]$

$=2(\lambda+r+1)$

$=2\mu$

$\Rightarrow \quad (r+1)^2+(r+1)$ is even

$\Rightarrow \quad P(r+1)$ is true

Mathematical Induction Ex 12.1 Q5

$P(n): 1+2+3+---+n=\dfrac{n(n+1)}{2}$ is true for all $n \in N$

Mathematical Induction Ex 12.1 Q6

$P(n): n^2 - n + 41$ is prime

$P(1): 1 - 1 + 41$ is prime

$\Rightarrow P(1): 41$ is prime

$\therefore P(1)$ is true.

$P(2): 2^2 - 2 + 41$ is prime

$\Rightarrow P(2): 43$ is prime

$\therefore P(2)$ is true.

$P(3): 3^2 - 3 + 41$ is prime

$\Rightarrow P(3): 47$ is prime

$\therefore P(3)$ is true.

$P(41): (41)^2 - 41 + 41$ is prime

$P(41): (41)^2$ is prime

$\Rightarrow \quad P(41)$ is not true

********** END **********