

### LA Session - Induction

1) Use mathematical induction on  $n$  to prove the following assertion for all positive integers  $n$ :  
$$\sum_{i=1}^n \frac{i(i+1)}{2} = \frac{n(n+1)(n+2)}{6}.$$

2) Use induction on  $n$  to prove that  $4^{2n} - 15n - 1$  is divisible by 225 for all non-negative integers  $n$ .

3) Use induction to show that  $\begin{pmatrix} 1 & 0 \\ -1 & 2 \end{pmatrix}^n = \begin{pmatrix} 1 & 0 \\ -2^n + 1 & 2^n \end{pmatrix}$  for all positive integers  $n$ .