2. 3 – *i*3 = n3 + 3n2 + 3n

For n = 1,

Given;

3 – *i*3 = n3 + 3n2 + 3n

LHS

1)3 - *i*3

= (1+1)3 – 1

= 8 – 1

= 7

RHS

n3 + 3n2 + 3n

= (1)3 + 3(1)2 + 3(1)

= 1 + 3 + 3

= 7

LHS = RHS

Assumption is true for all n,

i.e. 3 – *i*3 = n3 + 3n2 + 3n

Now prove for k+1,

LHS

3 – *i*3 = 3 – *i*3 + (k + 1 + 1)3 - (k + 1)3

= k3 + 3k2 + 3k + (k + 2)3 – (k + 1)3

= k3 + 3k2 + 3k + k3 + 6k2 + 12k + 8 - k3 – 3k – 3k -1

= k3 + 6k2 + 12k + 7

RHS

= (k + 1)3 + 3(k + 1)2 – 3(k + 1)

= k3 + 3k2 + 3k + 1 + 3k2 + 3 + 6k + 3k + 3

= k3 + 6k2 + 12k + 7

LHS = RHS

Assumption is true for all k+1,

i.e. 3 – *i*3 = n3 + 3n2 + 3n,

Hence proved