#1-10:

Prove:

$$\sum_{i=1}^{n} i = n(n+1)/2 \ \ for \ \ n >= 0, \ \ by \ induction$$

Figure 1: formula

$$\sum_{i=1}^{n} i = n(n+1)/2 \ \ for \ \ n >= 0, \ \ by \ induction$$

Figure 2: formula

$$\sum_{i=1}^{n} i = n(n+1)/2 \ \ for \ \ n >= 0, \ \ by \ induction$$

Figure 3: formula

$$\sum_{i=1}^{n} i = n(n+1)/2 \ \ for \ \ n >= 0, \ \ by \ induction$$

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$\sum_{i=1}^{n} i = n(n+1)/2forn >= 0, byinductionzz$

Let n = 1. Then:

establishing our base case.

Assume that:

We must show:

QED

#1-10:

Prove:

$$\mathrm{n(n{+}1)}/2 = 1 = \sum_{i=1}^{1} i$$

Figure 4: formula

$$\sum_{i=1}^{n} i = n(n+1)/2 \quad for\; n <= k,$$

Figure 5: formula

$$\sum_{i=1}^{n+1} i = (n+1)(n+2)/2$$

Figure 6: formula

$$\sum_{i=1}^{n+1} i = (n+1) + \sum_{i=1}^{n} i$$

Figure 7: formula

$$\begin{aligned} &\sum_{i=1}^{n+1} i = (n+1) + \sum_{i=1}^{n} i \\ &= (n+1) + n(n+1)/2 \\ &= [2(n+1) + n(n+1)]/2 \\ &= (n+1)(n+2)/s \end{aligned}$$

Figure 8: formula

$$\sum_{i=1}^{n} i = n(n+1)/2 \;\; for \;\; n >= 0, \;\; by\, induction$$

Figure 9: formula

`Let n = 1. Then:`

$$\mathrm{n(n{+}1)/2} = 1 = \sum_{i=1}^{1} i$$

Figure 10: formula

`establishing our base case.`

`Assume that:`

$$\sum_{i=1}^{n} i = n(n+1)/2 \quad for\; n <= k,$$

Figure 11: formula

`We must show:`

QED

#1-11:

Prove: SUM{i=1,n}(i^2) = n(n+1)(2n+1)/6 for n >= 0, by induction

```
let n = 1. Then n(n+1)(2n+1)/6 = 1 = SUM{i=1,1}(i^2)
Assume that SUM{i=1,n}(i^2) = n(n+1)(2n+1)/6.
SUM{i=1,n + 1}(i^2) = (n+1)^2 + SUM{i=1,n}(i^2)
                    = (n+1)^2 + n(n+1)(2n+1)/6
                    = (n+1)[6(n+1) + n(2n+1)] / 6
                    = (n+1)[2n^2 +7n + 6] / 6
                    = (n+1)(n+2)(2n +3) / 6
                    = (n+1)(n+2)(2(n+1) + 1) / 6 which we needed to how :.
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1-12: // SUM{i=1,n}(i^3) = $\mathrm{n}^{2(\mathrm{n}+1)}$2/4 for n >= 0, by induction

1-13: // Prove SUM{i=1,n}((i)*(i+1)*(i+2)) = n(n+1)(n+2)(n+3)/4 for n >= 0, by induction

$$\sum_{i=1}^{n+1} i = (n+1)(n+2)/2$$

Figure 12: formula

$$\sum_{i=1}^{n+1} i = (n+1) + \sum_{i=1}^{n} i$$

Figure 13: formula

$$\begin{aligned} \sum_{i=1}^{n+1} i &= (n+1) + \sum_{i=1}^{n} i \\ &= (n+1) + n(n+1)/2 \\ &= [2(n+1) + n(n+1)]/2 \\ &= (n+1)(n+2)/s \end{aligned}$$

Figure 14: formula

1-14: // Prove by induction on n >= 1 that for every a!=1 SUM{i=0,n}(a^i) = [a^(n+1) - 1] / [a - 1]

1-15: // Prove by induction on n >= 1 SUM{i=1,n}(1/i*(i+1)) = n/(n+1)

1-16: // Prove by induction that n^3 + 2n is divisible by 3 for all n >= 0.

1-17: // Prove by induction that a tree with n vertices has exactly n - 1 edges

1-18: // Prove by mathematical induction that the sum of the cubes of the first n positive integers is equal to the square of the sum of these integers, i.e. SUM{i=1,n}(i^3) = [SUM{i=1,n}(i)]^2

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> dknfddf dknfddfdknfddfdknfddfdknfddfdknfddfdknfddf
> dknfddfdknfddfdknfddfdknfddfdknfddfdknfddfdknfddf
>
> dknfddf
```

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![formula](http://latex.codecogs.com/gif.latex?%24%24%5Cint_%7Ba%7D%5E%7Bb%7D%20x%5E2%20dx%2
```

$$\int_a^b x^2 dx$$

Figure 15: formula