

2.54
I → 1

$$n=1 \quad 1 \cdot 2 + 2 \cdot 4 + 3 \cdot 2^3 = 2 + 1 \cdot 2^5 \quad \checkmark$$

$$n=k \quad 1 \cdot 2 + 2 \cdot 4 + \dots + (2k+1) 2^{2k+1} = 2 + k \cdot 2^{2k+3}$$

$$n=k+1 \quad \underbrace{1 \cdot 2 + 2 \cdot 4 + \dots + (2k+1) 2^{2k+1}}_{= 2 + k \cdot 2^{2k+3}} + (2k+2) 2^{2k+2} + (2k+3) 2^{2k+3} \stackrel{?}{=} 2 + (k+1) 2^{2k+5}$$

$$2 + k \cdot 2^{2k+3} + (2k+2) 2^{2k+2} + (2k+3) 2^{2k+3} \stackrel{?}{=}$$

$$2 + 2^{2k+3} (k+k+1+2k+3) \stackrel{?}{=}$$

$$2 + 2^{2k+3} (4k+4) \stackrel{?}{=}$$

$$2 + 2 \cdot 2^{2k+3} (k+1) = 2 + 2^{2k+5} (k+1) \quad \leftarrow =$$