

2.61  
①

$$n=1 \quad \frac{1 \cdot 2}{2 \cdot 3} - \frac{1}{1 \cdot 3} = 0$$

$$n=k+1 \quad \frac{(k+1)(k+2)}{2(2k+3)} - \underbrace{\frac{1^2}{1 \cdot 3} - \dots - \frac{(k+1)^2}{(2k+1)(2k+3)}}_{=0} = 0$$

$$\frac{(k+1)(k+2)}{2(2k+3)} - \frac{k(k+1)}{2(2k+1)} - \frac{(k+1)^2}{(2k+1)(2k+3)} = 0$$

$$\frac{(k+1)(k+2)(2k+1) - k(k+1)(2k+3) - 2(k+1)^2}{2(2k+1)(2k+3)} = 0$$

$$\frac{(k+1)[2k^2 + 5k + 2 - 2k^2 - 3k] - 2k^2 - 4k - 2}{2(2k+1)(2k+3)}$$

$$\frac{2k^2 + 2k + 2k + 2 - 2k^2 - 4k - 2}{2(2k+1)(2k+3)} = 0$$