

Evaluate

$$\textcircled{1} \quad \sum_{i=1}^n \cos(ix)$$

$$\textcircled{2} \quad \sum_{i=1}^n \frac{1}{(3i-1)(3i+2)}$$

Find the following sum using
summation by parts 3-5

$$\textcircled{3} \quad \sum_{i=1}^n i^3$$

$$\textcircled{4} \quad \sum_{i=1}^n i^4$$

$$\textcircled{5} \quad \sum_{i=1}^n i \sin(ix)$$

⑥ Find a geometric illustration of summation by parts formula.

Show that for the Fibonacci numbers F_i the following equality holds

$$⑦ \quad F_1 + F_2 + \dots + F_{2n-1} = F_{2n}$$

$$⑧ \quad F_2 - F_3 + F_4 - \dots + (-1)^n F_n = (-1)^n F_{n-1}$$

Evaluate

$$⑨ \quad 1 \cdot 1! + 2 \cdot 2! + \dots + n \cdot n!$$

$$\text{Here } a! = 1 \cdot 2 \cdot 3 \cdot \dots \cdot a$$

Evaluate

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$$\frac{1}{2!} + \frac{2}{3!} + \dots + \frac{n}{(n+1)!}$$

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$$\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \dots + \frac{1}{(2n-1)(2n+1)}$$

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$$\sum_{i=1}^{\infty} \frac{1}{i(i+2)}$$

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Telescope

$$\sum_{i=1}^n i^4$$