

جواب سوال ۹ ص ۱۳ ریاضی دکمپلین هفتم

$$\frac{1}{2} + \frac{1}{6} + \dots + \frac{1}{54} = \sum_{n=1}^v \frac{1}{n(n+1)} = \sum_{n=1}^v \left(\frac{1}{n} - \frac{1}{n+1} \right) = \frac{1}{1} - \frac{1}{v+1} = 1 - \frac{1}{\lambda} = \frac{v}{\lambda}$$

$$\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \dots + \frac{1}{54} =$$

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$$\left(\frac{1}{1} - \frac{1}{2} \right) + \left(\frac{1}{2} - \frac{1}{3} \right) + \left(\frac{1}{3} - \frac{1}{4} \right) + \dots + \left(\frac{1}{v} - \frac{1}{\lambda} \right) = \frac{1}{1} - \frac{1}{\lambda} = \frac{v}{\lambda}$$

$$1.) \frac{2}{3 \times 0} + \frac{2}{5 \times 4} + \frac{2}{7 \times 6} + \dots + \frac{2}{49 \times 48} = \sum_{n=1}^{24} \frac{2}{(2n+1)(2n+2)} = \sum_{n=1}^{24} \left(\frac{1}{2n+1} - \frac{1}{2n+2} \right)$$

$$= \frac{1}{2(1)+1} - \frac{1}{2(24)+2}$$

$$= \frac{1}{3} - \frac{1}{50} = \frac{17-1}{51} = \frac{16}{51}$$

$$\frac{2}{3 \times 0} + \frac{2}{5 \times 4} + \frac{2}{7 \times 6} + \dots + \frac{2}{49 \times 48}$$

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$$\left(\frac{1}{3} - \frac{1}{5} \right) + \left(\frac{1}{5} - \frac{1}{7} \right) + \left(\frac{1}{7} - \frac{1}{9} \right) + \dots + \left(\frac{1}{49} - \frac{1}{51} \right) = \frac{1}{3} - \frac{1}{51} = \frac{16}{51}$$

$$2.) \frac{1}{5 \times 8} + \frac{1}{8 \times 11} + \frac{1}{11 \times 14} + \dots + \frac{1}{22 \times 25} = \sum_{n=1}^{10} \frac{1}{(3n+2)(3n+5)}$$

$$= \sum_{n=1}^{10} \frac{1}{3} \left(\frac{1}{3n+2} - \frac{1}{3n+5} \right)$$

$$= \frac{1}{3} \left(\frac{1}{5} - \frac{1}{25} \right)$$

$$= \frac{1}{15} - \frac{1}{75} = \frac{1}{15} \left(\frac{1}{1} - \frac{1}{5} \right)$$

$$= \frac{1}{15} \times \frac{4}{5} = \frac{4}{75}$$

به دانش آموز گرامر کنیم $\frac{1}{5} - \frac{1}{25} = \frac{4}{25}$ بعد با تقسیم صورت بر ۳ آنرا

را اصلاح میکنیم و میگیریم $\frac{1}{5} \times \frac{4}{5} = \frac{4}{25}$ پس داریم:

$$\left(\frac{1}{5} - \frac{1}{25} \right) + \left(\frac{1}{8} - \frac{1}{11} \right) + \left(\frac{1}{11} - \frac{1}{14} \right) + \dots + \left(\frac{1}{22} - \frac{1}{25} \right) = \frac{1}{5} - \frac{1}{25} = \frac{4}{25}$$

$$\begin{aligned}
 >) \quad \underbrace{\frac{1+2}{2 \times 3 \times 4} + \frac{2+3}{3 \times 4 \times 5} + \frac{3+4}{4 \times 5 \times 6} + \dots + \frac{18+19}{18 \times 19 \times 20}}_A = \sum_{n=1}^9 \frac{n+(n+1)}{n(n+1)(n+2)} \\
 &= \sum_{n=1}^9 \frac{n+n+1}{n(n+1)(n+2)} \\
 &= \sum_{n=1}^9 \frac{2n+1}{n(n+1)(n+2)}
 \end{aligned}$$

$$= \sum_{n=1}^9 \frac{1}{n(n+2)} = \sum_{n=1}^9 \frac{1}{2} \left(\frac{1}{n} - \frac{1}{n+2} \right) = \frac{1}{2} \sum_{n=1}^9 \left(\frac{1}{n} - \frac{1}{n+2} \right)$$

$$= \frac{1}{2} \left(\frac{1}{1} - \frac{1}{11} \right) = \frac{1}{2} \times \frac{10}{11} = \frac{5}{11}$$

راه حل داتش آموز سید !!

$$A = \frac{\frac{3}{2 \times 3 \times 4}}{\frac{1}{3 \times 4 \times 5}} + \frac{\frac{4}{3 \times 4 \times 5}}{\frac{1}{4 \times 5 \times 6}} + \dots + \frac{\frac{19}{18 \times 19 \times 20}}{\frac{1}{18 \times 19 \times 20}}$$

$$= \frac{1}{2} + \frac{1}{12} + \frac{1}{24} + \dots + \frac{1}{180}$$

$$= \frac{1}{2} \left(\frac{1}{1} + \frac{1}{6} + \frac{1}{12} + \dots + \frac{1}{90} \right)$$

$$= \frac{1}{2} \left(\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{9 \times 10} \right)$$

$$= \frac{1}{2} \left(\underbrace{\frac{1}{1} - \frac{1}{2}} + \underbrace{\frac{1}{2} - \frac{1}{3}} + \underbrace{\frac{1}{3} - \frac{1}{4}} + \dots + \underbrace{\frac{1}{9} - \frac{1}{10}} \right)$$

$$= \frac{1}{2} \left(\frac{1}{1} - \frac{1}{10} \right) = \frac{9}{20}$$

$$d) A = \frac{1}{1 \times 4} + \frac{1}{4 \times 11} + \frac{1}{11 \times 19} + \dots + \frac{1}{\varepsilon 4 \times \delta 1}$$

$$\hookrightarrow \frac{1}{1} - \frac{1}{4} = \frac{3}{4} \quad \rightarrow \quad \frac{1}{4} - \frac{1}{11} = \frac{7}{44} \quad \rightarrow \quad \frac{1}{11} - \frac{1}{19} = \frac{8}{209}$$

$$\Rightarrow A = \frac{1}{3} \left[\left(\frac{1}{1} - \frac{1}{4} \right) + \left(\frac{1}{4} - \frac{1}{11} \right) + \left(\frac{1}{11} - \frac{1}{19} \right) + \dots + \left(\frac{1}{\varepsilon 4} - \frac{1}{\delta 1} \right) \right]$$

$$\Rightarrow A = \frac{1}{3} \left(\frac{1}{1} - \frac{1}{\delta 1} \right) = \frac{1}{3} \times \frac{\delta}{\delta 1} = \frac{1}{\delta 1}$$

$$g) \frac{1}{3 \times 4} + \frac{1}{4 \times 9} + \frac{1}{9 \times 16} + \dots + \frac{1}{r^2 \times r^2}$$

$$= \frac{1}{9} \left(\frac{1}{1 \times r} + \frac{1}{r \times r^2} + \frac{1}{r^2 \times r^3} + \dots + \frac{1}{r^2 \times r^2} \right) = \frac{1}{9} \times \left(\frac{1}{r} - \frac{1}{r} \right) = \frac{1}{9} \times \frac{r}{r} = \frac{1}{9r}$$

$$j) \frac{1}{r \times \varepsilon} + \frac{1}{\varepsilon \times \delta} + \frac{1}{\delta \times 4} + \frac{1}{4 \times \nu} + \dots + \frac{1}{9 \wedge \times 1 \wedge}$$

$$= \sum_{n=1}^{9 \vee} \frac{1}{(n+1)(n+r)} = \sum_{n=1}^{9 \vee} \left(\frac{1}{n+1} - \frac{1}{n+r} \right)$$

$$= \frac{1}{r} \left(\frac{1}{1+1} - \frac{1}{9 \vee + r} \right) = \frac{1}{r} \left(\frac{1}{r} - \frac{1}{1 \wedge} \right) = \frac{\varepsilon 9}{r \wedge}$$