

$$\int \frac{5x-2}{6x^2+18x+12} dx =$$

INT-S1-056

$$= \int \frac{5x-2}{6(x^2+3x+2)} dx =$$

$$= \frac{5}{6} \int \frac{x - \frac{2}{5}}{x^2+3x+2} dx = \frac{5}{6} \cdot \frac{1}{2} \int \frac{2x - \frac{4}{5}}{x^2+3x+2} dx =$$

$$= \frac{5}{12} \int \frac{2x+3-3-\frac{4}{5}}{x^2+3x+2} dx =$$

$$= \frac{5}{12} \int \frac{2x+3}{x^2+3x+2} dx - \frac{5}{12} \int \frac{\frac{19}{5}}{x^2+3x+2} dx =$$

$$= \frac{5}{12} \ln|x^2+3x+2| - \frac{19}{12} \int \frac{1}{(x+1)(x+2)} dx =$$

$$\downarrow$$

$$\frac{A}{x+1} + \frac{B}{x+2}$$

$$\frac{A(x+2) + B(x+1)}{(x+1)(x+2)}$$

$$\frac{x(A+B) + 2A+B}{(x+1)(x+2)}$$

$$\begin{cases} A+B=0 \\ 2A+B=1 \end{cases} \begin{cases} A=-B \\ -2B+B=1 \end{cases} \begin{cases} A=-B \\ B=-1 \end{cases}$$

$$\begin{cases} A=1 \\ B=-1 \end{cases}$$

$$= \frac{5}{12} \ln|x^2+3x+2| - \frac{19}{12} \int \frac{1}{x+1} - \frac{1}{x+2} dx =$$

$$= \boxed{\frac{5}{12} \ln|x^2+3x+2| - \frac{19}{12} \ln|x+1| + \frac{19}{12} \ln|x+2| + k}$$

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