

$$\int \odot \triangle' dx = \odot \triangle - \int \odot' \triangle dx$$

2 年 ____ 科 ____ 番 氏名 _____

★ 次の不定積分を計算せよ。

$$\begin{aligned} (1) \int (5x-3)^8 dx & \quad \begin{array}{l} t = 5x-3 \\ dt = 5dx \end{array} \\ &= \int t^8 \cdot \frac{1}{5} dt \\ &= \frac{1}{5} \cdot \frac{1}{9} t^9 + C \\ &= \frac{1}{45} (5x-3)^9 + C \end{aligned}$$

$$\begin{aligned} (2) \int \log 3x dx & \quad \leftarrow \text{部分積分の形!!} \\ &= \int (x)' \log 3x dx \\ &= x \log 3x - \int x \cdot \frac{1}{3x} \cdot (3x)' dx \\ &= x \log 3x - \int dx \quad (\log 3x)' \\ &= x \log 3x - x + C \end{aligned}$$

$$\begin{aligned} (3) \int \frac{2x^2-3}{\sqrt{x}} dx \\ &= \int (2x^{\frac{3}{2}} - 3x^{-\frac{1}{2}}) dx \\ &= 2 \cdot \frac{2}{5} x^{\frac{5}{2}} - 3 \cdot 2x^{\frac{1}{2}} + C \\ &= \frac{4}{5} x^{\frac{5}{2}} - 6x^{\frac{1}{2}} + C \end{aligned}$$

$$\begin{aligned} (4) \int \frac{1}{-3x+1} dx & \quad \begin{array}{l} t = -3x+1 \\ dt = -3dx \end{array} \\ &= \int \frac{1}{t} \cdot \left(-\frac{1}{3} dt\right) \\ &= -\frac{1}{3} \log |t| + C \\ &= -\frac{1}{3} \log |-3x+1| + C \end{aligned}$$

$$\begin{aligned} (5) \int x \sin x dx \\ &= \int x (-\cos x)' dx \\ &= x(-\cos x) - \int 1 \cdot (-\cos x) dx \\ &= -x \cos x + \int \cos x dx \\ &= -x \cos x + \sin x + C \end{aligned}$$

$$\begin{aligned} (6) \int x e^{-x} dx \\ &= \int x (-e^{-x})' dx \\ &= x(-e^{-x}) - \int 1 \cdot (-e^{-x}) dx \\ &= -x e^{-x} + \int e^{-x} dx \\ &= -x e^{-x} - e^{-x} + C \end{aligned}$$