

2年 科 番氏名

★ 次の不定積分を計算せよ。

$$\begin{aligned}
 (1) \int (4x-1)^7 dx & \quad t = 4x-1 \\
 & \quad dt = 4dx \\
 & = \int t^7 \cdot \frac{1}{4} dt \quad \leftarrow t^7 \text{を} t \text{に変えろ!} \\
 & = \frac{1}{4} \int t^7 dt \\
 & = \frac{1}{4} \cdot \frac{1}{8} t^8 + C \\
 & = \frac{1}{32} (4x-1)^8 + C
 \end{aligned}$$

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

$= \int (\frac{1}{2}x^2)' \cos x dx$ は逆.

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

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

$$\begin{aligned}
 (2) \int \sin(3x+1) dx & \quad t = 3x-1 \\
 & \quad dt = 3dx \\
 & = \int \sin t \cdot \frac{1}{3} dt \\
 & = \frac{1}{3} \int \sin t dt \\
 & = \frac{1}{3} (-\cos t) + C \\
 & = -\frac{1}{3} \cos(3x-1) + C
 \end{aligned}$$

$$\begin{aligned}
 (4) \int \frac{1}{-x+2} dx & \quad t = -x+2 \\
 & \quad dt = -dx \\
 & = \int \frac{1}{t} \cdot (-dt) \\
 & = - \int \frac{1}{t} dt \\
 & = - \log|t| + C \\
 & = - \log|-x+2| + C
 \end{aligned}$$

$$(6) \int x e^{2x+1} dx = \int (\frac{1}{2}x^2)' e^{2x+1} dx \text{ は逆.}$$

$$\begin{aligned}
 & = \int x (\frac{1}{2} e^{2x+1})' dx \\
 & = x \cdot \frac{1}{2} e^{2x+1} - \int (x)' \cdot \frac{1}{2} e^{2x+1} dx \\
 & = \frac{1}{2} x e^{2x+1} - \frac{1}{2} \int e^{2x+1} dx \\
 & = \frac{1}{2} x e^{2x+1} - \frac{1}{2} \cdot \frac{1}{2} e^{2x+1} + C \\
 & = \frac{1}{2} x e^{2x+1} - \frac{1}{4} e^{2x+1} + C
 \end{aligned}$$