

2年 ____ 科 ____ 番氏名 _____

★ 次の不定積分を計算せよ。

$$\begin{aligned}
 (1) \int (3x-5)^4 dx & \quad t=3x-5 \\
 & = \int t^4 \cdot \frac{1}{3} dt \quad dt=3dx \\
 & = \frac{1}{3} \cdot \frac{1}{5} t^5 + C \\
 & = \frac{1}{15} (3x-5)^5 + C
 \end{aligned}$$

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

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

$$\begin{aligned}
 (4) \int \frac{1}{7x-2} dx & \quad t=7x-2 \\
 & \quad dt=7dx \\
 & = \int \frac{1}{t} \cdot \frac{1}{7} dt \\
 & = \frac{1}{7} \int \frac{1}{t} dt \\
 & = \frac{1}{7} \log|t| + C \\
 & = \frac{1}{7} \log|7x-2| + C
 \end{aligned}$$

$$\begin{aligned}
 (5) \int \frac{x}{\sqrt{3x-1}} dx & \quad t=3x-1 \\
 & \quad dt=3dx \\
 & = \int \frac{t+1}{3} \cdot \frac{1}{\sqrt{t}} \cdot \frac{1}{3} dt \quad \text{※ } x = \frac{t+1}{3} \\
 & = \frac{1}{9} \int (t^{\frac{1}{2}} + t^{-\frac{1}{2}}) dt \\
 & = \frac{1}{9} \left(\frac{2}{3} t^{\frac{3}{2}} + 2t^{\frac{1}{2}} \right) + C \\
 & = \frac{2}{27} (3x-1)^{\frac{3}{2}} + \frac{2}{9} (3x-1)^{\frac{1}{2}} + C
 \end{aligned}$$

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

$$\int \textcircled{\bullet} \triangle' dx = \textcircled{\bullet} \triangle - \int \textcircled{\bullet}' \triangle dx$$

$\int x e^{-x+2} dx = \int (\frac{1}{2} x^2)' e^{-x+2} dx$ とするのは逆方向
(論理的に正しいが計算はうまくいかない)