

2年 ____ 科 ____ 番 氏名 _____

★ 次の不定積分を計算せよ。

$$\begin{aligned}
 (1) \int (8x+3)^5 dx & \quad t = 8x+3 \\
 & \quad dt = 8dx \\
 & = \int t^5 \cdot \frac{1}{8} dt \\
 & = \frac{1}{8} \cdot \frac{1}{6} t^6 + C \\
 & = \frac{1}{48} (8x+3)^6 + C
 \end{aligned}$$

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

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

$$\begin{aligned}
 (4) \int \frac{1}{7x+6} dx & \quad t = 7x+6 \\
 & \quad dt = 7dx \\
 & = \int \frac{1}{t} \cdot \frac{1}{7} dt \\
 & = \frac{1}{7} \int \frac{1}{t} dt \\
 & = \frac{1}{7} \log|t| + C \\
 & = \frac{1}{7} \log|7x+6| + C
 \end{aligned}$$

$$\begin{aligned}
 (5) \int \frac{x}{\sqrt{-2x+1}} dx & \quad t = -2x+1 \\
 & \quad dt = -2dx \\
 & \quad \text{また, } x = \frac{-t+1}{2} \\
 & = \int \frac{-t+1}{2} \cdot \frac{1}{\sqrt{t}} \cdot \left(-\frac{1}{2} dt\right) \\
 & = -\frac{1}{4} \int (t^{\frac{1}{2}} + t^{-\frac{1}{2}}) dt \\
 & = -\frac{1}{4} \left(-\frac{2}{3} t^{\frac{3}{2}} + 2t^{\frac{1}{2}}\right) + C \\
 & = \frac{1}{6} (-2x+1)^{\frac{3}{2}} - \frac{1}{2} (-2x+1)^{\frac{1}{2}} + C
 \end{aligned}$$

$$\begin{aligned}
 (6) \int x e^{-3x+2} dx & \\
 & = \int x \cdot \left(-\frac{1}{3} e^{-3x+2}\right)' dx \\
 & = x \cdot \left(-\frac{1}{3} e^{-3x+2}\right) - \int (x)' \cdot \left(-\frac{1}{3} e^{-3x+2}\right) dx \\
 & = -\frac{1}{3} x e^{-3x+2} + \frac{1}{3} \int e^{-3x+2} dx \\
 & = -\frac{1}{3} x e^{-3x+2} + \frac{1}{3} \left(-\frac{1}{3} e^{-3x+2}\right) + C \\
 & = -\frac{1}{3} x e^{-3x+2} - \frac{1}{9} e^{-3x+2} + C
 \end{aligned}$$

$$\int \textcircled{\text{▲}} dx = \textcircled{\text{▲}} - \int \textcircled{\text{▲}}' dx$$