

41  $\int x (3x+9)^{10} dx$

$u = 3x+9 \rightarrow u-9 = 3x$

$du = 3 dx$

$\frac{u-9}{3} = x$

$\frac{1}{3} du = dx$

$\frac{1}{3} \int x \cdot u^{10} du$

$\frac{1}{3} \int \frac{u-9}{3} \cdot u^{10} du$

$\rightarrow \frac{1}{9} \int u^{11} - 9u^{10} du$

$\frac{1}{9} \cdot \left( \frac{1}{12} u^{12} - \frac{9}{11} u^{11} \right)$

$\frac{1}{9} \left( \frac{1}{12} (3x+9)^{12} - \frac{9}{11} (3x+9)^{11} \right)$

$$\textcircled{56} \int \sec^2 x \tan^4 x dx$$
$$u = \tan x$$
$$du = \sec^2 x dx$$

$$\int u^4 du$$

$$\frac{1}{5} u^5 \rightarrow \frac{1}{5} (\tan^5 x) + C$$

$$\textcircled{67} \int \frac{\cos \sqrt{x}}{\sqrt{x}} dx$$

$$u = \sqrt{x} = x^{1/2}$$

$$du = \frac{1}{2} x^{-1/2} dx = \frac{1}{2\sqrt{x}} dx$$

$$2 du = \frac{1}{\sqrt{x}} dx$$

$$2 \int \cos u du$$

$$2 \sin u$$

$$2 \sin \sqrt{x} + C$$

$$\textcircled{3} \quad f(x) = 4x^{-2} + \frac{1}{4}x^2 + 4 \quad f'(2)$$

$$f'(x) = -8x^{-3} + \frac{1}{2}x$$

$$f'(2) = -\frac{8}{2^3} + \frac{1}{2}(2) = -1 + 1 = 0$$

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(4)

$$\int_1^2 \frac{dx}{2x+1}$$

$$u = 2x + 1$$

$$du = 2 dx$$

$$\frac{1}{2} du = dx$$

$$\frac{1}{2} \int \frac{du}{u}$$

$$\frac{1}{2} \ln u \Big|_3^5$$

$$= \frac{1}{2} (\ln 5 - \ln 3)$$

(E)