

5.3 | 연습문제 정답

01. (a) $\frac{2}{15}(5x+x^5)^{\frac{3}{2}}+C$ (b) $\frac{1}{22}(2x-1)^{11}+C$

02. (a) $\frac{2}{3}(1-e^{-x})^{\frac{3}{2}}+C$ (b) $-4\sqrt{1-x}\ln\sqrt{1-x}+4\sqrt{1-x}+C$

03. (a) $-\frac{1}{8}\cos^8x+C$ (b) $-\frac{2}{3}\cot^{\frac{3}{2}}x+C$

04. (a) $\frac{1}{36}$

(b) $\frac{3}{2}(3^{\frac{2}{3}}-1)$

(c) $2-\sqrt{3}$ (d) $\frac{1}{3}\left(-\cos 1+\cos \frac{1}{8}\right)$

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06. 증명 생략

07. (a) 증명 생략 (b) $\frac{\pi^2}{4}$

08. (a) $-\frac{1}{4}e^{-2x}(\sin 2x+\cos 2x)+C$ (b) $2\sqrt{1+x}\sin^{-1}x+4\sqrt{1-x}+C$

09. (a) $e^x\ln x+C$ (b) $-\cos x\ln|\cos x|+\cos x+C$

10. (a) $2\ln 2 - 1$ (b) $\frac{\pi}{4} - \frac{1}{2}\ln 2$

11. (a) $6\ln 2 - \frac{31}{16}$ (b) $\tanh 1 - \ln \cosh 1$

12. $-\frac{1}{3}\left(\frac{\sqrt{1-x^2}}{x}\right)^3 (\sin^{-1}x) - \frac{1}{6}\left(\frac{\sqrt{1-x^2}}{x}\right)^2 - \frac{1}{3}\ln|x| + C$

13. $\frac{1}{2}$

14. (a) 풀이참고 (b) $x^3 \sqrt{2x+1} + C$

15. $I_n = x(\sin^{-1}x)^n - n \int (\sin^{-1}x)^{n-1} \frac{x}{\sqrt{1-x^2}} dx,$

$$I_3 = x(\sin^{-1}x)^3 + 3\sqrt{1-x^2}(\sin^{-1}x)^2 - 6(x\sin^{-1}x + \sqrt{1-x^2}) + C$$