

13.2 | 연습문제 정답

2025. 3. 10 업데이트

01.

(a) $\frac{13\sqrt{13}}{3}$

(b) $\frac{10\sqrt{2}}{6}$

(c) $\frac{1}{108}(37\sqrt{37}-1)$

(d) $160\pi + 120\pi^3$

02. $\frac{3^2}{16^2}\pi$

03.

(a) $C: x=t, y=0, 0 \leq t \leq 3 \quad \int_C (x^2 + y^2) ds = 9$

(b) $C: x=2\cos t, y=-2\sin t, 0 \leq t \leq \frac{\pi}{2} \quad \int_C (x^2 + y^2) ds = 4\pi$

04.

(a) $x=\cos t, y=\sin t, 0 \leq t \leq \frac{\pi}{2}: \frac{5}{6} - \frac{1}{2}e^2$

(b) $x=t, y=\sqrt{1-t^2}, 1 \leq t \leq 0: \frac{5}{6} - \frac{1}{2}e^2$

05.

(a) $x=t, y=-2t+4, 2 \leq t \leq 0: -32$

(b) $x=t, y=4-t^2, 2 \leq t \leq 0: -32$

(c) (i) $x=2, y=t, 0 \leq t \leq 2: -4.$

(ii) $x=t, y=-t+4, 2 \leq t \leq 0: -28.$

그러므로 (i)+(ii)= -32

06. $2 + \sqrt{3}$

07. $1 - \frac{\pi^2}{4} + \frac{1}{\sqrt{2}} \left(e^{\frac{19\pi}{2}} + e^{\frac{\pi}{2}} \right)$

08. $x = t, y = t^2, -2 \leq t \leq 2: \int_{-2}^2 kt \sqrt{1 + 4t^2} dt = 0$

09.

(a) $x = a \cos t, y = b \sin t, 0 \leq t \leq \frac{\pi}{2}: -\frac{1}{2}(a^2 + b^2)$

(b) $x = t^2, y = t^3, -1 \leq t \leq 0: -\frac{7}{44}$

(c) $x = t, y = t, z = t, 0 \leq t \leq 1: 0$

(d) $x = e^t, y = e^t, z = t^2, 0 \leq t \leq 1: \frac{1}{2}$

10. $\frac{29}{60}$

11. $m = 3\pi k \sqrt{a^2 + b^2} \quad \bar{x} = \frac{M_{yz}}{m} = 0 \quad \bar{y} = \frac{M_{xz}}{m} = \frac{2a}{3\pi} \quad \bar{z} = \frac{M_{xy}}{m} = \frac{3}{2}\pi b$

12. $4000\sqrt{17}\pi$

13. $\frac{a^2}{\sqrt{2}} \int_0^{2\pi} \sqrt{1 - \sin t} dt$

14. $4a^2$

15. $I_x = I_y = \delta \left(-\frac{2}{3} + \frac{4}{3}a - a^2 + \frac{2}{3}a^3 \right)$