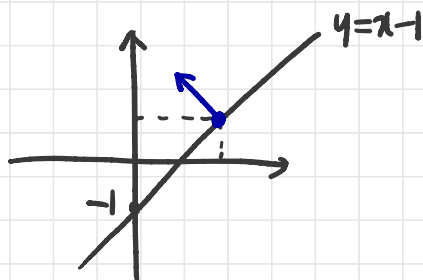


통계수학II 과제2 2016133 이유진

1. 그라디언트 벡터 $\nabla f(x, y) = (-1, 1)$

점 $(2, 1)$ 에서의 등위곡선 $y - x + 1 = 0$



2. -4

3. $y = -x + 2\sqrt{2}$

4. $(0, 0)$ 에서 안장점

5. $a = -2, b = 2$

6. 극대값 4, 극소값 0

7. $\frac{4}{3}$

8. 0

9. $\ln 2$

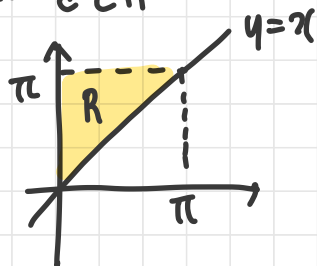
10. ① $\iint_R dA = \{(x, y) : 0 \leq x \leq 2, x^3 \leq y \leq 8\} = \int_0^2 \int_{x^3}^8 dy dx = 12$

② $\iint_R dA = \{(x, y) : 0 \leq x \leq y^{\frac{1}{3}}, 0 \leq y \leq 8\} = \int_0^8 \int_0^{y^{\frac{1}{3}}} dx dy = 12$

11. ① $\iint_R dA = \{(x, y) : 0 \leq x \leq 2, x^2 \leq y \leq 3x\} = \int_0^3 \int_{x^2}^{3x} dy dx = \frac{9}{2}$

② $\iint_R dA = \{(x, y) : \frac{y}{3} \leq x \leq \sqrt{y}, 0 \leq y \leq 9\} = \int_0^9 \int_{\frac{y}{3}}^{\sqrt{y}} dx dy = \frac{9}{2}$

12. 단면 R

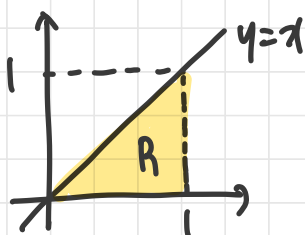


$$R = \{(x, y) : 0 \leq x \leq \pi, x \leq y \leq \pi\}$$

→ 직분도에서 바깥면

$$\begin{aligned} R &= \{(x, y) : 0 \leq x \leq y, 0 \leq y \leq \pi\} \\ &= \int_0^\pi \int_0^y \frac{\sin y}{y} dx dy = 2 \end{aligned}$$

13. 단면 R

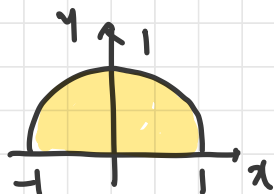


$$R = \{(x, y) : y \leq x \leq 1, 0 \leq y \leq 1\}$$

→ 직분도에서 바깥면

$$\begin{aligned} R &= \{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq x\} \\ &= \int_0^1 \int_0^x x^2 e^{xy} dy dx = \frac{1}{2}(e-2) \end{aligned}$$

14. 직교좌표 위의 영역 $R = \{(x, y) : -1 \leq x \leq 1, 0 \leq y \leq \sqrt{1-x^2}\}$

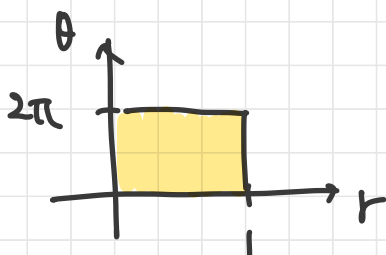


극좌표 위의 영역

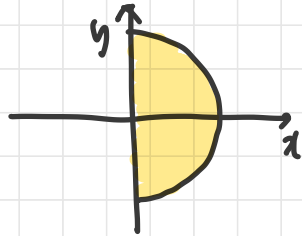
$$S = \{(r, \theta) : 0 \leq r \leq 1, 0 \leq \theta \leq \pi\}$$

$$= \int_0^1 \int_0^\pi r d\theta dr$$

$$= \frac{\pi}{2}$$



15. 직교좌표위의 영역 $R = \{(x, y) : 0 \leq x \leq \sqrt{4-y^2}, 0 \leq y \leq 2\}$

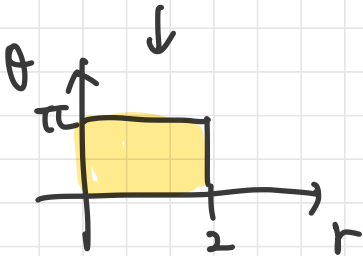


극좌표위의 영역

$$S = \{(r, \theta) : 0 \leq r \leq 2, 0 \leq \theta \leq \pi\}$$

$$= \int_0^2 \int_0^\pi r \, d\theta \, dr$$

$$= 2\pi$$



16. $a - b\sqrt{2}$

(7/3 테라지)