

8.6 EXERCISES

 PRACTICE

In Exercises 1–10, evaluate the given double integral.

1. $\int_0^1 \int_1^2 (x+1) dy dx$
2. $\int_0^2 \int_1^3 (4-x) dy dx$
3. $\int_{-1}^2 \int_1^4 (3x+2y) dy dx$
4. $\int_{-2}^2 \int_3^4 (2x-y) dy dx$
5. $\int_1^2 \int_2^3 \frac{2y}{x} dy dx$
6. $\int_1^3 \int_{-1}^2 \frac{3y}{2x} dy dx$
7. $\int_1^3 \int_{-2}^2 (x^2 + 3y^2 - 1) dx dy$
8. $\int_2^3 \int_{-1}^1 (2x^2 + y^2 - x) dx dy$
9. $\int_0^2 \int_0^1 e^{x+y} dx dy$
10. $\int_0^1 \int_{-1}^2 ye^{xy} dx dy$

In Exercises 11–16, evaluate the double integral on the given rectangular region.

11. $\iint_R (x - y^2) dA$ $R: 0 \leq x \leq 2$ and $0 \leq y \leq 1$
12. $\iint_R (xy + x) dA$ $R: 0 \leq x \leq 3$ and $0 \leq y \leq 3$
13. $\iint_R y\sqrt{x+1} dA$ $R: 0 \leq x \leq 3$ and $1 \leq y \leq 5$
14. $\iint_R x^2\sqrt{3+y} dA$ $R: -1 \leq x \leq 4$ and $1 \leq y \leq 6$
15. $\iint_R e^{x+2y} dA$ $R: 0 \leq x \leq 3$ and $0 \leq y \leq 4$
16. $\iint_R e^{2x+y} dA$ $R: 0 \leq x \leq 2$ and $0 \leq y \leq 1$

In Exercises 17–24, evaluate the double integral.

17. $\int_0^2 \int_0^{3x} xy^2 dy dx$
18. $\int_0^1 \int_{2x}^{x^2} x^2 y^2 dy dx$
19. $\int_1^4 \int_0^{x^2} \sqrt{\frac{y}{x}} dy dx$
20. $\int_1^4 \int_x^{x^2} \sqrt{\frac{x}{y}} dy dx$
21. $\int_1^3 \int_1^{e^y} \frac{y}{x} dx dy$
22. $\int_0^2 \int_0^y e^{y^2} dx dy$
23. $\int_0^4 \int_0^y \sqrt{9+y^2} dx dy$
24. $\int_0^2 \int_0^{4-y^2} y\sqrt{x} dx dy$

In Exercises 25–34, evaluate the double integral on the given region.

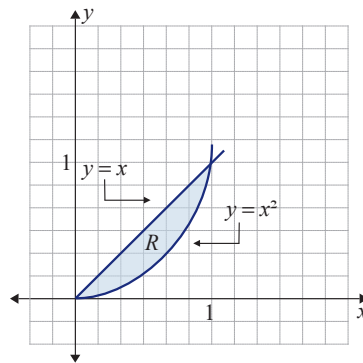
25. $\iint_R 2xy dA$ $R: 0 \leq x \leq 1$ and $x^2 \leq y \leq \sqrt{x}$
26. $\iint_R 3xy^2 dA$ $R: 0 \leq x \leq 1$ and $x^3 \leq y \leq \sqrt[3]{x}$
27. $\iint_R (x^2 - y) dA$ $R: 1 \leq x \leq 2$ and $x \leq y \leq x^2$

$$28. \iint_R (3 - 2x - 2y) dA \quad R: 0 \leq x \leq 1 \text{ and } 0 \leq y \leq (2 - x)$$

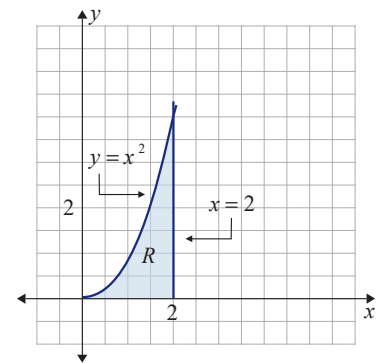
$$29. \iint_R e^y dA \quad R: 0 \leq x \leq 2 \text{ and } x \leq y \leq 3x$$

$$30. \iint_R e^y dA \quad R: 0 \leq x \leq 1 \text{ and } 0 \leq y \leq 2x$$

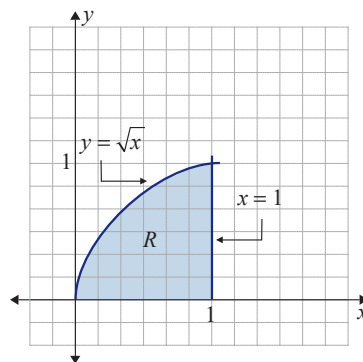
$$31. \iint_R (x + y) dA$$



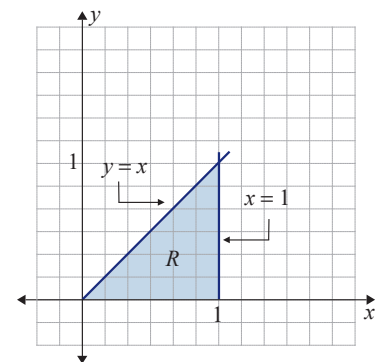
$$32. \iint_R (2xy + x) dA$$



$$33. \iint_R (3 - 2xy) dA$$



$$34. \iint_R \sqrt{4 - x^2} dA$$



35. Find the volume of the solid bounded above by the graph of $f(x, y) = 8 - x^2 - y^2$ and below by the rectangle $R: -1 \leq x \leq 2$ and $0 \leq y \leq 2$.

36. Find the volume of the solid bounded above by the graph of $f(x, y) = 2 + x^2 + y^2$ and below by the rectangle $R: 0 \leq x \leq 1$ and $0 \leq y \leq 3$.

37. Find the volume of the solid bounded above by the graph of $f(x, y) = 8 - 4x - 2y$ and below by the triangle with vertices $(0, 0, 0)$, $(2, 0, 0)$, and $(0, 4, 0)$.

38. Find the volume of the solid bounded above by the graph of $f(x, y) = 3 + x + 2y$ and below by the triangle with vertices $(0, 0, 0)$, $(0, 2, 0)$, and $(2, 0, 0)$.

39. Find the volume of the solid bounded above by the graph of $f(x, y) = 2xy$ and below by the region bounded by $y = \sqrt{x}$, $y = 0$, and $x = 1$.

40. Find the volume of the solid bounded above by the graph of $f(x, y) = 4x^2y$ and below by the region bounded by $y = x^2$, $y = 0$, and $x = 1$.