

# Workbook



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# Double Integrals - Jacobian

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### Questions

- 1) Compute the double integral  $\iint_R \frac{x-y}{x+y} dA$  where  $R$  is the region bounded by the lines:  $y = x$ ,  $y = x-1$ ,  $y = 1-x$ ,  $y = 3-x$ .
- 2) Compute the double integral  $\iint_R e^{xy} dA$  where  $R$  is the region bounded by the functions  $y = x$ ,  $y = 0.5x$ ,  $y = \frac{1}{x}$ ,  $y = \frac{2}{x}$ .
- 3) Compute the double integral  $\iint_R \sin \frac{1}{2}(x+y) \cos \frac{1}{2}(x-y) dA$  where the region  $R$  is the triangle with vertices:  $A(0,0)$ ,  $B(2,0)$ ,  $C(1,1)$ .
- 4) Compute the double integral  $\iint_R (4x+8y) dA$  where the region  $R$  is the parallelogram with vertices:  $A(-1,3)$ ,  $B(1,-3)$ ,  $C(3,-1)$ ,  $D(1,5)$ .
- 5) Compute the double integral  $\iint_R \sqrt{16x^2+9y^2} dA$  where  $R$  is the region bounded by the ellipse:  $\frac{x^2}{9} + \frac{y^2}{16} = 1$ .
- 6) Compute the double integral  $\iint_R y^2 dA$  where  $R$  is the region bounded by the curves:  $y = \frac{1}{x}$ ,  $y = \frac{2}{x}$ ,  $xy^2 = 1$ ,  $xy^2 = 2$ .
- 7) Compute the double integral  $\iint_R e^{x+y} dA$  where  $R = \{(x, y) \mid |x| + |y| \leq 1\}$ .

**Answer Key**

1)  $\frac{1}{4} \ln 3$

2)  $\frac{1}{2} \ln 2(e^2 - e)$

3)  $1 - \frac{1}{2} \sin 2$

4) 192

5)  $96\pi$

6)  $\frac{3}{4}$

7)  $e - \frac{1}{e}$