

In Apostol, Volume II, read Chapter 11, Sections 19-33, pages 378-413. (Sections 23-24 are optional.)

1. From Apostol, Volume II, Chapter 11, Section 11.22, pages 385-387, do problems 1(a,d), 2, 4.
2. From Apostol, Volume II, Chapter 11, Section 11.28, pages 399-401, do problems 1-3, 7, 15.
3. From Apostol, Volume II, Chapter 11, Section 11.34, pages 413-416, do problems 1, 2, 5, 11, 12, 14, 21. (See instructions for problems 10-16.)
4. Let  $\omega = P dx + Q dy$ , where  $P = y \csc(x^2)$  and  $Q = \cos(y^2)$ . Let  $C_1$  be the line segment in the  $x, y$ -plane from the origin to the point  $(\sqrt{\pi}, 0)$ , and let  $C_2$  be the portion of the graph of  $y = \sin(x^2)$  connecting those two points (in that same order).
  - (a) Show that  $\int_{C_1} \omega = 0$ .
  - (b) Evaluate  $\int_{C_2} \omega$ . (Hint: Use part (a), and apply Green's Theorem to an appropriate counterclockwise loop.)
5. Let  $R$  be the region in the  $x, y$ -plane between the hyperbolas  $xy = 1$  and  $xy = 4$ , and between the lines  $2y = x$  and  $y = 2x$ . Evaluate  $\iint_R xy^2 dA$ . (Hint: Use the change of variables  $x = u/v$ ,  $y = v$ .)