In Spivak, do the following problems: 3–22, 3–36, 3–37(a), 3–40, 3–41.

Notes:

(1) In 3–37(a), the function may be unbounded.

(2) In 3–40, assume that $g$ is smooth. Also, the last statement is false in one direction, so give a counterexample instead of a proof.

(3) Problem 3–41 is worth 20 points.

Also do the following:

1. Let $A$ be the region in $\mathbb{R}^2$ bounded by the curve $x^2 - xy + 2y^2 = 1$. Express $\int_A xy$ as an integral over the unit disc $B_1(0)$. Hint: Complete the square.