32B Killip　　　　Homework 6　　　　Due May 15

(1) From Section 17.3: 10, 14, 16, and 20 (either edition).

(2) From Section 17.4: 4, 8, 12, 18, 22.
(In 5th Ed: 4, 10, 14, 18, 22.)

(3) First complete Question 33 from Section 17.3 (either edition, then do the following:
(c) Let C_1 and C_2 be concentric circles around the origin with the same orientation. Show that

$$\int_{C_1} \mathbf{F} \cdot \mathbf{dr} = \int_{C_2} \mathbf{F} \cdot \mathbf{dr}$$

by using Green's Theorem.

Remarks: (i) In this example, the integral over closed loops is not zero, despite the fact that $\frac{\partial P}{\partial y} = \frac{\partial Q}{\partial x}$. This does not contradict the theorem from class for the following reason: $\mathbf{F}$ has a singularity at $(0, 0)$ and so can only be defined on the plane with this point excluded. The plane with a point missing is *not* simply connected and hence no contradiction.

(ii) One can show (you are not required to do so) using the theorem from class that the value of the integral over a closed loop depends only on the total number of times it encircles the origin and in which direction.