1. Find $\oint_C -y\,dx + 2x\,dy$ where C is the part of the circle $x^2+y^2=1$ from $(1,0)$ to $(0,1)$.

2. Find $\oint_C -xy\,dx + x^2\,dy$ where C is the triangle bounded by $(1,0)$, $(3,0)$, and $(2,3)$, oriented counterclockwise.

3. Integrate $f(x,y)=xy^2$ along the circle $x^2+y^2=4$ from $(2,0)$ to $(0,2)$.

4. Find the counterclockwise circulation of $\vec{F}=\langle 3x,2y\rangle$ around the boundary of the region $0\le x\le\pi$, $0\le y\le \sin x$.

5. Let $\vec{F}(x,y)=\langle -x^2y, xy^2\rangle$, let C be the circle $x^2+y^2=a^2$, oriented counterclockwise, and let R be the region in the xy-plane bounded by C. Verify Green's Theorem by evaluating both sides of the equation in the theorem and checking that they are equal.

6. Let $\vec{F}(x,y)=\langle x^2+4y, x+y^2\rangle$ and let C be the square bounded by $x=0$, $x=1$, $y=0$, $y=1$. Use Green's Theorem to find the counterclockwise circulation for this $\vec{F}$ and C.

7. Apply Green's Theorem to evaluate

$$\oint_C 3y\,dx + 2x\,dy$$

where C is the boundary of the region $0\le x\le\pi$, $0\le y\le\sin x$.

8. Evaluate $\int_C (x+y^2)/\sqrt{1+x^2}\;\,ds$ where C is the part of the curve $y=x^2/2$ from the point $(0,0)$ to the point $(1,1/2)$.

9. Find the work done by $\vec{F}=\langle z,x,y\rangle$ over the helix $\vec{r}(t)=\langle \sin t,\cos t,t\rangle$ with $0\le t\le 2\pi$.

10. Find the circulation of the field $\vec{F}=\langle -y,x\rangle$ over the ellipse $\vec{r}(t)=\langle\cos t, 4\sin t\rangle$ with $0\le t\le 2\pi$.

11. Evaluate $\int_C \sqrt{x^2 + y^2} ds$ along the curve $\vec{r}(t) = \langle 4\cos t, 4\sin t, 3t \rangle$ where $-2\pi \leq t \leq 2\pi$.
