Binghamton University Math 323	Spring 2020 Problem Set 16.4

5-10 Use Green's Theorem to evaluate the line integral along the given positively oriented curve.

6. $\int_C (x^2 + y^2)\ dx + (x^2 - y^2)\ dy$, C is the triangle with vertices $(0,0)$, $(2,1)$ and $(0,1)$
7. $\int_C (y + e^{\sqrt{x}})\ dx + (2x + \cos(y^2))\ dy$, C is the boundary of the region enclosed by the parabolas $y = x^2$ and $x = y^2$
9. $\int_C y^3\ dx - x^3\ dy$, C is the circle $x^2 + y^2 = 4$

11-14 Use Green's Theorem to evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$. (Check the orientation of the curve before applying the theorem.)

11. $\mathbf{F}(x, y) = \langle y \cos x - xy \sin x, xy + x \cos x \rangle$, C is the triangle from $(0,0)$ to $(0,4)$ to $(2,0)$ to $(0,0)$
13. $\mathbf{F}(x, y) = \langle y - \cos y, x \sin x \rangle$, C is the circle $(x-3)^2 + (y+4)^2 = 4$ oriented clockwise

17. Use Green's Theorem to find the work done by the force $\mathbf{F}(x, y) = \langle x(x + y), xy^2 \rangle$ in moving a particle from the origin along the x-axis to $(1,0)$, then along the line segment to $(0,1)$ and then back to the origin along the y-axis.