1. Show that the line integral is independent of path and evaluate the integral.

$$\int_C \tan y dx + x \sec^2 y dy,$$

where C is any path from $(1,0)$ to $(2, \frac{\pi}{4})$.

2. Find a function f such that $\mathbf{F} = \nabla f$ and use the function f to evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$ along the given curve C.

$$\mathbf{F}(x,y) = x^2\mathbf{i} + y^2\mathbf{j},$$

where C is the arc of the parabola $y = 2x^2$ from $(-1,2)$ to $(2,8)$.

3. Find a function f such that $\mathbf{F} = \nabla f$ and use the function f to evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$ along the given curve C.

$$\mathbf{F}(x,y) = \frac{y^2}{1+x^2}\mathbf{i} + 2y \arctan x\mathbf{j},$$

where C is given as $\mathbf{r}(t) = t^2\mathbf{i} + 2t\mathbf{j}$, $0 \leq t \leq 1$.

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

$$\mathbf{F}(x, y) = \langle y^2 \cos x, x^2 + 2y \cos x \rangle,$$

where C is triangle from $(0, 0)$ to $(2, 6)$ to $(2, 0)$ to $(0, 0)$.

5. Evaluate $\oint (3y - e^{\sin x})dx + (7x + \sqrt{y^4 + 1})dy$, where C is the circle $x^2 + y^2 = 9$.

Course Homework due Apr 23, Wed.

Apr 14, Mon. : **16.4** 1, 3, 5, 7, 8, 9, 11, 13
Apr 16, Wed. : **16.4** 17, 19, 21, 22, 23, 24
Apr 18, Fri. : **16.5** 1, 3, 5, 7, 9-11, 13, 15, 21, 25