Section 16.3: Additional Problems

1. Given $F = \langle 2xy^3, 3x^2y^2 \rangle$. Evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$ where C is the curve given by $\mathbf{r}(t) = \langle t^3 + 2t^2 - t, 3t^4 - t^2 \rangle$, $0 \le t \le 1$.

2. Let $\mathbf{F} = \langle 2x + y^3,\ 3xy^2 + 4 \rangle$. Evaluate $\int_{(0,1)}^{(2,3)} \mathbf{F} \cdot d\mathbf{r}$.

3. Given $F = \langle y^2 \cos(x),\ 2y \sin(x) + e^{2z},\ 2ye^{2z} \rangle$ is a conservative vector field. Find the work done by F when moving a particle on any path C from from the point $\left(0, 1, \frac{1}{2}\right)$ to the point $\left(\frac{\pi}{2}, 3, 2\right)$.

   After learning section 16.5, see if you can show that this vector field is conservative.