Homework Set # 8

1. **(§4.2) Page 234:** # 13.

2. An object travels along the path $\mathbf{c}(t) = \left(t, \frac{2}{3}t^{\frac{3}{2}}\right)$, for $0 \le t \le 1$. Find the arc length function $s(t)$ and use it to reparameterize the path so that the object's speed is a constant 1 unit/sec for all t.

3. **(§4.3) Page 243:** # 5, 9, 16, 21.

4. Given that $\mathbf{F}(x, y) = \left(\{1 + 2x \ln y\}, \left\{ \frac{x^2}{y} + 2y \right\} \right) = \nabla \phi(x, y)$, find the potential function $\phi(x, y)$ which satisfies $\phi(-1, 1) = 4$.

5. **(§4.4) Page 258:** # 2, 3, 14, 24.

6. Prove the **Basic Identity** #11 on Page 255:

   If $f : U \subset \mathbb{R}^3 \longrightarrow \mathbb{R}$ is of class C^2, prove that $\nabla \times (\nabla f) = \mathbf{0}$.